ISBN: 978-969-8040-46-8

BOOK OF ABSTRACTS

INTERNATIONAL FOOD & NUTRITION CONFERENCE

18-20 August, 2022
Swat (KPK) Pakistan

International Food & Nutrition Conference
18-20 AUGUST 2022, SWAT PAKISTAN

Organized by

Institute of Food Science and Nutrition
Gomal University, Dera Ismail Khan

Published & Printed by

Pakistan Scientific and Technological Information Centre,
(PASTIC), Islamabad

BOOK OF ABSTRACTS

International Food & Nutrition Conference
18-20 August, 2022
Swat (KPK) Pakistan

Organized by

Institute of Food Science and Nutrition
Gomal University, Dera Ismail Khan

in collaboration with

Evolution, Pakistan
The University of Swat, Swat
University of Malakand, Malakand

Focused on

Food Safety & Security; Halal Food Management; Food Chemistry; Food Biochemistry; Food Biotechnology; Food Microbiology; Food Preservation; Food Nanotechnology; Food and Quality Control; Food Waste Management; Nutritional Value and Quality of Food; Sports Nutrition; Pediatrics Nutrition; Altered Diet & Response on Human Health

The material in the book may not be copied or reproduced without permission of authors.

ISBN: 978-969-8040-46-8

BOOK OF ABSTRACTS

International Food & Nutrition Conference

18-20 August, 2022

Published & Printed by

Pakistan Scientific and Technological Information Centre, (PASTIC), Islamabad

TABLE OF CONTENTS

ORGANIZING COMMITTEE

Patron in Chief
Prof. Dr. Iftikhar Ahmad (TI) VC, Gomal University, D. I. Khan

Principal Organizer
Dr. Sadaf Javaria, Director, IFSN, Gomal University, D. I. Khan

Conference Coordinator
Khurram Iqbal, MD, Evolution Pak

General Conference Chair
Prof. Dr. Hassan Sher (SAARC Gold Medalist), VC, USWAT
Prof. Dr. Rashid Ahmad, VC, University of Malakand, Chakdara, Dir

General Co-Chair
Prof. Dr. Faqir Anjum, Former VC University of Gambia
Prof. Dr. Javed Aziz Awan, IFANCA, Pakistan
Prof. Dr. Saleem Jilani, Gomal University, D. I. Khan
Prof. Dr. Naimat Ullah Babar, Gomal University, D. I. Khan
Prof. Dr. Muhammad Ayub, AUP, Peshawar
Prof. Dr. Saeed Akhtar, IFSN, BZU, Multan
Prof. Dr. Jafar Khan, CBM, University of Swat
Prof. Dr. Farooq Anwar, ORIC, University of Sargodha
Prof. Dr. Masood Sadiq Butt, NIFST, UAF, Fasalabad
Prof Dr. Imran Pasha, NIFST, UAF, Faisalabad
Prof. Dr. M. Umair Arshad, GC University, Faisalabad
Dr. Mian Anujm Murtaza, IFSN, University of Sargodha

Conference Conveners
Prof. Dr. Anwaar Ahmed, IFNS, PMAS-AAU, Rawalpindi
Prof. Dr. Sheraz Ahmad, Iqra International University, Peshawar
Dr. Khalid Khan, Ex-DG, DoST, KPK
Dr. M. Nasir, Scientific & Regulatory Affairs Engro, Pakistan
Dr. Zia Ud Din, AUP, Peshawar
Dr. Shahbaz A. Zakki, The University of Haripur
Dr. Shinawar Waseem Ali, University of the Punjab, Lahore
Dr. Abdul Sattar Shah, Director Technical, KPFSHFA

Industrial Co-Chairs
Mr. Tariq Sarwar Awan, Five Star Flour Mill & Nosh Foods
Mr. Mustajab Ahmed, PSFST
Dr. Muhammad Zia Shahid, UIFST, UOL, Lahore
Dr. Murad Ali, KPFSHFA

Technical Committee
Prof. Dr. Asif Ahmad, IFNS, PMAS-AAU, Rawalpindi
Prof. Dr. Amjad Iqbal, Abdul Wali Khan University, Mardan
Dr. Ali Zaman, Gomal University, D. I. Khan
Dr. Muhammad Jehangir, The University of Haripur
Dr. Khalid Iqbal, KMU, Peshawar

Dr. Fazia Ghaffar, College of Home Economics, UOP
Dr. Yasser Durrani, AUP, Peshawar
Dr. Malik Muhammad Hashim, IFSN, GU, D-I-Khan
Dr. Muhammad Nadeem, IFSN, University of Sargodha
Dr. Zia Ud Din, HOD, Women University, Swabi
Dr. Naimat Ullah, AUP, Peshawar

Publication Co-Chair
Dr. Nauman Khalid, SFAS, UMT, Lahore
Dr. Farhana, GC University, Faisalabad
Dr. Noor U lain, IFSN, Gomal University, D. I. Khan
Dr. Maryum Ibrar, PASTIC National Centre, Islamabad

Steering Committee
Dr. Haji Khan, CBM, University of Swat
Dr. Aisha Siddiqua, GCBB, Gomal University, D. I. Khan
Mr. Dilawar Abbas, IFSN, Gomal University, D. I. Khan
Mr. Noor Rahman, IQRA National University, Swat Campus

Accommodation Co-Chair
Ms. Iqra Rubab, IFSN, Gomal University, D. I. Khan
Dr. Zahin Anjum, College of Home Economics, UOP, Peshawar
Mr. Dilawar Abbas, IFSN, Gomal University, D. I. Khan
Ms. Aneela Yasmeen, CEMB, University of the Punjab, Lahore
Dr. Ijaz ul Haq, University of Haripur, Haripur
Ms. Jannat Ul Mawa, Women University, Swabi

Registration Co-chairs
Dr. Shamayem Aslam, University of Central Punjab, Lahore
Dr. Shahid Bashir, UIFST, The University of Lahore, Lahore
Ms. Hafiza Madiha Jaffar, The University of Lahore, Lahore

Local Arrangements Co-Chairs
Ms. Hina, University of Swat, Swat
Ms. Kulsoom Siddiq, Women University, Mardan
Mr. Muhammad Idres, IQRA National University, Swat Campus
Dr. Iftikhar Aziz, University of Agriculture, Swat
Mr. Iftihar Alam, IQRA National University, Swat Campus
Mr. Shehzad Ali, IQRA National University, Swat Campus

Food arrangements Co-Chair
Mr. Khurram Iqbal, Evolution Pak
Dr. Kanza Awan, FOST, University of Central Punjab, Lahore
Dr. Sadaf Shakoor, UAF, sub campus Burewala-Vehari

Publicity Co- Chair
Dr. Muhammad Munir, IFSN, Gomal University, D. I. Khan
Dr. Sher Zaman Khan, Gomal University, D. I. Khan
Dr. Jamal Uddin, University of Swat, Swat
Mr. Rafi-ullah Khan, University of Swat, Swat

INTRODUCTION

Food Science and technology and Human nutrition and Dietetics are dynamic disciplines that applies the knowledge of various allied sciences to find optimal approaches to improve the food quality, safety, and nutritional value of agricultural products and human health. Conventional methods of food processing have been practiced since ancient times. However, the last century has witnessed a dramatic increase in the development of several modern trends, which have been hyped as the need of the present time, and potential cornerstones for future developments.

Food and Nutrition Conference will provide a platform for scholars and experts from the field of Food and Nutrition to showcase their scientific work and research on topics such as Food Safety & Security, Halal Food Management , Food Chemistry, Food Biochemistry, Food Biotechnology, Food Microbiology, Food Preservation, Food Nanotechnology, Food and Quality Control, Food Waste Management, Nutritional Value and Quality of Food, Sports Nutrition, Pediatrics Nutrition, Altered Diet & Response on Human Health.

Therefore, food/nutrient scientists are always looking for opportunities in the existing food production systems for improving human health and safety. In this perspective, Institute of Food Science and Nutrition, Gomal University, Dera Ismail Khan is organizing the "International Food and Nutrition conference, 2022" in collaboration with Evolution Pakistan and The University of Swat with the core objective to present and introduce the innovative ideas related to the emerging technologies, contemporary trends and services in the domain of Food Science and Technology, Nutritional Sciences and other allied disciplines. The valuable advantage of this conference is to refresh our knowledge through informative interactions with eminent personalities. Thus, the scope of the conference addresses academic and industrial interests.

ABOUT PASTIC

Pakistan Scientific & Technological Information Centre (PASTIC) is a subsidiary organization of Pakistan Science Foundation (PSF), under the umbrella of Ministry of Science and Technology (MoST). PASTIC is a specialized premier organization in the field of S&T information handling and dissemination responsible for catering to information needs of R&D and industrial community across the country. The PASTIC National Centre is housed at Quaid-e-Azam University Campus, Islamabad having a network of 6 Sub-Centres at Karachi, Lahore, Peshawar, Quetta, Faisalabad and Muzaffarabad. To begin with PASTIC supported research community across the country when S&T research infrastructure in Pakistan was at a nascent stageand provided facilities including supply of scientific and technical documents, abstracts and indexes, bibliographies, translations, patent information and patent indexes, science reference library service, technological information transfer service, dissemination of computer-based information services, reprographic and publication services.

OBJECTIVES

- National S&T/R&D Information Repository of indigenous information resources (databases)
- S&T/R&D information dissemination through contemporary reference information tools
- Strengthen National Science Reference Library for resource sharing & Inter-library collaborations (consortium) and empowerment of information professionals.
- Promotion of R&D based industrial development
- Facilitate printing of S&T/R&D Publications
- Capacity/skill development of researchers & entrepreneurs
- Develop collaborations with national and international information networks

ACTIVITIES

PASTIC Online databases

Pakistan Science Abstracts (PSA): National research published in Pakistani S & T Journals & Conference Proceedings etc.

PakCat: Union online Public Access Catalogue (OPAC) of Books available in Science and technology Libraries of Pakistan.

DSpace full text digital repository of indigenous S&T literature.

Database of R & D Projects executed in Pakistan.

Industy related databases.

S&T Publications

- *Pakistan Journal of Computer & Information Systems (PJCIS):*A biannual Open Access primary Journal meant for researchers from Computer Science & Engineering, Information & Communication Technologies (ICTs), Information Systems, Library and Information Science.
- *Technology Roundup:* Publish bi-monthly bulletin by repackaging of latest global Trade and Technology information.
- *Union Catalogue:* Provide information on research materials (books/journals/conference proceedings/reports, etc) available in different S&T libraries of Pakistan.
- *Scientific Periodicals of Pakistan***:** A handy guide of scientific periodicals published in Pakistan.
- *Abstract Books of Conferences:* PASTIC support publication/printing of Abstract Books organized by various S&T universities (on request).

Promotion of Commercializable Technologies & Industrial Products

Organize STEM and IT Expoto promote local Research and Development, SMEs, technologies/products/services/industrial R&D challenges/issues as well as empowering youth and general public on new and faster ways of delivering and accessing information.

National Science Reference Library Facility

A state of the art Traditional Library facilitating the researcher through following services: Reference & Referral Services; Reader Service; Internet Service, Journal Listings; Photocopying & Scanning Services.

Human Resource Development (Capacity Building)

Organize Seminars/Workshops /Trainings/ for capacity building of:

- Young Researchers on Data Analysis and bibliographic citation Tools (SPSS, EndNote, Mendeley)
- Women Entrepreneurs on e-marketing and e business skills
- Library Professionals on Library Information Management Tools & techniques (Koha, D-space etc)
- Researchers and entrepreneurs on Intellectual Property Rights, Media Information Literacy

ABSTRACTS

Exploring the effects of Chia (*Salvia hispanica* L.) mucilage against Hypertension in Hyperlipidemic patients

Muhammad Khurram Afzal*, Saeed Akhtar, Tauseef Sultan, Tariq Ismail, Muhammad Naeem Zubairi, Laraib Aziz Joher

**khurram.afzal@bzu.edu.pk*

Previous studies have evaluated the effects of extracted oil and protein from chia seeds on non-communicable diseases including hypertension, but not a single study has examined the chia mucilage effect on human consumption. Therefore, the objective of the study was to explore the effects of chia mucilage supplementation for 4 weeks on blood pressure in hyperlipidemic individuals in a placebo-controlled trial. Chia mucilage was supplemented in wheat flour chapatis in 10 and 20% concentrations. 30 patients of hypertension and hyperlipidemia were provided with fortified chapatis for 4- weeks to meet the criteria of soluble dietary fiber, as governed by American Dietetic Association. Bp was measured weekly and Biochemical testing was performed before and after the study. Obtained results indicate that reduction in blood pressure was negligible in control and CMC-1 groups with 10% supplementation. But in the CMC-2 group reduction in blood pressure was negligible at the start but with the passage of time, it showed significant decrease in both SBP and DBP, 145.6 ± 4.5 to 142.4 ± 4.24mmHg and 104.2 ± 4.5 to 100 ± 3.9 mmHg, respectively. Significant improvements were also seen in lipid profile and fasting blood sugar in both experimental groups. Furthermore, chia mucilage supplemented chapati reduces the CRP, WBCs, and platelets due to the reduction in inflammation in the body but non-significant reduction in CK-MB, Urea, creatinine, ALT, and AST levels were observed. The study revealed the efficacy of chia mucilage supplementation in BP. Chronic studies are required to evaluate its pronounced effects.

Keywords: Blood pressure, Hypertension, Hyperlipidemia, Chia mucilage, Chia polysaccharides, chia prebiotic, chia soluble fiber

Nutritional and antioxidant characterization and food value addition properties of fenugreek seed powder

Zulfiqar Ahmad[1], Muhammad Ilyas[1], Muhammad Waseem*[1], Muhammad Asif Khan[1], Kashif Ameer[2], Faiz-ul-Hassan Shah[1], Tahir Mehmood[1], Muhammad Adil Rehman[1]

[1]Department of Food Science and Technology, Faculty of Agriculture & Environment, The Islamia University of Bahawalpur, Bahawalpur, Pakistan
[2]Department of Food Science and Technology, Faculty of Agriculture, University of Sargodha, Sargodha, Pakistan

The study in question targeted evaluation of the antioxidant, nutritional, and organoleptic properties of the fenugreek seed powder (FSP) and supplemented functional noodles developed using wheat flour @ 2.5, 5, 7.5 and 10% substitution. Findings revealed water solubility, foaming capacity and bulk density to be increased from 8 – 10%, 77 – 87% and 0.5 – 0.7 g/mL in finished product. FSP was known to have higher ash, proteins and fibers i.e., 3%, 44% and 7%, respectively which depicted significant ($p<0.05$) increment in ash (0.9 – 1.5%), proteins (10 – 14%) and fibers (1 – 2%) in noodles. Cooking losses of baked goods were decreased. FSP supplemented noodles showed higher TPC, TFC, DPPH and FRAP values from 111 – 310 mgGAE/100g, 2.3 – 2.8 mgCE/g, 31 – 42%, and 215 – 460 umol/100g, respectively. Organoleptic study revealed maximum sensory scores for 6% supplementation. Hence, addition of FSP in value added foods may improve its functional features which might be helpful in mitigating malnutrition and other health maladies like cardiovascular disorders, diabetes and cancer.

Keywords: Fenugreek seeds, value addition, antioxidants, leafy vegetables, noodles

Nutraceuticals and Health

Asif Ahmad, Rai Muhammad Amir, Sowaba Muneer, Sana Parveen

Institute of Food and Nutritional Sciences, Pir Mehr Ali Shah Arid Agriculture University Rawalpindi, Pakistan

Nutraceuticals are naturally derived bioactive compounds that are found in foods, dietary supplements, and herbal products, having health-promoting, and medicinal properties. These products have the advantage over medicines due to the lack of side effects. The most rapidly growing segments of this industry are dietary supplements and natural/herbal products. The global nutraceutical market is estimated at USD 117 billion. At the global level, FDA regulates these products. Whereas, at the local level DRAP have control over these products. They are classified on the basis of their natural source, chemical grouping, nutrients, herbals, dietary supplements, and dietary fiber. Research data revealed their

implication against several diseases, such as cancer, neurodegenerative diseases, cardiovascular diseases, and others. The nutraceutical revolution will lead us into a new era of medicine and health, in which the food industry will become research-oriented. Internationally, significant limitations to growth in this area are resulting from a necessity to properly label and assess the health effects of nutraceutical and functional foods. Food safety, quality, and a better understanding of interactions among foods, medicines, and dietary supplements are pivotal requirements for the development of nutraceutical products. This presentation will increase our understanding of the prospects of nutraceuticals in the country.

Keywords: Nutraceuticals, Market, Product Development

Evaluation of in Vitro and in Vivo Anti-Inflammatory Effects of Fractionated Chia Seed Mucilage

Jalwa Ahmad[1], Aymen Ajmal[1], Asad Khan[1], Nadeem Khan[1], Amjad Iqbal[2*], Ayaz Ahmad[1*]

[1]Department of Biotechnology, Abdul Wali Khan University Mardan, Pakistan
[2]Department of Food Science & Technology, Abdul Wali Khan University Mardan, Pakistan

**ahdayazb5@awkum.edu.pk(AA), amjadiqbal@awkum.edu.pk(AI)*

Inflammation is a natural host immune response to pathogens attack, cell injury and entry of noxious substances in to the body. To cure inflammation various drugs have been introduced in the market by pharmacists, but they have side effects. However, some of the medicinal plants contain numerous phytochemicals, including polysaccharides that have therapeutic effects. Salvia hispanica L., seeds that are commonly known as chia seeds release mucilage after in contact with water. The mucilage generally consists of 85-90% of carbohydrates and some are reported as potent bioactive compounds. This study was, therefore, designed to extract and fractionate the bioactive polysaccharides from the chia seed mucilage and to establish their in vivo and in vitro anti-inflammatory role. The mucilage was collected after soaking the seeds in distilled water and precipitated with 75% ethanol. The ethanol precipitated fraction was resuspended in water and fractionated through Bio Gel P10 (90µm-180µm, pore size).A total of 60 fractions were obtained, which contained saturated and unsaturated uronic acid, pentoses and hexoses. The fractions were tested for In vitro anti-inflammatory potential through HRBCs membrane stabilization assay, while the in vivo activity was performed using carrageenan induced paw edema model in mice. The results showed that the fraction Ch19 significantly (P=0.05) stabilized the HRBCs membrane (EC50=8.75 µg/mL). Similarly, application of fraction Ch39 at a concentration of 1000 µg/mL resisted (97.20%) the heat induced destabilization of HRBCs membrane. The results of in vivo anti-

inflammatory activity revealed that fractionCh31 significantly reduced the volume of the mice paw edema by 91.37%. The results indicate that the ethanol precipitated fractions of chia seed mucilage have medium sized polysaccharides with anti-inflammatory potential. These medium sized polysaccharides from chia seed mucilage appear to be promising candidates for further preclinical and clinical trials to treat inflammation and inflammation mediated diseases.

Keywords: Chia, Mucilage, Polysaccharides, inflammation.

Chickpea and psyllium; natural sources to enhance nutritional composition of cupcake

Shabbir Ahmad, Maryam Maqsood, Sadaf Yaqoob, Shamas Murtaza, Rao M. Ikram

Department of Food Science and Technology, MNS University of Agriculture, Agricultural Complex, Multan (Punjab), Pakistan

Malnutrition remains a serious public health concern around the world, particularly in poor nations, due to insufficient food quantity and quality. The food industry is facing the challenge of developing new food products with special health-enhancing characteristics. Therefore, the present study was carried out to prepare nutritionally enriched cupcakes by using chickpea and psyllium powder in different concentration. The study was performed in the food science lab and Central Hi-Tech lab of MNS-University of Agriculture, Multan. The raw material was analyzed to determine macro and micro components. Afterwards, cupcake was prepared using wheat flour (50%), chickpea flour (45%, 40%, and 35%) and psyllium powder (5%, 10%, and 15%). The cupcake was analyzed for nutritional composition like crude fiber, crude fat, crude protein, moisture & ash content and Fe & Zn contents. Chickpea variety "Thal 2016" was best in term of protein content, "Bakar 2011" was best in term of fiber content. According to the result, hardness of cupcakes increased during storage days (1st, 7th, and 14th days) while moisture content of cupcakes decreased with the addition of chickpea flour and psyllium powder. This might be due to low water absorption and number of entrapped air bubbles, which caused moisture loss and lower cupcake volume. It also observed that color valuesl*, a* and b*of cupcake crust was 68.48±0.47, 20.78±0.58 and 40.18±0.80 while color values l*, a* and b* for crumb was 41.46±30.86, 6.89±0.41 and 34.17±0.31 respectively. Samples T2, T3 showed better result in case of crust, crumb color of cupcakes. According to the result, it can be concluded that chickpea varieties "Thal 2016" and "Niab 2016" (@35% & 40%) along with psyllium powder (@ 10% & 15%) can be used to enhance nutritional profile of cupcake having good textural and sensorial attributes.

Keywords: Chickpea, psyllium, cupcakes, Texture analysis, Malnutrition, Wheat flour, Chickpea flour, Psyllium powder

Physicochemical quality attributes and antioxidant properties of yoghurt fortified with *Moringa oleifera* leaf powder

Salman Ahmad, Farzana Siddique*, Saima Noreen

Institute of Food Science and Nutrition, University of Sargodha, Sargodha-40100, Pakistan

The aim of present project is to incorporate the Moringa oleifera leaf powder for manufacturing functional yoghurt being a rich source of phytonutrient compounds. Moringa oleifera leaf powder at the rate of 0.2 % (T1), 0.4 % (T2), 0.6 % (T3) and 0.10 % (T4) was added to the yoghurt, control sample (T0) was made without added powder. The influence of addition of Moringa oleifera leaf powder on physicochemical of yoghurt was studied during 21 days of storage period under refrigerated condition. It was found that fat content decreased with addition of moringa leaves powder i.e., T0 (4.38±0.014A) while T4 (3.85±0.018E). Protein content increased with addition of Moringa leaves powder i.e., T0 (3.61±0.009E) while T4 (4.15±0.021A). It was also noted that with addition of moringa leaves powder the moisture content also decreased i.e., T0 (87.43±0.021A), while T4 (81.98±0.033D). Moreover, with addition of moringa leaves powder, anti-oxidant potential, total phenolics and DPPH radical scavenging activity was also improved. Above all, treatment T2 was found best as per sensorial perspectives. Current study concludes that moringa could be a very excellent fortification for yogurt manufacturing. More detailed studies are recommended that would discuss the addition of moringa leaves powder along with varied microbial culture.

Nutritional Optimization of Wheat Plantlet Juice Treated with Pulsed Electric Field

Zahoor Ahmed, Nauman Khalid

Human Nutrition and Dietetics, School of Food and Agricultural Sciences, University of Management and Technology, Lahore, Pakistan

Low-acid juices are favored by a wide range of consumers due to their excellent functional nutrition, such as aiding digestion, purifying the blood, and strengthening the immune system, which in turn has led to an increase in demand for plant-based beverages such as wheat plantlet juice. Wheat plantlet juice is full of vitamins, minerals, bioflavonoids, phenolics, carotenoids, chlorophylls, and vitamin C. It also contains major disease-preventive properties. The goal of this research was to examine the effects of wheat (Tritium aestivum L.) seed juice on the effects of the pulsed electric field (a number of pulses 25 and 50; PEF; 2 to 6 kV/cm). The changes in the nutrient fraction of wheat plantlet juice extracted from plants treated with the PEF conditions were further investigated. Wheat plantlets untreated seeds and treated with PEF at 50 pulses and 6 kV/cm and then

germinated overnight, and after 14 days, wheat plantlets were harvested from 2 cm above the tray and the juice was. The total phenolic content increased by 18.56% and the corresponding DPPH radical scavenging capacity increased by 75.9 Trolox μM; the contents of soluble protein, free amino acids and various mineral elements were significantly increased ($p< 0.05$) as compare to the untreated. The above results reflect that PEF treatment can improve the nutritional properties of wheat plantlet juice.

Antidiabetic Effects of Polysaccharide Fractions of Okra Pod Mucilage in Alloxan-Induced Albino Mice

Aymen Ajmal[1], Yusra Jamil[1], Jalwa Ahmad[1], Amjad Iqbal[2], Ayaz Ahmad[1]

[1]Department of Biotechnology, Abdul Wali Khan University Mardan
[2]Department of Food Science & Technology, Abdul Wali Khan University Mardan
**ahdayazb5@awkum.edu.pk; amjadiqbal@awkum.edu.pk*

Diabetes mellitus is termed as a progressive human metabolic disorder, primarily characterized by hyperglycemia. Current pharmacological measures to manage diabetes and it adverse effects pushed the scientific community to search for natural, yet novel, potent and cost-effective drugs. The seeds and pods of Abelmoschus esculentus commonly known as okra were soaked in water to collect a mucilage. The mucilage was further fractionated through Bio-Gel-P10and each fraction was tested to establish their antidiabetic potential. The okra mucilage was obtained by soaking the okra pods and seeds in distilled water and the collected mucilage was fractioned by using gel permeation chromatography. The biochemical analysis exhibited the presence of pentoses, hexoses, saturated and unsaturated uronic acids. In vitro antidiabetic activity of selected fractions was carried out using α-amylase, α-glucosidase and yeast glucose uptake assay. Fraction O24 significantly (P=0.05) inhibited the α-amylase activity (IC50 was 265.75 μg/mL). The fraction O32 on the other hand significantly (P=0.05) inhibited the α-glucosidase (IC50 was 441.87 μg/mL). Likewise, the fraction O36 significantly (P=0.05) reduced the yeast glucose uptake. In vivo antidiabetic activity of Balb/C mice was monitored after inducing the diabetes by injecting the mice with 1% alloxan. Blood glucose levels along with the weight of experimental mice were recorded for a period of 14 days after injection. Each fraction of the okra mucilage at three different concentrations (100 mg/kg, 200 mg/kg, 400 mg/Kg body weight) were screened for in vivo antidiabetic activity. Results revealed that the fraction OK1(400 mg/Kg body weight) reduced the blood glucose level of alloxan-induced diabetic mice by 74.85%. Similarly, the alloxan-induced diabetic mice group treated with fraction Ok3 resulted in weight gain and at day-14, the recorded average weight was 23.90 g, which was comparable to a group treated with standard drug. The findings of this study conclude that okra pods and seeds mucilage comprise of bioactive polysaccharides fraction that exhibited promising anti-diabetic activity.

Keywords: Abelmoschus esculentus, polysaccharides, alpha amylase, blood glucose level, diabetes mellitus.

Current Scenario in Food Production and Food Safety

Zakia Akram, *Sanabil Yaqoob, Areeba Irfan, Wajeeha Batool, Muhammad Sajid Manzoor, Kanza Aziz Awan, Shoaib Younas, Ayesha Murtaza, Waleed Sultan, Ukasha Arqam

Department of Food Science and Technology, Faculty of Science and Technology, University of Central Punjab, Lahore, Pakistan
**sanabil.yaqoob@ucp.edu.pk*

The centralisation and globalisation of foods increase the likelihood of pandemics of foodborne disease. People in developing countries are at greater risk from naturally occurring toxicants, foodborne disease, and contaminants in the food chain. The hazard critical control point concept is essential for assessing and managing risk. Special consideration is needed with regard to fish and shellfish. A major barrier to risk communication is a general lack of understanding by the public of relative risk as opposed to absolute risk. Concerted action needs to be taken to prohibit the use of antibiotics as growth promoters in animal production. The mass packaging of food is an important barrier against microbiological contamination. Global warming could dramatically change the geographical distribution of algal toxins. Internationally agreed food standards are essential to facilitate trade in food between areas with food surplus and those with food deficit.

Keywords: food quality, hazard analysis, risk assessment, food chain, food allergens.

Formulation and characterization of functional food bar based on dehydrated orange and tomato residue

Ayesha Akram, Tusneem Kausar*, Ghulam Mueen ud Din

Institute of Food Science and Technology, University of Sargodha, Sargodha 40100, Punjab, Pakistan
**tusneem.kausar@uos.edu.pk*

The processing of fruits and vegetables results in waste material such as peel, seeds, stones and unused flesh generated in different steps of processing and discarded as waste. These waste materials are rich in valuable compounds. The main purpose of this research is the production of food bar by using residues of orange and tomatoes. Tomatoes are major source of antioxidants, lycopene, vitamin C and Vitamin K. Oranges are source of vitamin C, fiber and phenolic compounds. Pomace obtained from orange and tomatoes, after juice extraction was dried and incorporated in different concentration (4, 8, 12%) in preparation of food bar. The prepared food bars were evaluated for their quality, microbial stability and sensory acceptability. Proteins (0.95-1.05%), ash (1.5-5.0%) and

fibre (3.7-4.4%) contents increased by addition of orange and tomatoes pomace powders while fat (4.6-2.5) content decreased, respectively. During sensory evaluation, scores for color (6.8-7.5) and flavor (7.1-7.8) increased while for taste (7.3-7.1) and texture (7.8-7.0) decreased but remain in acceptable limits. Incorporation of orange and tomato pomace powder also results in reduction of total plate count and mold count in prepared food bar samples. Thus, the chemical, microbiological and sensorial results of the designed products attested for an alternative towards applying and reducing agro-industrial wastes and its use for nutritional improvement of foods.

Keywords: Food bar, Orange pomace, Tomato pomace, Dehydrated powders, Quality evaluation

Probiotics and Gestational Diabetes: A Review

Noor Akram, Muhammad Afzaal, Huda Ateeq, Aasma Asghar, Amara Rasheed

Gestational diabetes mellitus, more commonly known as GDM, is a frequent pregnancy condition. It carries significant short-term and long-term adverse health outcomes for both the mother and the offspring. The physiological alterations in insulin resistance and lipid profiles are accentuated in GDM women, which may reflect an underlying metabolic abnormality that only temporarily presents itself during pregnancy. An example of the hyperglycemic intrauterine environment is provided by pregnancies that are complicated by gestational diabetes mellitus. This environment may not only reflect but also drive the epidemic of type 2 diabetes mellitus (T2DM). Supplementation with probiotics has the ability to reduce GD-predisposing metabolic parameters such blood glucose level, lipid profile, inflammation, and oxidative indicators, which in turn may reduce the incidence of GD in pregnant women. Remarkable outcomes have been seen by the supplementation of probiotic strains during pregnancy. In addition to lowering lipid profiles, inflammatory markers, and oxidative stress, probiotics were found to have favorable impacts on gene expressions related to insulin, inflammation, and glycemic management. By generating changes in the microbiota of the gut, probiotics may help women maintain a healthy weight and experience fewer difficulties during pregnancy. It's possible that probiotics could have an effect on the microbiota of an infant, which would have significant repercussions for the child's growth and health. Following on from the previous point, probiotic supplementation lowers the risk of GD in pregnant women. As a result, the administration of particular probiotics through supplementation could be considered one of the adjuvant therapies for patients suffering from GD.

Pharmacological basis for the antihypertensive activity of Grewia asiatica fruit extract

Zuneera Akram[1]*, Rehana Perveen[1], Hasan Salman Siddiqi[2], Muzammil Hussain[1], Iqbal Azhar[1]

[1]Department of Pharmacology, Baqai Institute of Pharmaceutical Sciences, Baqai Medical University, Karachi, Pakistan
[2]Department of Biological and Biomedical Sciences, AKU
[3]Department of Pharmacognosy. Faculty of Pharmacy & Pharmaceutical Sciences, University of Karachi
**dr.zunaira@baqai.edu.pk*

In the management of cardiovascular disorders, medicines from herbal sources have played a vital role through centuries. The following study was commenced in order to lay possible pharmacological foundation associated with medicinal uses of edible fruit of Grewia asiatica in hypertension through in-vitro method. In this study isolated atrial preparation of Guinea pig was used where crude ethanolic extract of Grewia asiatica fruit (Ga.Cr) decreased the force and rate of spontaneous atrial contractions (0.03-1 Omg/kg). In isolated rat aortic ring preparations previously vasoconstricted by phenylephrine and High [K.sup.+], it also resulted in dose dependent vasodilation (0.01-10 mg/kg).In the presence of L-NAME, the relaxation curve of Ga.Cr was partially inhibited showing involvement of Nitric oxide (NO) mediated pathway. The speculative analysis contemplated that Ga.Cr has blood pressure reducing potentials through inhibition of [Ca.sup.++] influx via [Ca.sup.++] channels, its release from intracellular stores and through other means like NO mediated pathways.

Keywords: Grewia asiatica fruit, hypertension, vasodilation, NO- mediated, Ca++ influx.

Culinary Herbs and Spices with Peerless Role in Nutrition and Health

Ali Ijlal Aleem*, Fatima Tariq, Muhammad Sajid Manzoor, Humna Mehmood, Shoaib Younas, Muhammad Sheharyar, Kanza Aziz Awan

Department of Food Science and Technology, Faculty of Life Sciences, University of Central Punjab, Lahore, Pakistan

Spices and herbs have been in use for both culinary and medicinal purposes. They not only enhance the flavor, aroma, and color of food, but they can also protect from several diseases. The popularity of these aromatic plant products in culinary preparations has been accredited to their antimicrobial properties. Culinary Herbs and Spices (CHS) possesses antioxidant, anti-inflammatory, anti-carcinogenic, and glucose and cholesterol-lowering activities and properties that affect cognition and mood. Some spices and culinary herbs also possess anti-adhesive

properties that prevent the adhesion of the microbes to the host tissue. Some may enhance immune cell activity, such as garlic. Garlic is a safe, inexpensive, common spice that could have public health implications in areas prone to diarrhea. Both spices and herbs are rich sources of phytochemicals, many of which are biologically activeand functional foods because of the eclectic range of health benefits beyond essential nutrition. Human studies show the significance of the potential health benefits of CHS in a dietary context. Ginger, commonly used for its bioabsorption and anti-inflammatory effects, contains several identified bioactive constituents, including gingerol and gingerol-like compounds and antioxidants like beta-carotene, polyphenols, terpenoids, and alkaloids. Aqueous and methanol extracts of dry sage, rosemary, basil, parsley and chili were seen with their antioxidant and anti-glycan activities and in vitro inhibitory potential against enzymes involved in glycemic regulation. The aqueous extracts of rosemary and sage were the richest in phenolic compounds. They showed the glycation end-product production, lipid peroxidation and the activity of α-glucosidase and α-amylase.

Keywords: culinary herbs, spices, antioxidant, anti-inflammatory, bioactive compounds

Stability and survivability of free and microencapsulated *Lactobacillus rhamnosus* under simulated gastrointestinal conditions and in orange juice

Umair Ali[1], [2]*, Muhammad Saeed[1], Zulfiqar Ahmad[2], Faiz-ul-Hassan Shah[2], Muhammad Adil Rehman[2], Muhammad Waseem[2], Hammad Hafeez[2], Tahir Mehmood[2], Muhammad Azam[1]

[1]National Institute of Food Science and Technology, University of Agriculture, Faisalabad, Pakistan
[2]Department of Food Science and Technology, Faculty of Agriculture and Environment, Islamia University of Bahawalpur, Bahawalpur, Pakistan
**umairali7017@gmail.com; 0092 306 3749055*

Survivability of probiotics is severely affected by harsh gastrointestinal conditions. In present study, microbeads of Lactobacillus rhamnosus were formulated using alginate (1.5% w/v) and xanthan gum (0.5% w/v) through emulsion technique in order to improve bacterial viability in low pH orange juice and in gastrointestinal conditions. Probiotic orange juice was formulated and tested for the physicochemical parameters (pH, titratable acidity and total sugars) and sensorial properties (flavor, taste, color, aroma and overall acceptability) as well as encapsulation efficiency, survivability in bile salt, SGF (simulated gastric juice) and SIF (simulated intestinal fluid). Encapsulated cells depicted the highest survivability as compared to free cells. Gum coated alginate microbeads showed higher encapsulation efficiency i.e. 95.2% as compared to alginate microbeads i.e. 86.85%. Similarly, alginate and gum coated beads (T3) showed the highest

survival (83.6%) and resistance against bile salt (8.50 log CFU/g), SGF (7.95 log CFU/g) and in SIF (8.0 log CFU/g) during 80min exposure as compared to single layer alginate coated bacteria (T2) and free cells. The viability of gum coated alginate beads remained above 107 CFU/g in gastrointestinal conditions. All the physicochemical parameters of probiotic juice were significantly ($p \leq 0.05$) goes on decreasing with respect to storage except acidity but the minimal changes were observed in gum coated alginate microbeads (T3). But different treatments had no significant impact on flavor, aroma, color, taste and acceptability of juice while affected significantly ($p \leq 0.05$) with respect to storage. Conclusively, gum coated alginate beads improved the survivability of probiotics and probiotics orange juice may contribute a good market share due to its therapeutic benefits

Keywords: probiotics, Lactobacillus rhamnosus, alginate, xanthan gum, encapsulation, SIF, SGF

Effect of high speed homogenization on morphological characteristics and survival of alginate-gum coated microbeads of *Lactobacillus rhamnosus*

Umair Ali[1], [2], Muhammad Saeed[1], Zulfiqar Ahmad[2], Faiz-ul-Hassan Shah[2], Muhammad Adil Rehman[2], Muhammad Waseem[2], Hammad Hafeez[2], Tahir Mehmood[2], Muhammad Azam[1]

[1]National Institute of Food Science and Technology, University of Agriculture, Faisalabad, Pakistan
[2]Department of Food Science and Technology, Faculty of Agriculture and Environment, Islamia University of Bahawalpur, Bahawalpur, Pakistan

Xanthan gum can be utilized to overcome the structural defects in alginate microbeads and to improve the stability of microbes under harsh conditions. The present study was focused to enhance the survival of Lactobacillus rhamnosus using alginate (1.5 % w/v) along with xanthan gum (0.5 % w/v) for encapsulation and structural modifications of microbeads. Homogenization emulsion technique was used for encapsulation at various homogenization speeds i.e. 3000 rpm (HS1), 6000 rpm (HS2), 9000 rpm (HS3) and 12000 rpm (HS4). The resultant microbeads were characterized for their diameter, production yield, structural morphology through SEM (Scanning Electron Microscopy), bacterial count, bacterial survival and homogenization efficiency. SEM images indicate that beads produced at 12000 rpm are more uniform, spherical in shape and have large surface area as compared to other treatments. The diameter of microbeads was reduced from 323.01 µm to 238.17 µm as the homogenization speed increases from 3000 to 12000 rpm. The highest bacterial count (9.45 log CFU/g), homogenization efficiency (91.56 %), beads yield (23 %) and releasing behavior (86.52 %) was recorded at 12000 rpm (HS4). Conclusively, homogenization of encapsulated microbeads at 12000 rpm significantly improves the beads surface and sphericity, bacterial count, production yield as well as efficiency.

Keywords: Xanthan gum, encapsulation, homogenization, SEM, Lactobacillus rhamnosus, microbeads

Beneficial Effects of Ultrasound on Different Food Processing Operations to Control the Quality of Food

Shehzad Ali[1]*, Haroon Munir[1], Shakeel Hussain[2]

[1]Department of Food Science and Technology, GC University, Faisalabad
[2]Department of Dairy Technology, UVAS, Lahore, Pakistan
**shehzadali8812@gmail.com*

Ultrasound consists of sound waves with frequency beyond the limit of human hearing. Ultrasound can be applied by tuning frequency in many industrial applications including food. Ultrasound systems are relatively inexpensive, simple and energy saving, and thus became a developing technology for analytical and modifying food products. For monitoring the composition and physicochemical properties of food components and products during processing and storage low power with high frequency is used and it is vital for monitoring the food properties and improving its quality. On the other hand, high power with low frequency ultrasound persuades mechanical, physical and chemical/biochemical variations by cavitation, which supports several food processing operations like inactivation of pathogenic bacteria on food contact surfaces, emulsification, drying and extraction. The basic aim of this study is to summarize the major applications of low and high-power ultrasound in food science and technology. Low and high-power ultrasound cab used in many food industrial applications and by using this method important research results can be obtained. These applications include meat products, vegetables and fruits, cereal products, aerated foods, honey, food gels, food proteins, food enzymes, microbial inactivation, freezing, drying and extraction.

Keywords: Ultrasound, Application, High-power, Food

Production of Energy from Food Wastes Applying Sustainable Approaches for Food Waste Management and Nutrient Recycling

Shehzad Ali[1]*, Haroon Munir[1], Shakeel Hussain[2]

[1]Department of Food Science and Technology, GC University Faisalabad
[2]Department of Dairy Technology, UVAS, Lahore, Pakistan
**shehzadali8812@gmail.com*

Due to continuous increase of the world population food wastage and its accumulation are becoming a critical problem around the globe. Many serious threats such as health risk, scarcity of dumping land and environmental pollution can be imposed to our society by the exponential growth in food waste. To control

food waste burden there is a need of applying the appropriate measures adopting standard management operations. For societal benefits and applications currently, various kinds of approaches are being investigated in waste food processing and management. In promising solutions for food wastes management, energy, and nutrient production, digestion of anaerobic approach has appeared beneficial and as one of the most eco-friendly. The purpose of this study is to utilize the different aspects of anaerobic biodegrading approaches for food waste, effects of co-substrates, effect of environmental factors, contribution of microbial population, and available computational resources for food waste management researches.

Keywords: Food waste, management, Nutrient, Environmental

Dietary and lifestyle factors and risk of non-communicable diseases (NCDs) in Pakistan

Amanat Ali

School of Engineering, College of Engineering and Physical Sciences, University of Guelph, 50 Stone Road East, Guelph, Ontario, Canada, N1G 2W1.
**amanat@uoguelph.ca*

Non-communicable diseases (NCDs) present a global public health burden either in terms of direct cost to the society or in terms of loss of disability adjusted life years (DALYs). It is estimated that almost 80 million people in Pakistan are currently suffering from non-communicable diseases (NCDs) such as obesity, diabetes, cardiovascular diseases, cancers, respiratory diseases, osteoporosis, mental disorders etc. and another 8 million are feared to be affected by 2025. The rate of NCDs in Pakistan has progressively increased over the past years and is higher as compared to other Asian countries. According to World Health Organization (WHO), almost 60% of people in Pakistan under the age of 70 years die because of NCDs. The root causes of NCDs include unhealthy dietary habits, lack of physical activity, other lifestyle related behaviours including use of tobacco and alcohol, as well as exposure to environmental contaminants/pollutants, food insecurity, poverty, hunger, and injustice, which require nutritional, political and social actions to eliminate them. The prevalence of these risk factors is increasing at an alarming rate in Pakistan. Nearly 60% of Pakistanis are facing food insecurity, have multiple nutrient deficiencies and indicate a significant decline in their nutritional status. These conditions can lead to serious public health implications and have negative impact on the economic growth and development of Pakistan. The NCDs are largely preventable but require a strong and effective public health approach to manage the epidemic. The government needs to engage the people, communities, and health-care providers to create awareness about the risk and prevention of NCDs. This paper discusses the role of unhealthy dietary habits and other lifestyle behaviours in the prevention and management of NCDs and what nutritional strategies should Pakistan adopt to reduce the burden on NCDs and improve the nutritional and health status of its people.

Characterization of apricot kernel as fruit waste processing: a comprehensive review

Saadia Ambreen[1], Umair Arshad[2], Ali Imran[2]

[1]*University Institute of Food Science & Technology, The University of Lahore*
[2]*Department of Food Sciences, GC College University Faisalabad, Pakistan*

Apricot kernel is a byproduct of apricot and is very valuable. In addition to oil and fiber, apricot kernels provide a significant source of dietary protein. Additionally, the kernel is said to have strong antibacterial and antioxidant properties. A rich supply of proteins, vitamins, and carbs can be found in the apricot kernel. Thiamine, riboflavin, niacin, vitamin C, a- and d-tocopherols, and riboflavin are all present in the kernels. Major essential amino acids like arginine and leucine are also present. Additionally, it can be made into food ingredients and used for therapeutic purposes. The extraction of bioactive components from the apricot kernel has been carried out using various methods, including solvent extraction, ultrasonication, enzyme-assisted extraction, microwave-assisted extraction, and aqueous extraction. Apricot kernels are mainly used to make oils and benzaldehyde, but they are also crushed or incorporated whole into baked goods and eaten as an appetizer. Bitter apricot kernels are said to aid in the treatment of cancer. This assertion hasn't been demonstrated scientifically, though. The kernel is renowned for its numerous industrial applications in various industries and scientific disciplines, including food, cosmetics, pharmaceutical, and thermal energy storage. The kernel is famous for its multiple industrial applications in numerous industries and scientific disciplines, including thermal energy storage, the cosmetic, pharmaceutical, and food industries. In folk medicine, the apricot and its kernel have been utilized as treatments for a number of ailments.

Development of Octavo for Healthy Eating and Active Lifestyle to Prevent Osteoporosis

Neelam Amir, Qurat-ul-ain Aleem

Department of Food Science & Human Nutrition (FSHN), Kinnaird College for Women, Lahore, Pakistan

Osteoporosis is a bone related disease. It occurs due to decreased bone mass and bone mineral density resulting in deformities in bones. The prevalence of disease is increasing all over the world. However, the incidence of osteoporosis is also very high in developing countries like Pakistan. It is a progressive disease and if not treated, will results in osteopenia, which can further lead to the development of osteoporosis. Its incidence or progression can be prevented by maintaining a healthy lifestyle. This study focuses on the formulation of a booklet that targets two main variables: healthy diet and active lifestyle in order to avert the incidence of disease. The study targets females. In this study, Octavo was developed to

provide awareness about Osteoporosis, its determinants, importance of healthy eating patterns and foods containing essential vitamins and minerals that plays vital role in the maintenance of bone health. With this, it contains information about significance of physical activity and its different types for bone health. Booklet was developed and translated into Urdu. It was validated by expert panel comprised of Dietitians from Hameed Latif Hospital and Food Science and Human Nutrition department of Kinnaird College for Women. It was also evaluated by general public to examine the understandability of booklet by general public. For evaluation, a questionnaire was developed. According to Results, respondents were able to understand the message delivered by Octavo; they agreed that the appearance of Octavo was appealing. From pictorial representation, they were able to understand foods important for bones and foods that should be avoided. Overall, the response of dietitians and general public was positive.

Keywords: Octavo; Osteoporosis; Public awareness; Book

Dietary diversification by exploring the potential of unconventional food sources

Muhammad Amira*, Saeed Akhtara, Tariq Ismaila

Faculty of Food Science and Nutrition, Bahauddin Zakariya University, Multan, Pakistan
**amirm4984@gmail.com*

Despite the extensive research and development programs, the world is facing severe challenges to food security. Diets of many regions are restricted to a few plant species even in the presence of vast floral diversity. Technological moves, soil degradation, massivecultivation, urbanization and lack of data on many plants are limiting factors to nutritional security. The exploration of the ethnobotanical perspectives of regional communities on the unconventional plant species and their scientific evidencing can provide us with information of great interest. In the present era, food biodiversity is the only solution to deal with food and nutrition insecurity. The study aimed to explore the nutritional potential of various unconventional food plants i.e., (Solanum nigrum L, Rumex dentatus, Bauhinia variegate, Atropa belladonna, Digera muricata, Portulaca oleracea, Physalis minima L, Cordia myxa, Cucumis melo L and Lotus roots) in the Punjab province. In this way, the regional unconventional natural flora can contribute value addition to the daily intake, enrich diet diversity and ensure nutrition security.

Keywords: Diet diversity, unconventional food plants, scientific exploration, food Security

The Ameliorative Effect of Apple Peel and Pulp Extract in Lowering Hyperlipidemia

Adnan Amjad[1], M. Sameem Javed[1], Raheel Suleman[1], Shabbir Ahmad[2], Mohibullah Shah[3], Muhammad Rizwan Amjad[4], Dur-e-Shahwar Sattar[1]

[1]*Institute of Food Science & Nutrition, BZU, Multan, Pakistan*
[2]*Department of Food Science & Technology, MNSUAM, Multan, Pakistan*
[3]*Department of Biochemistry, Bahauddin Zakariya University, Multan, Pakistan*
[4]*Pest Warning and Quality Control of Pesticides Punjab, Lahore, Pakistan*

Current study aimed to investigate the anti-hyperlipidemic effects of apple peel powder (APP) and apple pulp extract (APE) in male albino rats fed with high cholesterol diet. Apple contains antioxidants with potential benefits in treating chronic diseases like cardiovascular, cancer, diabetesand hypertension. Consumption of apple is associated with significant decrease of total cholesterol, triglycerides, LDL-C, VLDL-C and improve HDL levels. Firstly, 18 male albino rats were divided into two groups (control and hyperlipidemic group). High fat diet 10% coconut oil, 0.5% egg yolk and 0.5% cholic acid was given for two weeks. Secondly, hyperlipidemic rats were further divided into four groups and fed on 5% and 10% APP and APE for 28 days. Rats were sacrificed to investigate their biochemical parameters. Total cholesterol, LDL-C and triglycerides levels were significantly reduced and HDL-C showed significant increase. Supplementation of 10% APP and APE ameliorated lipid markers, kidney and liver function test.

Keywords: Hyperlipidemia; cholesterol; albino; apple peel powder; apple pulp extract

Effect of Food Quality and Nutritional Attributes on Consumer Choices During COVID-19 Pandemic

Zainab Bintay Anis, Ubaid ur Rahman, Nauman Khalid, Wahab Nazir

University of Management and Technology, Lahore, Pakistan

COVID-19 has imposed a number of serious threats to different sectors including food industry. Consumer choices for a food product are dependent on multiple factors i.e., availability, taste, brand, quality and information about the product. Disruption in food demand and supply chain has led to adjustment of prices and variety of food products in response to consumer's demand, frequency of delivered items and production setup during pandemic. The present study develops a relationship between the consumer buying preference of food product with its quality and nutritional value and how the pandemic situation worldwide has affected this preference. In this regard, a cross-sectional survey research was conducted through survey-based questionnaire. Results of the study showed that there was no such difference in receptiveness of COVID-19 infection between

both genders. Quality perspective (p = 0.001) is deemed as a significant positive predictor in the change of food consumption patterns during COVID-19 pandemic. It also stated price (p = 0.045) and purity (p = 0.009) as a quality factor while sugar (p = 0.028) and fiber (p = 0.034) content as nutritional attributes to influence the consumption frequency of food groups. The overall experience of online shopping in positive and negative COVID-19 infection status participants is in neutral category. It was concluded that food quality cues as well as nutritional attributes affect consumer food choices during COVID-19 pandemic regardless of the gender. Online shopping trends have also been greatly influenced but overall experience remained neutral during pandemic.

Prevalence of Iron Deficiency Anemia in Pregnant Women District Peshawar, Pakistan

Zahin Anjum[1], Shaista Ali[1], SumblaYousaf [2]Amina Rahat[1], Farhat Shehzad[1].

[1]College of Home Economics, University of Peshawar, Peshawar, Pakistan
[2]Home Economics, Higher Education Department, KP, Pakistan
** zahinanjum@uop.edu.pk, Cell No:0333-9266985*

Background: The Iron deficiency in pregnant women cause pregnancy related complication, premature births and still birth. Iron deficiency is a major issue among Pakistani female population especially in rural and poor communities. The common causes of anemia include parasitic infestations such as malaria and hookworm; infections like HIV and hemoglobinopathies, the predisposing factors are grand multiparity, young age, low socioeconomic status, and illiteracy. Methods: This study was carried out among 150 pregnant women of age range 18-45years. After taking written consent 3 to 5 ml blood samples were collected from each pregnant woman and a predesigned questionnaire was filled. The Biochemical and hematological test was carried out and the test results were collected. Nutrient intake of the pregnant women was assessed through 24 hours' recall method for analysis Win-diet 2005 software was used to evaluate the nutrients in food consumed by the respondents based on their portion size. The data were entered and analyzed in SPSS version 20.

The Nutritional Composition and Health Benefits of Wheat (Triticum Aestivum) Cell Wall: A review

Sanabil Anmol

University Institute of Diet & Nutritional Sciences, UOL, Lahore, Pakistan

Grains and cereals are widespread ingested staple food in many regions of world. Cereal are those categories of grains which have most complex structure including cell wall. Cell wall possesses wide range of composition and properties. Many cereals which include wheat, oats, barley and rye contains some structural components including B-glucans and arabinoxylans. The walls of cell residues

within wheat (Triticum aestivum) endosperm are approx. 2-8 percent, which contain mainly non-starch polysaccharides, 24-105 gram per kg of arabinoxylans and 2-18 gram per kg of Beta-glucans quantity. Prebiotic effects of arabinoxylans are visible in human and animal colon due to stimulation of gut microbiota. Antidiabetic role is shown by arabinogalactan in various ways by lowering the GI load of different foods in a positive way, reducing influence of glucose level and insulin resistance and ultimately lowering the risk of Diabetes Mellitus. Chemo protective role of AXOS termed as Arabinoxylan oligosaccharides is visible in cancer causing agents in colon. Lowering total blood cholesterol, low density cholesterol, cholesterol whereas increasing the efficacy of high density lipoproteins and blood lipid profile to maintain body weight. The main purpose of this review is to highlight nutritional and physiological benefits of wheat cell wall in human body. More researchers are required to illuminate role of wheat cell wall in nutraceutical domains and integrate them into different products so that people can have more of these products to combat current health problems.

Green Extraction of Functional Bioactives and Nutraceutical Components

Farooq Anwar

Institute of Chemistry, University of Sargodha, Sargodha, Pakistan
**fqanwar@yahoo.com*

It is well accepted that plants are a rich source of wide array of high-value bioactives with proven functional food and nutraceutical benefits. The extraction and /or isolation of such functional bioactives from various plant materials is a challenging task due to diversity of their structural features, varying concentration and resources. Due to serious concerns about the process safety and non-ecofriendly nature of conventional extractions, currently, the food and nutra-pharmaceutical industry is keenly persuing the use of non-denatured, safer and healthy plant extracts produced via some green extractions. This lecture is mainly aimed to present an overview of modern green extraction techniques to be applicable for optimal recovery of plant based natural bioactives/ functional components. In this regard, some methodological developments made by our research group for efficient extraction of high-value components (plant oils and phenolics) involving the applications of green routes such as enzyme-assisted-, ultrasound-assisted-, and supercritical fluid extraction (SFE) are covered. Moreover, analytical characterization of these bioactives is also presented.

Keywords: Optimal nutrition, Eco-friendly extraction, Plant bioactives, Enzymatic hydrolysis, Ultrasound waves, Supercritical fluid extraction, Nutra-pharmaceutiacls

Effect of beef fat replacement with linseed oil emulsions on physicochemical and sensory properties of beef patties

Ayesha Anwar, Sadia Aslam, Nauman Khalid

Department of Food Science and Technology, School of Food and Agricultural Sciences, University of Management and Technology, Lahore, Pakistan

Recent studies have focused on the development of the low-fat meat products due to the association between fat and health and the consumer demand of low-fat meat products. From a technical point of view, fat is an essential ingredient in meat products, and removing it could change both the sensory and technological elements. To produce healthier processed meat products, liquid oil is substituted for animal fat, which has a negative impact on the technological and sensory qualities of meat products. Therefore, different emulsion that give right properties to meat products can be used in place of animal fat. Current study was designed to replace beef fat with linseed oil emulsions in beef patties to measure its impact on physicochemical and sensory properties. The varying concentrations of beef fat was replaced with 5 to 15% linseed oil-based emulsions. The chemical composition of the patties was affected by the inclusion of the linseed oil emulsion in patties. The cooked and uncooked patties prepared with the 10% and 15% linseed emulsion showed highest moisture and ash content while patties with 20% beef showed highest fat and protein content. There was a significant difference between the pH values of cooked and uncooked patties from different treatments. Increased lipid oxidation content was observed in cooked and uncooked patties containing different concentrations of emulsions, together with non-significant difference in values of water holding capacity and cooking yield among different treatments. A slightly higher scores were obtained for sensory parameters of patties containing linseed oil emulsions.

Keywords: Beef fat, Patties, Fat replacer, Linseed oil emulsion, PUFAs

Potential Role and impact of paediatrics nutrition on children Body's Metabolism

Shanza Anwar, Shakeel Hussain

Department of Human Nutrition and Dietetics, University College of Montgomery, Sahiwal, Pakistan
**shanzaanwer148@gmail.com*

No time of life is more dominant for provision of adequate and balanced diet than infancy and childhood. During this zestful phase a sufficient amount and appropriate composition of nutrients are of key importance. To prevent the disabilities the services of nutrition are very important. Malnutrition overweight and their consequences remain extensive in public health issues for children and infants across the globe. The dietary guidelines for Americans (2020_2025)

recommend that people aged 2 years or older follow a healthy eating pattern including the variety of fruits and vegetables, whole grain, fat free and low fat dairy products. Undernutrition is estimated to be associated with 2.7 million child deaths annually. According to WHO and UNICEF early commencement of breastfeeding should be within 1 hour of birth. Exclusive breastfeeding should be implemented during 6 months of life, it's very beneficial for proper growth. Practice good hygiene and healthy food handling. Avoid the introduction of solid foods beyond about 6 months of age to reduce the iron deficiency risk. Proper nutrition helps for proper growth and maturity of children and enabling them to reach their full potential.

Keywords: adequate pediatric nutrition, healthy eating pattern, healthy life, breastfeeding, proper hygiene

Development of Safe Halal Food Management System

Shanza Anwar, Shakeel Hussain

Department of Human Nutrition and Dietetics, University College of Montgomery, Sahiwal, Pakistan
**shanzaanwer148@gmail.com*

The term halal is used for label food Recognized as allowable according to Islamic law. The global demand for halal food products increased with the increase of Muslim population globally. It has been projected that the global Muslim population will be 2.2 million in 2030. The national advisory committee on microbiological criteria for foods remit a Hazard Analysis Critical control point (HACCP) working group in 1995. The committee again enclosure HACCP as an effective and rational means of assuring food safety from harvest to consumption. Preventing problems from occurring is the paramount goal underlying any HACCP system. The concern for halal is not only limited to meat and poultry, but also incorporate dairy products, food ingredients and even life style requirements. The market for halal products is growing rapidly and has great influence on consumer worldwide. The halal safety management system is based on the principles of company vision and responsibilities, sanitary system, hazard analysis and marketing. The general parameters of a conformity assessment required by Islam are similar to those of management system like standards, inspection, certification and accreditation.

Keywords: Halal food safety, HACCP, halal products, halal management system

Emerging trends for Food Waste Management

Shanza Anwar, Ammna Shahid, Shakeel Hussain

Department of Human Nutrition and Dietetics, University College of Montgomery, Sahiwal, Pakistan
**shanzaanwer148@gmail.com*

The increased age of food waste is a global problem. Recently organic waste has been acknowledged as reclaimable resource. The primary goal of waste management is waste prevention. In recent years there has been international agreement to prioritize the food waste managements. 60% of fruits and vegetables waste prevention is possible by re-division of surplus food. To achieve the feasible development goals regarding food loss and waste depletion targets at the retail level. Recycling techniques like incineration, landfilling and anaerobic digestion are advantageous in food waste management. Many strategies to improve food waste like co-compositing, addition of organic and inorganic additives, and the mitigation of gaseous emissions are implemented. The sustainable and effective approach to treat bio waste is thorough compositing. Waste management policy and regulations should be implemented in areas such as public health transport and environment and also careful assessment should be made on priority basis to avoid policy crash.

Keywords: Waste management, recycling technologies, improving strategies, policy and regulations

Impact of Microorganisms on Food

Shanza Anwar, Shakeel Hussain

Department of Human Nutrition and Dietetics, University College of Montgomery Sahiwal, Pakistan
**shanzaanwer148@gmail.com*

Food microbiology refers the role of microorganisms in foods. Some microorganisms can be considered useful, if the change due to their growth in foods are considered beneficial. Many microorganisms naturally present in foods, sometimes as contaminants. Bacteria plays role as both the pathogens and as spoilage microorganisms. Like pseudomonas spp can be responsible for the reduction of shelf life of high protein, chilled food stored under aerobic conditions such as meat and dairy products. Addition to bacteria, fungi are also very important group to be concerned with, fungi involve only in food production but also their spoilage and mycotoxin production, which may have several adverse effects to human and animal health. Fungi may gain access to foods through different routes such as in the field (pre and post harvest during processing and storage). Storage at low temperature is one of the most important way of slowing microbial metabolic activity in foods. It is most established that most

microorganisms grow better in pH values close 7.0, although few can grow in pH values below 4.0. Except for a sterile food, all foods harbor one or more types of microorganisms some of them have desirable roles in food such as in production of naturally fermented food.

Keywords: food microbiology, microorganisms, bacteria, fungi, microbial metabolic activity

Dietary Fibers: Magical Food Against Various Ailments

Ukasha Arqam[1]*, Syed Qamar Abbas[2], Maryam Syed[2], Muhammad Sajid Manzoor[1], Shoaib Younas[1], Muhammad Sheharyar[1], Sanabil Yaqoob[1]

[1]Department of Food Science and Technology, Faculty of Life Sciences, University of Central Punjab, Lahore, Pakistan
[2]National institute of Food Science & Technology, Faculty of Food, Nutrition & Home Sciences, University of Agriculture, Faisalabad, Pakistan

Plants are an abundant source of non-starch polysaccharides. The nutritional characteristics and physiological parameters of these compounds are linked to dietary fibers that may be soluble and insoluble in nature. Consumption of dietary fiber exhibits a positive impact on gut health. Non-starch polysaccharides (NSPs) play an essential role in the healthy colonic function and the prevention of constipation. Besides, insufficient dietary fiber and essential fluids, a sedentary lifestyle and hypothyroidism are pathogenesis of constipation. Scientific research has been carried out to evaluate dietary fiber's beneficial and detrimental impacts on health. Research outcomes elaborate that NSPs have remarkable water dispersibility, viscosity, bulk producing and fermentability of long-chain fatty acids into short-chain fatty acids. These features produce preventive effect from diseases related to diet. Due to irregular dietary behavior, some serious diseases may occur, including chronic heart disease, breast cancer, colon cancer and mineral absorption abnormalities. Soluble NSPs maintain plasma cholesterol, blood glucose and insulin level while insoluble NSPs are effective laxatives. Some NSPs enhance the growth of beneficial colonic bacteria through the fermented products that impart positive prebiotic effect. Hence NSPs are proven as therapeutic agent. Recommended daily intake of dietary fiber for adults is 18g. More research should be needed on dietary fiber because its proper physiological and nutritional mechanism is not entirely understood.

Keywords: Nonstarch polysaccharides, laxative, physiological effect, therapeutic agent.

Therapeutic effect of *Sesamum indicum* L. supplementation on blood lipid profile among mild to moderate hyperlipidemic patients

Misbah Arshad, Shahnai Basharat, Shahid Bashir, Maimoona Ashfaq

University Institute of Diet & Nutritional Sciences, UOL, Lahore, Pakistan

Objectives: To find out the therapeutic effect of Sesamum indicum L. supplementation on blood lipid profile among mild to moderate hyperlipidemic patients. Methodology: A total of 30 mild to moderate hyperlipidemic patients aged 25-40 years were selected for the 4 weeks of study. The sample was selected from the university of Lahore teaching hospital, Lahore. Sesamum indicum L. seeds were roasted at 200ºC for 15 minutes in hot air oven. After roasting seeds were ground into fine powder by using commercial blender. Patients were informed to consume 40mg of Sesamum indicum L. supplementation daily and follow basal diet plan for 4-weeks. The anthropometric measurements, biochemical evaluation (lipid profile) and dietary intake data were collected. Results: The mean age group of Hyperlipidemic patients enrolled in study was 32.033 ± 4.895 years. There was a significant reduction in Low density lipoprotein (LDL) and Cholesterol levels with p-value less than 0.05. But no change in Triglycerides levels was observed (p-0.343). High density lipoprotein levels were also improved from 41.8±3.31mg/dl to 46.26±2.29mg/dl. Conclusion: The study concluded that Sesamum indicum L. supplementation showed a significant improvement in hyperlipidemic condition. The study found an increase in high density lipoprotein among patients.

Keywords: Sesamum indicum L, Blood Lipid Profile, Sesamol, Lipid Peroxidation, Lipid Ameoliorating Effect

Guava Powder Added Muffins: A Strategic Approach to Make it Diabetic Friendly

Muhammad Asad[1]*, Rizwan Shukat*[1], Ahmad Din[1], Syed Qamar Abbas[1], Irfan Shaukat[2], Shehzad Muzammil[1], Ghulam Mustafa[3]

[1]National Institute of Food Science and Technology, UAF, Faisalabad, Pakistan
[2]Department of Biochemistry, University of Narowal, 51601, Narowal, Pakistan
[3]CABB, University of Agriculture, Faisalabad, Pakistan
**asadijaz6138@gmail.com(MA), rizwanuaf@hotmail.com(RS)*

Guava has very low in glycemic index, making it an extremely healthy food for diabetic subjects.Guava (Psidium guajava)is known as a good source of biologically active food component.It is a natural product that aids in controlling blood glucose level because of its rich source of dietary fiber and antioxidant value.The most effective technological approach is to develop fortified foods designed to maximize the bio-availability of added ingredients to prevent increase

of glucose level.Therefore, guava can be used in powder form for its refreshing taste as well as preventive and curative medicinal values. The Aim of this study was to develop muffins for diabetic consumers with the addition of guava powder and to investigate the physicochemical and sensory properties of muffins prepared by utilizing guava fruit powder. Guava powder wasprepared by oven drying method at 60oC until its moisture content remains less than 4%. Wheat flour was partially substituted with guava powder from 5-20% to prepare diabetic muffins. Guava powder increased total dietary fibers, total phenolics, mineral contents and total antioxidant activity values. Guava fruit powder can be used to partially replace wheat flour in the preparation of muffins to improve the nutritional quality without affecting the product's sensory quality.

Keywords: guava powder, diabetes, functional foods, fibers, muffins.

Significance of Modified diets and their role in the management of Non-Communicable Diseases

Nida Asghar[1]*, Shakeel Hussain[1]*, Aamna shahid[2]*

[1]Department of Human Nutrition and Dietetics, UCM, Sahiwal, Pakistan
[2] National Institute of Food Science and Technology, UAF, Faisalabad, Pakistan
**nidaasghar0150@gmail.com*

Modified diet is any diet altered to include or exclude certain nutrients like fat, vitamin or minerals and fiber. Modification can be done in consistency also due to medical conditions. In the Condition like Dysphagia (swallowing difficulties) foods are mechanically altered by blending, grinding, chopping, or mashing so that they are easy to chew and swallow. Consistency of food need to alter by depending on the person's ability to swallow. Pudding-like foods consist of pureed consistency including pureed fruits, yogurt, oatmeal, custards and pureed meat are beneficial for severe dysphagia. The diet consist of Soft texture food that are moist and easily swallowed are soft pancakes with syrup, canned fruits or scrambled eggs. In this condition use all food group but in mechanically altered form to fulfill the nutrient requirements of a person. Low residue diet which may be recommended for patients who are at the risk of Bowl obstruction. This diet is used to reduce the amount of undigested food moving through the small intestine which ultimately reduces stool bulk and size. Tender meat, eggs, tofu, dairy products, some fruits that contain low fiber content can be used in this condition. People with lactose intolerance use the diet in which lactose containing products are excluded. Almond milk, soy milk or some formula milk can be used as the alternate of milk. A bland diet consist of the food that are soft, low in spices and low in fiber. Which is used can be used to address the symptoms of ulcers, heartburn, GERD, nausea, and vomiting. Patients also need a bland diet after gastric sleeve or intestinal surgery. Diet low in fat and cholesterol helps to combat the clogged arteries and other cardiovascular diseases. Oils from plant sources are rich in omega-3 and omega-6 which helps to improve the overall wellness. People with neck surgery, gastrointestinal obstruction, short bowl syndrome, coma and

metabolic stress like burn conditions are nourished by the method called Tube feeding. Clear liquids, broths, soup, thickened liquid these are the mechanically altered diet used in tube feeding to fulfills the nutrient requirements for certain patients. Apart from this formulas milk can also be included to the diet which are fortified with essential nutrients needed by the body for growth, repair and maintenance of the body.

Keywords: modified diet, nutrient requirement, diet in disease condition, mechanically altered diets.

Food-based Dietary Guidelines in accordance with physical activity for athlete and various Age groups

Nida Asghar[1]*, Shakeel Hussain[1]*, Aamna shahid[2]*

[1]Department of Human Nutrition & Dietetics, UCM, Sahiwal, Pakistan
[2]National Institute of Food Science and Technology, UAF, Pakistan
**nidaasghar0150@gmail.com*

Sports nutrition refers to nutritional strategies that is designed to increase athletic performance. Athletes' energy requirements are different than the average person because their body expand more energy. So their body needs additional nutrients to recover from intense physical activity. For peak athletic performances nutritional needs include sufficient calorie intake, adequate hydration, and attention to timing of meals. The athlete may experience deficits in speed, strength or stamina as well as decreased focus on exercise with fatigue and high risk of injury who is not well-fueled or hydrated. Physical activity can improve the muscle strength and boost your endurance. Muscle building supports the bone and joints. For children and adolescents (6-17 years) recommended physical activity is 60 minutes or more. People with the age of 18-64 years do at least 30minutes' walk and exercise daily. You also need more protein when you start an exercising activity. Most athlete requires 40-60% of carbohydrates, 20-25% of protein, and 20-30% of fats from healthy sources of fat (usually from plant sources). Consumption of CHO (unrefined whole wheats) can increase the stores of glycogen in athlete body and fat is also work as a primary fuel which help to combat with fatigue. Protein from diet and supplements like whey protein helps to repair and strengthens muscle tissue. Getting enough protein supports the growth of muscle which is essential for peak athlete performance. Calcium rich food in diet helps to strengthen bones and reduces the risk of bone fracture. Before exercise an intake of carbohydrates is required to top up blood glucose to delay fatigue. After exercise fluid intake should be consumed because dehydration can impair athletic performance. Consuming fluids at a level of 400-800ml per hour of exercise might be suitable way to avoid dehydration. Coconut water is a best option to maintain the balance of electrolytes. A well-planned diet should meet most of an athlete's vitamin and minerals need, also provide enough protein to promote muscle growth and repair.

Keywords: nutrition for sports men, balance diet, healthy activity, athlete nutrition, importance of physical activity.

Survillence and Advances in the Management of Pediatric Nutrition

Nida Asghar[1]*, Shakeel Hussain[1], Aamna Shahid[2]

[1]Department of Human Nutrition and Dietetics, University College of Montgomery, Sahiwal, Pakistan
[2] National Institute of Food Science and Technology, UAF, Faisalabad, Pakistan
**nidaasghar0150@gmail.com*

Pediatric nutrition is the maintenance of a diet required at the various stages of child development consisting of a balanced diet that provides essential nutrients and adequate calorie intake necessary to promote growth, development, and physiological functions. It includes the nutrition for children from infancy upto 18 years of age. This period of life is the best time for the provision of adequate and balance nutrition to reduce the risk of malnutrition which leads to complicated diseases. Exclusive breastfeeding is a complete diet for the infants up to 0-6 months because breastfeeding provides all the essential nutrients needed by the body for immunological protection, growth and development. Its unique composition provides all the nutrients like vitamins and minerals, water, various essential fatty acid, hormones and antibodies which protect from respiratory tract infection, and the risk for sudden infant death syndrome. Breastfeeding makes the child more intelligent according to a research. Whereas prolonged breastfeeding is correlated with high cognitive skills. Children up to 12 to 24 months also fed on breastfeeding coupled with appropriate complementary feeding. In complementary feeding you can start with a single baby rice cereals or pureed iron-rich pureed food. Mashed potatoes or meat, banana or other soft food pureed introduce firstly. Then gradually try to introduce foods from all food groups this will helps to prevents from different food allergies. Children who skip breakfast have high probability to getting 'hangry' (hungry and angry) while at school. So giving children breakfast is too important for their overall development. To maintain the proper nutrition an appropriate balance of diet with exercise and healthy lifestyle is important. Choose the foods from all food groups including dairy products, protein, fruits and vegetables and whole grains. Eating a variety of food keeps the meals flavorful and colorful which attract the children. Use of dairy products provide calcium that are important to strengthen the bones and teeth. Fruits and vegetable provide antioxidant and have anti-inflammatory properties that helps to fight against different infection and diseases. Whole grain instead of processed are the healthier option which provides bulkiness and relieves constipation. Meat and nuts are good source of protein required for tissue development. Use vegetable oils which contain omega-3 or omega-6 fatty acids may aid sleep quality. Apart from this, physical activity also plays an important

role to strengthen bone and growth. Better nutrition in childhood prevents from complication in later life by reducing the risk of chronic diseases and malnutrition.

Keywords: Nutrition for pediatrics, Healthy kids, Healthy eating for children, Infant's growth and development, Importance of breastfeeding, Balance diet.

Soybean waste (okara) and its potential food applications

Aasma Asghar, Muhammad Afzaal, Huda Ateeq, Noor Akram, Amara Rasheed

Government College University, Faisalabad, Pakistan

Soybean and its products (soymilk or its powder, fresh or dried tofu, soybean oil, soy flour, soy sauce, and bean sprouts) are liked in Asian countries. Every year soybean processing produces bulk waste in the form of okara. Soybean waste (okara) has good nutritional, microbial, and functional properties. 1kg of soybean processing produces 1.1 kg of okara which is discarded. This bulk amount of waste may cause environmental pollution which produces health problems. Okara (soybean waste) has a good nutritional and phytochemical profile as well as microbial properties, therefore it is safe for human consumption. Okara has many health endorsing properties which make it suitable for the development of various functional foods. Current review, discussed prebiotic, nutritional, and bioactive properties of okara. Okara is effective in prevention of diabetes, obesity, cancer, hypertension, and decrease triglyceride and improve cognitive performance. Consiuviley, okara has potential for the development of various types of bakery and beverage-based foods.

Quantification of Aflatoxins in Different Dates (*Phoenix Dactylifera* L.) Varieties from Humid Subtropical Regions.

Shamayem Aslam[1]*, Muhammad Yasin Ashraf[1], Muhammad Rafique Asi[2], Shabbir Hussain[2], [3], Hafiz M. Fahad Raza[2], Muhammad Adil Rehman[4], Sumera Anwar[1], Fahad Shafiq[1]

[1]*Institute of Molecular Biology & Biotechnology, The University of Lahore, Lahore 54000, Pakistan*
[2]*Food Toxicology Lab, Nuclear Institute for Agriculture and Biology, Faisalabad 38000, Pakistan*
[3]*Central Analytical Facility Division, Pakistan Institute of Nuclear Science and Technology (PINSTECH), P.O. Box Nilore, 1482, Islamabad, Pakistan*
[4]*Department of Food Science and Technology, University College of Agriculture & Environmental Sciences, The Islamia University of Bahawalpur, Bahawalpur 63100, Pakistan*

Food items are prone to fungal attacks due to the warm and humid climatic conditions of Pakistan. The aflatoxins (AFs) are the most common mycotoxins produced by fungal species highly responsible for liver toxicity and hepatocellular carcinoma. The present study was planned to assess the contamination levels of

aflatoxins (AFB1, AFB2, AFG1, and AFG2) in local and imported varieties (Irani and Saudi) collected from Pakistan. About 251 dates samples were procured from the markets and analyzed by reverse-phase high performance liquid chromatography coupled with a fluorescence detector (HPLC-FLD) in isocratic mode. The AFs were detected in 89% of date samples ranging from 32.9 to 1465.4 µg kg-1 all of which exceeded the permissible limit of AFs set by FDA (USA) (20 µg kg-1) and EU (4 µg kg-1) for human consumption. The two main local varieties Kupro (801.5 µg kg-1), and Mazafati (1275.8 µg kg-1) had maximum concentrations of total aflatoxins. Out of imported varieties, Mabroom (Saudi) (272.94 µg kg-1) and Rubai (Irani) (1465.42 µg kg-1) have the highest concentrations of total aflatoxins. The maximum levels of AFB1 were seen in Mazafati (Pakistani) (521.5 µg kg-1), Mabroom Saudi (127.6 µg kg-1) and Rubai Irani (662.8 µg kg-1). It could be seen that overall local varieties have higher contamination of AB1 and total AFs with the exception of Rubai (Irani) and Mabroom (Saudi) due to the poor storage conditions, improper pre- and post-harvesting handling, and humid conditions of Pakistan emphasizing the need for proper management and regulation. This study could be taken towards the analysis of risk assessment of Pakistani population on greater scale and also to determine more fungal susceptible Pakistani date varieties.

Evaluation of the antioxidant activities of protein hydrolysate produced from enzymatic hydrolysis of rohu (*Labeo rohita*) waste using response surface methodology

Sadia Aslam[1], Rizwan Shukat[2], Nauman Khalid[1]

[1]Department of Food Science and Technology, School of Food and Agricultural Sciences, University of Management and Technology, Lahore, Pakistan
[2]National Institute of Food Science and Technology, Faculty of Food, Nutrition and Home Sciences, University of Agriculture Faisalabad, Pakistan

The fish by-products contain an appreciable amount of nutritious proteins. However, these by-products are either dumped into waste, which could pollute the environment, or they are converted into low-value commodities like fertilizer and animal feed. Enzymatic hydrolysis can be employed to transform them into bioactive fish protein hydrolysate in order to maximize their bioactive potential. Current study was aimed to optimize the reaction conditions such as temperature, pH, time of hydrolysis and enzyme to substrate ratio by response surface methodology to produce protein hydrolysates from rahu (Labeo rohita) fish waste exhibiting antioxidant potential. Experiment was initiated with the preliminary trials to estimate the optimum temperature (50oC, 55oC, 60oC), pH (6.5, 7.0 and 7.5) enzyme (alcalase) to substrate ratio (1.5, 2.0, 2.5 w/w) time of hydrolysis (60, 90 and 120 minutes) to get maximum 2, 2-diphenyl-1-picrylhydrazylradical (DPPH) radical scavenging activity and ferric reducing antioxidant power (FRAP). The optimum conditions for maximum DPPH• scavenging activity of protein hydrolysate were 55.61oC temperature, 91.54 minutes time of hydrolysis,

2.48% [E]/[S] ratio and 8.44 pH and estimated DPPH• scavenging activity was 53.05%. The optimum conditions for maximum FRAP of protein hydrolysate were 55.32oC temperature, 77.09 minutes hydrolysis time, 1.89% [E]/[S] ratio and 7.73 pH and estimated FRAP activity was 17.72%. Non-significant difference was observed between experimental (52.79%) and predicted values (53.05%) of DPPH radical scavenging activity and actual (17.09%) and predicted values (17.72%) for FRAP of protein hydrolysate. Results showed that the experimental model generated by design expert software V-11 demonstrated a quadratic fit with experimental data.

Keywords: Fish, Antioxidants, Protein hydrolysate, Alcalase, response surface methodology

Investigating the Antioxidant Potential and Volatile Profile of Defatted Microwave Assisted Flaxseed Extracts at Different Power Intervals

Ayesha Aslam, Anees Ahmed Khalil*, Shahid Bashir, Ammar Ahmad Khan, Ahood Khalid, Quratul Ain Shahid

Microwave assisted extraction one of the recent technologies have been a positive impact on the environment. The effective heating, rapid energy source, shorter extraction period and high yield are some of the aspects making this technique efficient. The present study was aimed to assess the total phenolic content (TPC) and total flavonoid content (TFC) of the defatted flaxseed extract obtained through microwave assisted extraction technique. Variations in the values for TPC and TFC obtained at different power intervals (150, 300 and 450W) were 20.90 to 31.55mg/GAE/g and 0.19 to 0.33mgLUE/100g, respectively. In-vitro antioxidant potential was determined by the significant values obtained for DPPH (10.87 – 19.12%), FRAP (15.44 – 20.91%) and Fe II Chelating assay (12.17 – 25.46µg/ml), respectively. The results clearly showed a significant extraction of phenolics and flavonoids along with the other volatile compounds to be highest at 450W as compared to the lower power intervals.

Keywords: Microwave assisted extraction, phenolics, flavonoids

Therapeutic and Antimicrobial potential of synbiotic products

Huda Ateeq, Muhammad Afzaal, Aasma Asghar, Amara Rasheed, Noor Akram

Government College University Faisalabad, Pakistan

As probiotics and prebiotics has been proposed to confer numerous health benefits and provide a barrier against a range of infectious disorders, irritable bowel syndrome, diarrheal sicknesses etc. However, the safe delivery of probiotics in human gut in adequate amounts a challenge for food scientists due to the unfavorable conditions of GIT, especially in stomach, which is highly acidic.

However, researchers are working on the modern techniques that can be used for safe delivery of probiotics. Discovery of synbiotic food products (food product having both prebiotics and probiotics) is gaining much attention recently due the availability of prebiotics along with probiotics that enhance gut functionality and resulted as a natural cure for various diseases through the synergistic action of probiotic and prebiotics. The synbiotic products enhances the availability of different bioactive compounds and reduces the free radical production in body. As a result, it boosts the immumodulatory components but also reduces the risk of cancer and tumor formation, cardiovascular diseases, irritable bowel syndrome, respiratory problems etc. For optimized results, Fermented and dairy food products can serve as a best vehicle for this synergistic effect.

Keywords: Probiotics, prebiotics, synbiotics, immunomodulatory effect, improved health

Effect of lifestyle on nutritional status among adolescents

Atif, Umar Farooq, Afshan Shafi, Muhammad Shahbaz, Umrah Zafar, Aliza Batool, Naqi Abbas, Khizar Hayat, Zahid Rafiq

Department of Food Science and Technology, MNS University of Agriculture, Agricultural Complex, Multan, Punjab, Pakistan

Pakistan, like other developing countries is going through the double burden of under nourished with continuous increasing number of obese and overweight. Adolescence, transformation from childhood to adulthood, is a period of significant human growth. Adolescents now a days acquiring the life style that are imparting negative effects on nutritional status. Life style behavior and practices observed in adolescents may have deleterious consequences on their health. Apprehension that how life style affects nutritional status is important for health professionals to make strategies for improvement of the health status of adolescents. The purpose of the study was to answer the question that how lifestyle effects the nutritional status of adolescents by keeping in view, the components of life style of adolescents. The mandate of the study was, whether the nutritional status of adolescents is influenced by different factors of life style i.e socio-demographic profile, eating behaviors, physical activity, screen time, stress and sleeping habits. The study also accessed lifestyle of adolescence. This was a cross sectional study done by using questionnaire and FFQ. Nutritional Status was assessed by height, weight and BMI. Life style variables were dietary habits, physical activity, screen time, stress and sleeping pattern. Result showed that dietary habits had significant association with nutritional status.

Keywords: Nutritional status; adolescents; life style

Calcium fortified milk to cure Osteoporosis

Atif, Umar Farooq, Afshan Shafi, Ambreen Naz, Nighat, Umrah Zafar, Aliza Batool, Khizar Hayat, Naqi Abbas, Zahid Rafiq

Department of Food Science and Technology, MNS University of Agriculture, Agricultural Complex, Multan, Punjab, Pakistan

Osteoporosis is an arising socio-economic and medical warning identified by systemic skeletal disease leads to insidious bone mass loss and strength. As estimated, more than 200 million people in the world are suffering from osteoporosis. Bone loss cannot be reversed on its own but mineral can be restored by taking a dietary supplement of stimulated non-fat, calcium fortified milk. It can be lactose treated for lactase-deficient patients. Studies reveal that calcium bioavailability of calcium fortified milk is slightly higher than unfortified cow milk. Phytates and oxalates in pulses and green leafy vegetables lower the bioavailability of calcium by forming insoluble calcium complexes. Various studies suggest that selection of appropriate calcium sources with respect to sensory quality and in-vivo absorbability, to prevent osteoporosis and to maximize life quality. Daily intake of 1200 mg of non-fat, calcium fortified milk appears to be acceptable measure in osteoporotic patients. Sufficient amounts of vitamin D are also necessary for maximum calcium absorption and bone mass restoration. To combat with this disease, there is an urgent need to cover up the myths about milk that it can be substituted with plant-based foods having calcium levels.

Keywords: Osteoporosis, calcium, phytates, oxalates

Pediatric Nutrition in Low-Birthweight Infants

Rehman Atta

Department of Human Nutrition and Dietetics, University College of Montgomery, Sahiwal, Pakistan
** rehman99.swl@gmail.com*

Low birth weight (LBW) remains a significant public health problem in many developing countries, and poor nutrition both before and during pregnancy is recognized as an important cause. Emerging evidence on the role of intergenerational effects in determining maternal preconceptual nutritional status indicates the need for continued investment in strategies that improve women's nutrition and health throughout the life cycle, especially during the early years. Controlled trials have shown that improving food intakes during pregnancy effectively reduces LBW, but programs have been less successful because these interventions are expensive and difficult to manage. Multivitamin-mineral supplements have been viewed as a simpler solution, but 2 of 3 controlled trials conducted to date failed to show that multivitamin-mineral supplements are more

effective than are iron-folate supplements, which are already the standard of care during pregnancy. Emerging evidence indicating the benefits of iron supplements in improving birth weight illustrate the need for increased efforts to reduce iron deficiency by improving coverage of antenatal programs and promoting fortification. Other causes of LBW include environmental factors, such as smoking; indoor air pollution; and infections, such as malaria. However, little is known about the interactions between nutrition and infection. Underlying social factors, such as poverty and women's status, are also important, especially in South Asia, where more than one-half of the world's LBW infants are born. There was a relation between high maternal CMD and poor child nutritional status in worldwide. Regardless of the direction of the relation, child nutrition programs in Asia should consider incorporating promotion of maternal mental health. In summary, strategies that combine nutrition-based interventions, such as improving food intakes and micronutrient status, especially iron status, with approaches that improve women's status and reproductive health are needed to reduce LBW.

Keywords: Growth factor, Lifestyle modification, Infants health, Maternal CMD, Nutritional status

Restorative potential of date fruit supplemented diet on serum lipidemic and oxidative stress biomarkers in rodent experimental modeling

Kanza Aziz Awan[1], Masood Sadiq Butt[2], Hussan Munir[3], Sanabil[1], Amal Shaukat[1], Waleed Sultan[1], Aysha Imtiaz[2]

[1]Department of Food Science and Technology, Faculty of Science and Technology, University of Central Punjab, Lahore, Pakistan
[2]National Institute of Food Science and Technology Faculty of Food, Nutrition & Home Sciences University of Agriculture, Faisalabad, Pakistan
[3]Al-Shaheer Foods, Karachi National Institute of Food Science and Technology, University of Agriculture Faisalabad, Pakistan

Present research was designed to explore the functional worth Pakistani date cultivar (Zahidi) against atherogenic diet induced oxidative stress. Bioefficacy assessment of Zahidi fruit and extract was carried out via model feeding trial. The rats (Sprague dawley) were divided into two broad categories; one fed on normal diet, whereas the others were administered atherogenic diet to induce oxidative stress. The formulated groups were G1 (Normal diet), G2 (Date fruit + normal diet), G3 (Date extract + normal diet), G4 (Atherogenic diet), G5 (Date fruit + atherogenic diet) and G6 (Date extract + atherogenic diet). The results showed that date fruit reduced 3.65% serum cholesterol in normal rats, whereas 15.14% in atherogenic rats, while, the date extract treatment resulted in 4.49 and 18.55% reduction in normal and atherogenic rats, respectively. Low-density lipoprotein (LDL) cholesterol reduced by 8.66 and 11.55% in date fruit and date extract fed

normal rats, respectively. Whilst, 21.05 and 25.98% reductions were noted in the atherogenic groups fed on date fruit and date extract containing diets, respectively. To assess the extent of cardiac risk in the subjects, several atherogenic ratios were calculated based on the serum lipid parameters. The analysis showed that atherogenic diet groups were at higher risk than the normal ones and date fruit and extract containing functional diets effectively ameliorated the elevated risk ratios. The date fruit and extract-based diets intensified serum superoxide dismutase (SOD) and catalase (CAT) levels throughout the study up to 29.05 and 27.99%, respectively. Date fruit effectively lowered lipid peroxidation by 13.64 and 33.67% in normal and atherogenic rats, respectively. Conclusively, date fruit and extract treatment proved effectual in modulating the serum lipid profile and effectively restored the SOD and CAT levels alongside reducing the lipid peroxidation.

Keywords: Zahidi date fruit, Serum Cholesterol, Lipid peroxidation, Endogenous enzymes, Atherogenic diet, Atherogenic index

Role of Drying and Dehydration for Longer Shelf Life of Food and Agricultural Products.

Namra Shams Awan, Namrah Mehmood

Department of Human Nutrition and Dietetics, UCM, Sahiwal, Pakistan
**namra3609@gmail.com*

Basically, Food drying is a method of food preservation in which food is dried (dehydrated or desiccated). Drying is one of the most important method of preserving wide variety of food and agricultural products. Drying inhibits the growth of bacteria, yeast, and mold through the removal of water. Moreover, due to high heat capacity of water, drying is usually a long-lasting and energy-intensive process, thus new drying techniques are continuously being sought. Dehydration has been used widely for this purpose since ancient times (12, 000BC) in hot sun. This review presents the current state of art in ultrasonic-assisted drying. Despite immense knowledge on the principles of ultrasound generation and action, this technology has found no practical application in industrial drying yet. The preservation of food by drying is the time-honored and most common method used by humans and the food processing industry. Dehydration (or drying) is also define as 'the application of heat under controlled condition to remove the majority of the water normally present in a food by evaporation' (or in the case of freeze drying by sublimation). The analysis of the results presented by researchers here allow to state that applying ultrasound to drying caused a shortened of the drying time and could reduce total energy consumptions. The necessity of conducting detailed study on ultrasound application in drying was emphasized. Drying is for the purpose of moderating the amount of water activity to prevent the growth of bacteria by aerobically respiring. Clearly, drying food does not fully prevent contamination, but in addition, the process changes the physical properties of the food.

Keywords: Drying, Dehydration, Ultrasonic, Food, Preservation.

Phytochemical Composition of Date Fruit, it's Nutritional Value & their Role in the Treatment of Various Diseases, A Review

Akasha Khan Bangial, Sadaf Javeria, Shehroz Raza, Abbas Dilawar, Iqra Rubab, Malik Hashim

Institute of Food science and Nutrition, Gomal University, D. I. Khan, Pakistan

This review article provides information on the nutritional functional constituents of dates (Phoenix dactylifera L.). The use of date fruit which is taught by Our Holy Prophet Hazrat Muhammad (ﷺ) and is now being supported by strong scientific evidence Nowadays, date fruit is considered a reliable source of herbal medicine for the management of several diseases. Date flesh is found to be low in fat and protein but rich in sugars, mainly fructose and glucose. It is a high source of energy, as 100 g of flesh can provide an average of 314 kcal. Ten minerals were reported, the major being selenium, copper, potassium, and magnesium. The consumption of 100 g of dates can provide over 15% of the recommended daily allowance from these minerals. Vitamins B complex and C are the major vitamins in dates. High in dietary fiber (8.0 g/100 g), insoluble dietary fiber was the major fraction of dietary fiber in dates. Dates are a good source of antioxidants, mainly carotenoids and phenolics. Date seeds contain higher protein (5.1 g/100 g) and fat (9.0 g/100 g) as compared to the flesh. It is also high in dietary fiber (73.1 g/100 g), phenolics (3942 mg/100 g) and antioxidants (80400 μ mol/100 g). Regarding this, the aim of the current review study was to highlight the role of the phytochemical composition of date fruit in the treatment of various diseases in both acute and chronic conditions, as well as exploring their in vivo mechanisms and nutritional value.

Keywords: Date fruit, Phytochemical, Nutritional value, In vivo mechanism.

Utilization of Pomegranate Peel Powder for Production of Functional Meat Product

Zunaira Basharat[1], Muhammad Rizwan Tariq[1]*, Shinawar Waseem Ali[1], Muhammad Usama Pervaiz[2]

[1]Department of Food Sciences, University of the Punjab, Lahore, Pakistan
[2]Department of Chemistry, UET, Lahore, Pakistan
**rizwan.foodsciences@pu.edu.pk, 923007254349*

Poultry meat particularly chicken meat is well-regarded from other meat types because of its low energy value with high nutritional density. However, chicken meat doesn't provide sufficient amount of dietary fiber to its consumers. On the other hand, food industry by-products are excellent source of many functional

ingredients such as dietary fibers and bioactive compounds. Pomegranate processing produce an enormous amount of food waste that is dumped as waste without begin knowing the functional importance of pomegranate peel. Pomegranate peel provides a significant amount of dietary fiber with minute's amount of fat. Furthermore, it is an outstanding reservoir of many bioactive compounds that are responsible for anti-oxidant and anti-microbial properties. The purpose of this study was to develop a functional meat product (chicken tender pops) by effective valorization of pomegranate peel powder (PPP) and to explore its efficacy as a natural dietary fiber source, anti-oxidant and anti-microbial agent. Chicken tender pops were developed by incorporation of various concentrations of pomegranate peel powder. Treatments were named as control sample (T0), chicken tender pops with 3% PPP (T1), chicken tender pops with 6% PPP (T2), chicken tender pops with 9% PPP (T3). All the samples were developed under good hygienic conditions, stored at 4 ± 2℃ for 30 days and evaluated for stability and acceptability under storage conditions. Incorporation of pomegranate peel powder significantly increased the dietary fiber content of chicken tender pops from (0.252%) in T0 to (1.45%) in T3. Water holding capacity of product was improved significantly due to addition of PPP. While other physicochemical parameters fat, protein, ash and pH showed non-significant effect. The lowest values of TBARS (0.59 mg monoaldehyde/Kg) and total plate count (3.05 log CFU/g) was observed in T3. Furthermore, addition of PPP significantly improves the cooking yield and cooking loss of the product. Sensory evaluation was carried out by trained panelist using nine-point hedonic scales. Chicken tender pops with 6% PPP (T2) was preferred by panelist due to high acceptability and balanced organoleptic properties. Hence it can be concluded that PPP can be effectively utilized as a natural fiber source, anti-oxidant and anti-microbial agent in novel functional foods.

Keywords: Pomegranate Peel Powder, Chicken tender Pops, Fiber Supplementation, Natural anti-oxidant, Anti-microbial, Valorization

The economic status of food fortification: An Overview

Shahid Bashir, Ali Ikram, Ammar Ahmad khan, Muhammad Zia Shahid

Fortification is the process of adding one or more necessary nutrients to food to prevent a population's specific nutrient deficiency. It is a successful public health intervention technique. This approach aims to enhance the consumption of one or more nutrients that have been determined to be insufficient in the food. In middle and low-income countries, food deficiencies in one or more micronutrients, like iron, zinc, and vitamin A, etc. are common and threaten the physical and mental health of millions of individuals. Food fortification has been shown to positively affect individuals' economic, social, and health outcomes. A considerable proportion of infant and toddler fatalities are prevented by fortification with vitamin A, iron, and zinc, making it a particularly alluring preventive healthcare strategy. With impacts via cognition being significant for iron and iodine,

fortification with these nutrients delivers economic benefits and the minimal cost of food fortification ensures big benefit-cost ratios. Fortification won't benefit everyone, but it will be more cost-effective if there is a fast food delivery system, more centralized processing, and a widespread deficit or unpleasant consequences that are extremely expensive even though only a small population is affected. The literature on the cost-benefit and cost-effectiveness of food fortification with particular micronutrients that are important for developing countries is summarized in this study.

Keywords: Review; Economic Status; Food fortification

Olive oil: A natural therapy in management of hypercholesterolemia

Aliza Batool, Umar Farooq, Afshan Shafi, MianShamas Murtaza, Shabbir Ahmed, Umrah Zafar, Afira Akhtar, Naqi Abbas, ZahidRafiq, Atif, Tahir Habib

Department of Food Science and Technology, MNS University of Agriculture, Agricultural Complex, Multan, Punjab, Pakistan

Hyperlipidemia is a widespread illness that is mostly responsible for coronary heart diseases and develops due to changes in plasma lipid transport, lipid metabolism, or the production and breakdown of plasma lipoproteins. Additionally, it can develop as a side effect of the metabolic syndromeand includes obesity, hyperglycemia, cardiovascular disease, dyslipidemia, and hypertension. It has drawn the interest of different scholars and medical professionals as a critical public health-related issue. By adopting healthy lifestyles and good eating habits one can manage the hypercholesterolemia and the related health disorders. Despite recent advancements in medicine, more focus is now being placed on plant-based therapies because they are more widely accessible, less expensive, convenient, and have less adverse effects than synthetic medications. The fruit oil known as extra virgin olive oil (EVOO) is a rich source of monounsaturated fats and efficient antioxidants. With the administration of EVOO, a considerable reduction in plasma lipid levels has been observed due to its hypolipidemic effects. Olive oil supplementation lowers serum triglycerides, normalizes liver enzyme biomarkers, and dramatically reduces the deposition of fat droplets in the liver. Extra virgin olive oil has the potential to be a useful food source of antioxidants that can reduce the incidence of liver damage and cardiovascular illnesses.

Keywords: Extra virgin olive oil, triglycerides, cardiovascular, hyperlipidemia

Evaluation of Nutritional Status of Covid 19 Patient Admitted in Intensive Care Unit in Shifa International Hospital.

Zainab Bibi

Shifa International Hospital Ltd, Islamabad, Pakistan
**zainab.bibi@shifa.com.pk*

Back ground: Covid 19 emerged in China's Wuhan in December, 19 and become reason for legion moralities and economic losses globally at different rate. This change can be the outcome of many factors like health facility, age factor or ethnical. Impaired immune response is the key factor to catch the respiratory virus. Improved nutritional status and Healthy life style are basic pillars for effective functioning of immune system to restrain from infection. In the generalized therapeutic strategy of any health care center, nutritional diagnoses and initial nutrition management especially for covid patients must also be incorporated. Multiple tools have been proposed so for nutritional screening, nutritional status can be elevated by using these tools to prevent the patients from malnutrition. Among them the healthy diet and adequate nutritional status are the foundation for the effective and stronger immune system to prevent from different infectious ailments. Objective: Current study was aimed to evaluate the nutritional status of critically ill covid patient. Methodology: This was a retrospective observational study conducted in the Intensive Care Units of tertiary care hospital in Islamabad, for this study organizational approval from formal ethical committee will be taken (). Study population was the confirmed cases of covid - 19 admitted in critical care units, APATCHE II and Nutric score were used as screening tool for severity of disease and nutrition status on day of admission. Cases were enrolled between the duration of November 2020-May2021. Baseline data include demographic, anthropometric (weight, Height and BMI), Habit of smoking, past medical history about any comorbid diagnosed in past or in current hospital admission were recorded. The SOFA score (Sequential Organ Failure Assessment score) and GCS (the Glasgow Coma Scale) were calculated. Some biochemical parameter including Blood Glucose Kidney function test (Creatinine), liver function test (bilirubin), Hemoglobin, inflammatory factor (WBC, CRP) and protein biomarker (Albumin) were done. The dietary data were analyzed (calorie, protein). Caloric recommendation was according to ASPEN (American Society for Parenteral and Enteral Nutrition, 25 kcal/kg body weight) were according to adjusted body weight for the patient with BMI more >30 and to actual body weight of BMI with< 30 were compared with current intake. Respiratory support at the time of admission were also monitored with sign and symptoms. Results: During the specific duration total 1382 patient were screened in which 163 were confirmed covid 19 patients including 109 males and 56 females with mean age 63.93years (Range:30-100y). 51% patient were those who are directly admitted to ICUs and 47.8 were shifted to ICU from stable floor later on worsening the condition covid floor 1% patients were shifted from other hospital. Hypertension was most common comorbid in past medical history which

is present in 59% of subject's others include diabetes 51%, Chronic kidney disease 14 % in which 3% have end stage renal disease, 6% cardiac disease, 5.5% with chronic liver disease3% each with asthma and COPD and dementia arthritis, TB and Parkinson patients are less common in subjects. 50% covid 19 patients admitted in critical care units have decrease in GCS while fever and shortness of breath were most common symptom (27.6%, 20.24% respectively) other complain including cough, poor appetite, constipation, diarrhea, chest pain body aches and melena.35% of covid 19 patients were currently smoker or ex-smoker.39%ptient were at high nutrition risk initially and having lower albumin level than reference value, both inflammatory factors CRP and WBC and HBA1C were also show higher readings as compare to normal(133.43, 14029, 7.49 respectively) while coagulation factor and hemoglobin showed normal mean values. Conclusion:39% of covid 19 patient in ICU were at nutrition risk while habit of smoking hypertension and obesity can be factor in the worsen outcome of covid 19 patients.

Keywords: Nutritional Status; Covid 19; Shifa International Hospital; ICU

Bioactive Rich Foods: Status, Challenges and Opportunities

Shahzad Ali Shahid Chatha*

Director International Linkages, Government College University, Faisalabad, Pakistan
**chatha222@gmail.com; diril@gcuf.edu.pk*

There has been a remarkable resurgence of interest in natural product based food items from the last few decades. With the outstanding/developments in the areas of separation science, spectroscopic techniques, and microplate-based ultrasensitive in vitro assays, natural product research is enjoying renewed attention for providing novel and interesting chemical scaffolds. The various available hyphenated techniques (GC-MS, LC-PDA, LC-MS, LC-FTIR, LC-NMR, LC-NMR-MS, CE-MS) have made possible the preisolation analyses of crude extracts or fractions from different natural sources, isolation and on-line detection of natural products, chemotaxonomic studies, chemical finger printing, quality control of herbal products and metabolomic studies. This talk will present, with practical examples, a general overview of the processes involved in natural product research, starting from extraction to determination of the structures of purified products and their biological activity.

Keywords: Natural products; secondary metabolite; extraction; isolation; bioassay.

Quality evaluation and bioactive contents of white pepper (*Piper nigrum* L.)

Muhammad Ehsaan[1], Saira Tanweer[1], Muhammad Ammar Khan[1], Adnan Khaliq[2], Tariq Mehmood[2], Saadia Zainab[2]

[1]*Department of Food Science and Technology, IUB, Bahawalpur, Pakistan*
[2]*Department of Food Science and Technology, KFUEIT, Rahim Yar Khan*

Spices like white pepper commonly use now a day, India, china and Sri lanka, are big grower of white pepper. In Pakistan it is cultivated at small level. It is most famous in world for their pungency and flavor spices used for the making varieties of product with special aroma and flavor. It is normally poorly soluble in aqueous environment but has a good effect on human health. The extraction approaches are necessary for the extraction of piperine from the white pepper for their bio availability. Natural bioactive compound that is obtained from white pepper which have antibacterial activity. White pepper shows antioxidant and antimicrobial activity that can maintain the quality of food product and impart good flavor for product development.

Keywords: Spices, Solubility, Piperine, Product Development

Studies on the preparation and quality evaluation of cookies by using powders of Moringa olefera leaf and pumpkin seed (*Cucurbita pepo* L.)

Muhammad Ehsan, Tusneem Kausar*, Ammara Ainee

Institute of Food Science and Technology, University of Sargodha, Sargodha
**tusneem.kausar@uos.edu.pk*

A cookie is a baked or cooked food that is typically small, flat and sweet. Nutritional value of cookies can be manipulated by adding some nutritional ingredients. So, the present study was planned to improve the nutritional value of cookies by adding Moringa leaf powder and pumpkin seed powders. Moringa Oleifera is used as vegetable (leaves, green pods, flowers, roasted seeds), for spice (mainly roots), cooking and cosmetic oil (seeds) and as a medicinal plant (all plant organs) and contains vitamin C, calcium, potassium as well as proteins. Pumpkin seeds are also good source of proteins, vitamins and minerals. Cookies were prepared by replacing wheat flour with Moringa leaf and pumpkin seed powders at 0, 5, 10, 15 and 20%and quality characteristics of resultant cookies which include the physical, chemical and sensory properties were analyzed. Use of Moringa leaf and pumpkin seed powders decreased the spread ratio of cookies. Protein, fat, fibre and ash content increased while increasing these powders. Sensory evaluation also showed the acceptability of these cookies. The results showed the possibility of using Moringa leaf and pumpkin seed powders to improve the nutritional value of cookies.

Keywords: Cookies, Moringa leaf, Pumpkin seed, Chemical properties, Sensory evaluation

Development of quick, healthy and high protein school lunch snack for middle childhood (6-8yr)

Iqra Elahi

BSc Food Science and Human Nutrition, Kinnaird College for Women, Lahore

Children globally are consuming high caloric energy-dense foods and inadequate protein which resulted in malnutrition and obesity in children. Most snacks are either made of all- purpose flour or potatoes both of which trace amounts of protein, children munch on these snacks all-day and consume small amount of regular meal. Macronutrients consumption in 24hr by school children was found out to be as follows, carbohydrates ranged 55%-70% which exceeds the AMDR, protein ranged 10-12% while AMDR is 10-30% and fat was found to be 21% to 30% which was adequate. To increase consumption of proteins in school-going children most frequently consumed snacks (FCS) were listed in a questionnaire to know which one among them was FCS then modified. Cake-like products such as cake-pops were found to be FCS. The recipe of cake-pop was modified by substituting APF partially with 3 composite flours (CF) T1(100%) T2(90%) and T3(80.4%) containing chickpea flour, black gram flour, almond flour, pumpkin seed powder and moringa powder all of which are plant based high protein sources. Percentage of chickpea flour was kept high in all CF as the Protein Quality (PQ) and bioavailability is high. CF increased the amount of protein in cake pops from 0.9g in unmodified cake-pop to 1.5g (T1), 1.6g (T2), 2.1g (T3). Sensory evaluation by experts showed most liked cake pop was made by 80.4% replacement of APF (T3) as its sensory parameters were close to the control and it had no after taste.

Comparison of Serum Albumin Level in Edematous Vs Non-Edematous Severe Acute Malnourished Children Age 6-59 Months Admitted in Nutritional Rehabilitation Unit of Lady Reading Hospital, Peshawar

Shah Fahad, Aimal Khan

The University of Agriculture, Peshawar, Pakistan

The Albumin protein enters in our bloodstream and reduce the leakage of fluids out from our blood vessels into other tissues and it is also the main carrier for hormones, vitamins, and enzymes throughout the body. The present study was conducted at Lady Reading Hospital (LRH), Peshawar. A comparative cross-sectional study design was selected to compare the Serum Albumin level of edematous and non-edematous severe acute malnourished children age 6 – 59

months. A questionnaire was designed for the collection of data and nutritional status was assessed through anthropometry, family history, clinical and dietary methods. A total number of 20 patients were selected from Nutritional Rehabilitation Unit (NRU) in which 10 were edematous and 10 were non-edematous severe acute malnourished. Data were analyzed in SPSS v.20. Data showed that out of 20 children 17 had low level of serum albumin level than normal. All 10 edematous patients were suffering from hypoalbuminemia whereas 7 out of 10 non-edematous severe acute malnourished children were suffering from hypoalbuminemia. The data further showed that only 30% children were exclusively breastfed up to 6 months and 55% children were giving mixed breastfed up to 12 months of age in which most of the mothers were giving formula milk and cow's milk with improper dilution. The most common risk factor of hypoalbuminemia in both edematous and non-edematous severe acute malnourished children was found to be the improper dilution of formula milk i.e. 80% children were given formula milk with improper dilution.

Integrated processes that work together to control and minimize Food safety hazards, A Review

Muhammad Faisal*, Malik Muhammad Hashim, Sadaf Javeria, Iqra Rubab, Muhammad Zohaib Zia

Institute of Food Science and Nutrition, Gomal University, Dera Ismail Khan
**muhammadfaisalaslam986@gmail.com*

Food safety and quality has received attention in the agri-food sector and is basis of all initiatives taken on different activity levels starting from farm to enterprises as a whole on regional, national, and international levels. A hybrid of the ISO 9001, Quality Management System and Hazard Analysis and Critical Control Point (HACCP), ISO 22000 has been developed as an international solution for improving the food safety. Instead of applying good manufacturing practices. This standard endorses conformity of services and products for international trading by assuring about reliability, food quality, and food safety. The role exploration of Food Safety Management System (FSMS) in implementing food safety throughout the food production and supply chain is reviewed in this paper. The goal "once certified, accepted worldwide" of Globe Food Safety Initiative theme discussed to help industries and researchers. ISO 22000 along with its sister standards are auditable, reliable, and reasonable to ensure safe production, distribution, and consumption of food. Food safety and nutrition are inextricably linked: to achieve optimal human health and wellbeing, people must be both well-nourished and free from foodborne disease. Despite these linkages, the connections between food safety and nutrition have been largely lacking from existing frameworks for food systems, which tend to treat food safety superficially, as only one sub-component, not integrated throughout. As a result, they do not highlight relevant pathways for integrated action and measurement related to food safety and nutrition.

Impact of long-term exposure of sub-lethal drug concentrations on *Staphylococcus aureus* and *Pseudomonas aeruginosa* dual species biofilm Formation

Maria Faraza, Muhammad Badara, Seerat uz Zahraa Hafsa Khan, Asma Khan

Gomal Center of Biochemistry & Biotechnology, Gomal University, D.I. Khan

Biofilms are the well-organized communities of microorganisms attached to biotic or abiotic surfaces and encased in the self-produced matrix of extracellular polymeric substances (EPS) mainly composed of proteins, carbohydrates and DNA. Biofilms are very difficult to eradicate by conventional antibiotics. Biofilms mostly consist of more than one bacterial species, and there occur complex interactions between species in the biofilm. One such complex interaction is between S. aureus and P. aeruginosa present in the airways of Cystic fibrosis patients and in wounds. Synergistic and antagonistic interactions occur between the two species which lead to poor clinical outcomes. It has been found that sub lethal drugs concentrations of antibiotics greatly impact the physiology of bacterial strains. Exposure of bacteria to sub lethal concentrations of antibiotics leads to disturbance in the virulence factors of bacteria including resistance, biofilm formation and eDNA production. The present study aimed to investigate the impact of 3 fluoroquinolone antibiotics including Ciprofloxacin, Levofloxacin and Ofloxacin at half of their MIC concentrations on the co-culture biofilm formation of S. aureus and P. aeruginosa at different time points. For this purpose, crystal violet binding assay was used for the biofilm quantification of 14 isolates of S. aureus which included 5 strong biofilm forming MRSA, 5 strong biofilms forming MSSA, 2 non-biofilm forming MRSA and 2 non-biofilms forming MSSA co-cultureed with P. aeruginosa. Results showed that biofilm formation was significantly reduced in 80% of strong biofilm forming MRSA and MSSA strains, while biofilm formation was observed to be increased in 75% of non-biofilm forming isolates. The most significant results were observed after 96 hours of incubation and onwards. It is concluded from the results that sub lethal concentrations of antibiotics has major impact on the biofilm formation of co-cultured S. aureus and P. aeruginosa in a time dependent manner. Further studies in this field would help us combat the complex interactions within multi-species biofilms using sub lethal drugs concentrations.

Keywords: Staphylococcus aureus; Pseudomonas aeruginosa; biofilm Formation

Effect of factors on buckwheat starch digestibility and its mechanism

Muhammad Adil Farooq, Muhammad Farhan Jahangeer Chughtai, Atif Liaqat, Adnan Khaliq, Samreen Ahsan, Tariq Mehmood

Institute of Food Science and Technology, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan, Pakistan

Carbohydrates are abundant in starchy crops, commonly used as a staple diet. Obesity and type II diabetes are common in those who have a sedentary lifestyle and consume a lot of carbohydrate-rich foods. It is necessary to design such starch-containing foods that produce a modest and stable postprandial blood glucose response by increasing the amount of slowly digested and indigestible carbohydrate content to reduce their influence. Buckwheat is an excellent choice for such a dietary intervention because it has more slowly digested starch and have a lower glycemic index than other cereal starches. The rate and extent of buckwheat starch and its derivatives are affected by a number of variables. This review will overview the effect of different factors such as starch structure, ratio of amylose and amylopectin, degree of gelatinization, and retrogradation on buckwheat starch in-vitro digestibility as well as highlight distinct in-vitro starch digestible techniques. Buckwheat starch glycemic index (GI) and digestibility can be improved after processing, mainly via gelatinization and retrogradation. Buckwheat starches' unique functional characteristics encourage their use in innovative food and non-food application and can be developed by altering them chemically, physically, or enzymatically. Further research is needed to understand the relationship between the protein/polyphenols and the physicochemical properties of buckwheat. Furthermore, developing buckwheat-based whole food products will require more information on starch retrogradation and nutritional enhancement of buckwheat noodles.

Nutritional bioactive compounds and potential health benefits of date's fruit: A review

Kinza Farooq[1], Saira Tanweer[1], Zulfiqar Ahmad[1], Muhammad Farhan J. Chughtai[2], Saadia Zainab[2]

[1]Department of Food Science and Technology, IUB, Bahawalpur, Pakistan
[2]Department of Food Science and Technology, KFUEIT, Rahim Yar Khan

The use of fruits in edible food products has garnered more interest in recent years. Fruits are a great source of vitamins, minerals, fibers, carbs, and proteins. Multiple studies have demonstrated their positive effects for human health when consumed. One of the earliest trees that humans have cultivated is the date palm (5500–3000 BCE). The only fruit that has been consumed as a mainstay of numerous cultures' diets for millennia is dates. It has a high concentration of dietary fiber as well as

a high concentration of protein, vitamins, salts, and minerals. While the seeds contain 14 different types of fatty acids, only eight of these fatty acids are found in extremely low concentration in the flesh. The fatty acids are present in both the flesh and the seed as a variety of saturated and unsaturated acids. Palmitoleic, oleic, linoleic, and linolenic acids are examples of unsaturated fatty acids found in date's fruit. There are 23 different types of amino acids in dates' protein, some of which are absent from the most common fruits like oranges, cherries, and bananas. At least six vitamins are present in dates, including vitamin A, vitamin B1, vitamin B2, niacin and a minor quantity of vitamin C. According on type and level of ripeness, the dietary fiber in different varieties of dates can range from 6 to 11%. Pectin, which is found in dates in amounts of 0.5 to 3.9%, may have significant health advantages. Dates fruit provide a diverse range of necessary micro and macro nutrients and significant health advantages, making them a nearly ideal food in many aspects.

Keywords: Dates fruit, Food product, Nutrition compounds, Macronutrient, Micronutrient

Dietary Guidelines for Mothers Awareness to Prevent and Manage Milk Induced Anemia

Eshal Fatima[1], Nida Tasneem Khan[2]

[1]*Depart.Food Sci & Human Nutrition, Kinnaird College for Women, Lahore*

Milk-induced anemia is a type of anemia that is caused due to the excessive consumption of cow milk during the first 12 months of life when that baby cannot digest it properly leading to many health problems. The awareness regarding milk-induced anemia during infancy and its prevention are not available in Pakistan. Therefore, the purpose of this study was to develop a booklet of dietary guidelines to prevent and manage MIA. For the development of the booklet, data was gathered on milk anemia and dietary guidelines from the existing literature available on the internet from various books, journals, and articles. Following this evaluation of the booklet was done via the devised validation forms. The content validity of the first draft of the booklet was evaluated by the Expert Panel from the field of food science and human nutrition to ensure the content and utilization could be assessed. The developed booklet was evaluated by mothers and females of reproductive age to assess its utilization and acceptability. The booklet was well-received by the general public and they responded that the information in the educational dietary booklet was readable and easy to comprehend. The booklet can be a significant source of dietary guidelines for mothers' awareness to prevent and manage milk-induced anemia.

Keywords: Awareness; Milk induced Anemia; Book; Publication

Probing the association of diet with migraine among adults

Ghulam Fatima, Tusneem Kausar*, Shahid Mahmood

Institute of Food Science and Technology, University of Sargodha, Sargodha 40100, Punjab, Pakistan
**tusneem.kausar@uos.edu.pk*

Migraine is a kind of headache accompanied by neurologic, gastrointestinal and autonomous variation and its prevalence has increased in the last few years. Different factors trigger migraine includes fatigue, exercise, sleep deprivation, bright lights, head trauma, infection, menstruation etc. The role of nutrition triggers, have become much more questionable with the increase in the rate of migraine occurrence. The main objective of the study is to evaluate the dietary triggers of migraine among patients. This cross-sectional study was conducted in district Sargodha, Punjab, Pakistan. Data was collected from local hospital by interviewing the 90 patients who were previously diagnosed with migraine by neuro-physician. Nonprobability sampling and judgmental sampling methods were used for study. A self-designed questionnaire was used to collect the data regarding demographics, clinical signs and symptoms, dietary habits and others. The findings suggested that most of migraine patients were early adults (20-35 years). 80% patients were belonging to lower middle socioeconomic status and 63% were not satisfied about their social circumstances. In regard to dietary habits most of the patients were using caffeinated beverages, soy sauce, high fat diets, pickled products, tyramine rich diets and skipping their main meals. Majority of migraine sufferers were overweight and obese because of less physical activity and poor eating practices. These findings demonstrated that dietary factors and obesity can trigger and contribute in increasing severity of migraine attacks. Lack of awareness regarding headaches and their triggering factors is also contributing in worsening the condition.

Keywords: Migraine, Adults, Diet, Cross-sectional study, Obesity

Cinnamon-a multifaceted medicinal plant

Areej Fatima[1]*, Saira Tanweer[1], Muhammad Asif Khan[1], Samreen Ahsan[2], Saadia Zainab[2], Saba Zartaj[1]

[1]Department of Food Science and Technology, IUB, Bahawalpur, Pakistan
[2]Department of Food Science and Technology, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan, Pakistan

Cinnamon is a spice which procure from the inner bark various tree species from the genus Cinnamomum. Cinnamon used as an aromatic and flavor additive in a breakfast cereal, snack foods, teas, and tradition foods. The aroma or flavor of cinnamon obtain from its essential oil and main component, cinnamaldehyde, and other constituents including eugenol. Cinnamon powder in terms of chemical

composition and its content of fiber, minerals, bioactive components, antioxidant activity and antimicrobial activity. Cinnamon is an unusual tropical plant belonging to the Lauraceae family. Cinnamon extracts that contain biologically active compounds such as cinnamic aldehyde, cinnamic alcohol, cinnamic and cinnamic acid. It has antioxidant, anti-inflammatory and antibacterial properties and is used to treat conditions such as diabetes, cardiovascular disease, manage blood pressure, lowering the effects of high fat meals and many other diseases related to oxidative stress.

Keywords: Cinnamon; Spice; Review; Medicianl plant; Aromatic plant

Nutritional Health Status of Afghan Refugee Women living in Punjab: A Cross Sectional Study

Maleeha Fatima, Farhana Nosheen, Adeela Manzoor, Norina Jabeen

Afghan Refugees are world's supreme populated community with 2.6 million registered Afghan refugees existing worldwide from which about 2.2 million are present in Iran and Pakistan. Pakistan is a highly populated country and due to low socioeconomic status, food insecurity, unhygienic conditions and inadequate access to health care in Pakistan, they might be having high chances of being malnourished. Undernutrition is a very unescapable condition present mostly in Afghanistan and Afghans have 25 times more high chances of death every year from undernourishment and poverty due to war occurrence than from violence. Due to starvation as well as insufficient nutrition are among the most somber problems that convoy all wars. The study aimed to assess nutritional health status of Afghan refugee women living in Islamabad Punjab as women are most vulnerable and highly group in any community. Good health of women at time of conception means successful pregnancy and having healthy child. This cross-sectional study was carried by taken 150 women from 15–30 years of age group and assessing their nutritional status through different methods. The results indicate a prevalence of underweight, normal and overweight at 74.7%, 16.7% and 8.7% respectively. As their Body mass index values are significant which means they have iron deficiency as well as having low body mass index as compared to their age. This study shows an alarming situation that these refugee women have chances of malnutrition and if not having proper and nutritious diet, they becoming malnourished soon.

Keywords: Nutritional Health Status; Afghan Refugee Women; Punjab

Role of Microbiology in Food Constituents

Almas Fatima[1]*, Shakeel Hussain[1], Aamna Shahid[2]

[1]Department of Human Nutrition and Dietetics, UCM, Sahiwal, Pakistan
[2]National Institute of Food Science and Technology, UAF, Faisalabad, Pakistan
**almasfatima559@gmail.com*

Food microbiology studies the role of microorganisms in foods. It incorporates aspects of microbial ecology in food as well as the use of microorganisms for manufacturing of ingredients and foods. Moreover, some microorganisms represent a major challenge for public health due to their potential to cause diseases. Microorganisms most commonly related with foods are described, together with intrinsic and extrinsic parameters of foods that influence microbial growth. Microbiology is important for food safety, production, processing, preservation, and storage. Microbes such as bacteria, molds, and yeasts are employed for the foods production and food ingredients such as production of wine, beer, bakery, and dairy products. Food loss by either spoilage or infected food affects food industry and consumers leading to economic losses and enlarged hospitalization costs. The harmful microorganism's bacteria, yeasts, molds, virus, and parasites involved in food spoilage or contamination. Spore-forming bacteria involved in the spoilage of several refined foods. This type of bacteria is considered a vital threat in heat-treated foods. The use of microorganisms to attain dissimilar types of food, such as beer, wine, bread, cheeses, and fermented milk is very old. Yeasts are fungi that extend as solitary cells that reproduce by budding. Molds are concerned in the spoilage of foods where moldy or mildewed foods are considered unhealthy to eat. Various parasites can be transferred by food including many helminthes and protozoa. Developments in the study of infectious disease, microbial ecology, plant and animal pathology, and biotechnology promise to upgrade human life and the well-being of the environment, and new opportunities have come about through social and scientific substitutes.

Keywords: Spoilage, Spore-forming bacteria, Molds yeasts, Parasites

Development & quality characterization of sapodilla drink (RTS)

Khansa Fiaz[1], Muhammad Nadeem*[1], Tahir Mahmood Qureshi[2], Sadaf Javeria[3]

[1]Institute of Food Science & Nutrition, University of Sargodha, Sargodha
[2]Department of Food Sciences, CUVAS, Bahawalpur, Pakistan
[3]Institute of Food Science and Nutrition, Gomal University, DI Khan, Pakistan
** nadeem.abdul@uos.edu.pk*

We have been awarded by nature with a stunning flora and fauna which had prettified our life. Sapodilla is well-known for its therapeutic and nutritive properties. Sapodilla has a good antioxidant mutagenic and anti-cancer property that directly influences radical-scavenging potential. Sapodilla has short shelf life

due to its perishable nature. An attempt was carried out to develop sapodilla RTS beverage using green techniques such a sonication and microwave techniques. Physicochemical attributes like acidity, pH, -TSS, pH, antioxidant activity, and sensory attributes of RTD was analyzed during 90 days of storage. The highest º Brix was found in T0 (12.14±1.19º Brix) and the highest pH was found in T2 and T3 with mean values (3.82±0.06% and 4.28±0.04%) and the lowest pH was observed in T1 with mean value (3.72±0.03%). Total phenolic contents were found the maximum in T3 (370.42±1.88bmg GAE/100mL drink) and the lowest phenolic contents was observed in T0 (334.53±1.66 mg GAE/100mL drink). The highest total flavonoid contents were found in T2(316.67±19.51 µg CE/mL) and the lowest total flavonoid contents was observed in T0(111.48±24.28 µg CE/g). The highest antioxidant capacity was found in T3 (410.68±5.10 µl AAE/ml) and the lowest total antioxidant capacity was observed in T0 (381.85±6.09 µl AAE/ml). The results of sensory evaluation disclosed that maximum score for sensory properties like color, flavor, taste and overall acceptability was achieved by treatment T3 and T4 which revealed that these treatments of sapodilla RTS were declared the best with sonication and microwave treatment.

Keywords: Sapodilla, total antioxidants, total phenols, total flavonoids, acidity

Terminalia Chebula (Myrobalan): An Emerging Functional Plant (A Review Study)

Kandra Gill, Nida Tasneem Khan

Department of Food Sciences and Human Nutrition (FSHN), Kinnaird College for Women, Lahore, Pakistan

The aim of the study was to identify benefits and properties of Terminalia Chebula (myrobalan) a functional plant what are its components and how it helps in preventing certain diseases. This research covers the benefits and uses of (Terminalia Chebula) as well as its pharmacological properties. The secondary data was used to conduct the research through different research articles. The study concludes that Terminalia Chebula (myrobalan) is an emerging functional plant that has several uses. The traditional uses include, use for cough, and promote digestion; helps treat vomiting, gout, its pharmacological uses include, anti-viral, anti-microbial, and anti-caries- Immuno-modulatory-, anti-carcinogenic, chemo protective, hepato protective activities etc. it can promote your heart health, helps in maintaining blood glucose levels and is useful in arthritis. It also has an effect on pain. Terminalia Chebula is studied in regards to its link as a therapeutic plant. It is known as the “king of medicine” and been extensively used in certain Iranian and Tibet medicine. It has a high nutritive value when compared with apples but little evidence is available in this regard. Terminalia Chebula is a called therapeutic plant because of its several components that exist in it, for example the anti-oxidants, flavonoids, glycosides and other components. It was observed that it has potent dyeing effects on wool because of having tannins and other components. By using several research studies the aim

was to highlight potential uses and properties of the plant. This study will provide basis for several other studies.

Utilization and Processing of Unconventional Food Sources: A Way to Food Safety and Security

Aneela Hameeda, Muhammad Junaid Anwara*

Faculty of Food Science and Nutrition, Bahauddin Zakariya University, Multan
**Junaidfst786@gmail.com*

Food insecurity is an emerging threat to the increasing population worldwide. The scarcity and hunger have shifted the nations of backward and low-income regions towards death globally. The only way to ensure food safety and security are to evaluate the toxicity levels of existing foods and explore unconventional food sources from backward and uncultivated areas. Numerous edible plants such as Stinging Nettle (Urtica dioica), Air yam (Dioscorea bulbifera), kachnar (Bauhinia variegate) and Moringa (Moringa olifera) etc. and their parts, i.e. fruits, leaves and other edible parts, growing in these areas are being neglected by the majority of the population due to absence of shreds of evidence about their safety and health effects. However, studies suggested that unique bioactive compounds and polyphenols in these plants enhanced their importance in managing various disorders. The emerging processing techniques are among the best options to process these edible plants in the development of various health-promoting food commodities, which can be stored and transported to the different communities suffering from the shortage of essential foods and nutrients. Hence, unconventional foods can be proven in the management of the nutritional status of the nutrition deficient community.

Keywords: Food Security, Food Safety, Unconventional Edible Plants, Emerging Processing Techniques

Low Mass, Long Shelf life, Highly Nutritious (fulfilling 24 hours calorie requirement) Food Products for Teenagers to Overcome Malnutrition in the Rural Areas of Pakistan

Maha Hanif, Komal Azam, Muhammad Shehryar, Samia Majeed

Department of Food Science and Technology, UCP, Lahore, Pakistan

Pakistan is standing against the tornado of Malnutrition and hunger. A United Nation's study of 2018 claimed that only 4% of children in Pakistan are receiving fully nutritious diet. Pakistan is aiming to become zero hunger country by 2030. To overpower the obstacle of malnutrition in teenagers' study has been done to develop high calorie cookies with vital nutrients for their healthy growth and nourishment. Teenagers require 1600-1800 calories per day. These products can also be used in emergency conditions such as in war, floods, droughts or famines

etc. People can also take these products with them for children while going on long trips or tours where healthy food is not available. Each cookie was of about 50g in weight providing 3.523 Calories per gram so each cookie of 50g contains 176 calories. One serving contained 4 cookies which means the total calories for one-time meal were 704kcal. Consuming 3 packets per day fulfills calorie requirement of teenagers. As these cookies are rich in Protein so they prevent malnourished teenagers from Kwashiorkor, night blindness and anemia. These cookies not only satisfy the calorie requirement but is also rich in nutrients like protein and fiber so it is also considered as a healthy food option.

Risk Factors and Feeding Patterns Associated with Protein Caloric Malnutrition (PCM) in Children Age 6-59 Months Admitted in Nutritional Rehabilitation Unit of Lady Reading Hospital, Peshawar

Malik Abdul Haseeb, Aimal Khan

The University of Agriculture, Peshawar, Pakistan

Protein caloric malnutrition (PCM) is one of the most prominent type of undernutrition in developing countries which causes significant morbidity and mortality especially in children. For the current study Lady Reading hospital (LRH), Peshawar was selected as a host institute. A cross sectional study design was selected to find out the risk factors and feeding patterns associated with Protein Caloric Malnutrition (PCM) in children age 6-59 months. A questionnaire was designed for the collection of data and nutritional status was assessed through anthropometry, family history, clinical and dietary methods. Data was collected randomly from 50 PCM patients admitted in Nutritional Rehabilitation Unit (NRU) of LRH. Among 50 patients 27 were male and 23 were female. Data were analyzed in SPSS v.20. The data showed that 10% admitted children were not vaccinated and 90.0% were vaccinated. It has been observed that 44% were exclusively breastfed up to 6 months and 26% children were giving mixed breastfed up to 12 months of age in which most of the mothers were giving formula milk and cow's milk with improper dilution. The most common risk factors associated with PCM were lactation failure (70%), delayed weaning (66%), improper dilution of formula milk (70%), maternal illiteracy (96%), joint family setting (76%), poor economic status (86%) and other infectious diseases was (16%).

Keywords: Risk Factors; Feeding Patterns; Protein Caloric Malnutrition; Children; Peshawar

Beneficial effects of Carotenoids in Food and Nutraceutical products

Ali Hassan, Malaika

Department of Human Nutrition and Dietitian, University college of Montgomery, Sahiwal, Punjab, Pakistan
**ali03051561696@gmail.com*

Carotenoids are a mixture of extraordinary dietary significance. Robustness gain of carotenoids is emanated along with the fruits and foodstuffs in the nourishment, awfully from knock-up products accommodate and hold oil, or from the addition of their take outs, dried tomatoes, or those suspended in oil. Extensive ingredients for the accomplishment to fulfill and nourish suitable eye wellness two. Xanthophyll and zeaxanthin are major carotenoids. A diet high in regular bulk expending is generally interconnected with supporting health and lowering the risk of several diseases. In the face of the confirmation of the sap comfort of carotenoids, large population-based addition studies have produced mixed results for some of the carotenoids. The up-to-the-minute interpose studies have intimated that, in well-nourished, a medium strength of carotenoid supplementation is neither friendly nor harmful. Concerning the objective, 52 trials were deep on studying carotenoids' bioavailability, and 140 studies look over the effects of carotenoids on human health. The flavonoids possible of carotenoids are of special importance to human health because misplacing antioxidant-reactive oxygen species stability out-turn into "oxidative stress", a disapproving element of the pathogenic processes of profuse chronic disorders., The carotenoid oxygenase (BCMO1 and BCDO2), is demonstrated, as well as the importance of carotenoid metabolites as bioactive compounds in the regulation of retinoid actions in the body. The risk of noxious results for some carotenoids under certain occurrences is thought about. These compounds have the distinctiveness of acting to impair or stave off human chronic diseases (e.g., breast cancer, diabetes mellitus, eye illness, and cardiovascular ailments) and aging. In conclusion, Carotenoids remain a fascinating group of natural pigments. They have a functional role in biology

Keywords: Carotenoids, Health, Nourish Disease

Edible Coatings for Shelf-Life Extension and Nutritional Enhancement of Fresh Fruits and Vegetables

Suqlain Hassan, Mishal Khan Khosa, Muhammad Akhtar, Zulqurnain Khan, Muhammad Usman, Plosha Khanum

Department of Food Science and Technology, MNSUA, Multan, Pakistan

Food industries conventionally use plastic materials like polythene, polystyrene, and polypropylene for fruits and vegetables packaging purposes, but these packaging materials pose many problems. These are becoming dangerous to the environment by increasing environmental pollution due to their non-recyclable and non-degradable nature. Because of this, now scientists are much concerned regarding development of environment friendly packaging technologies like edible coatings that are used to control gas exchange, moisture and oxidative process of many fresh fruits and vegetables. Edible coatings may be made from plant or animal sources. These coatings can modify the composition of internal gases of products and can also provide additional protection. These coatings can be useful in extending the shelf life of fresh fruits and vegetables and are mostly consumed with the food. These may provide food safety due to their resistance against different factors deteriorating the food. The edible coating can also enhance the nutritional status of the products as several nutritional ingredients can be incorporated into the matrix of edible films. The success of these coatings for fruits and vegetables depends on the control of the composition of internal gases. It also depends on the determination of several other quality criteria, including firmness loss, color change, ethanol fermentation, and weight loss. This criterion needs to be monitored strictly throughout the period of storage for the success of these coatings and to achieve the desired goals in terms of retention of the quality and enhanced shelf life.

Keywords: Edible Coatings, Food Processing, Shelf-life Extension, Nutritional Enhancement

Biodegradation of antinutritional factors in chickpea through fermentation

Khizar Hayat, Umar Farooq, Babar Ali, Awais ur Rehman, M. Zaki Khan

Department of Food Science and Technology, MNSUA, Multan, Pakistan
**kizarhayat36@gmail.com*

Chickpea (*Cicer arietinum* L.) belongs to the family of "Leguminosae" is one of the oldest pulse crop with high content of protein (25-30%). Along with high protein contents, presence of non-nutritive/anti-nutritional factors (trypsin inhibitor, tannin, protease inhibitor and phytates) in chickpea hinders the availability and digestibility of protein and other nutrients. The current research work was planned for the breakdown of these anti-nutritional factors to increase

the availability and digestibility of protein and other nutrients. The standard procedure was followed for the fermentation of chickpea. The chickpea samples were inoculated with different cultures Streptococcus thermophilus, Lactobacillus plantarum, Lactobacillus bulgaricus and Lactobacillus acidophilus by using 2% inoculum size (107 cfu/mL) and incubated at 37±2ºC for 0, 2, 4, 6 and 8 hours' time intervals. Results indicated that the fermentation significantly reduced the anti-nutritional factors. The phytic acid was reduced from 11.70±0.08 to 8.67±0.49 mg/g, tannin from 5.49±0.02 to 3.23±0.33 mg/g, trypsin inhibitor from 11.27±0.03 to 8.92±0.09 mg/g and protease inhibitor from 51.27±0.03 to 44.78±0.05 U/g. Similarly, the protein digestibility was increased from 61.24±0.75 to 80.00±0.27%. Fermentation also improved the amino acid profile and mineral contents and its availability. On the basis of these findings it was concluded that the nutritional value of the chickpea can be improved through fermentation technology by using selected strains of microorganisms.

Keywords: Anti-nutritional factors, Fermentation, Protein digestibility.

Study on PostbioticsDerived from Lactic Acid Bacteria as Functionality Improvers: A Novel Strategy in Food Safety and Biopreservation

Marzieh Hosseininezhad

Food Biotechnology Department, Research Institute of Food Science and Technology, Mashhad, Iran

The challenges of food safety have been continuing to persist although numerous action plans have been employed to improve food security. While food microbial spoilage places an enormous financial burden on the industries in addition to public health concerns, an over-growing trend among consumers preferring preservative free foods have provided conditions for developing innovative alternatives in food safety assurance. In recent years, among natural antimicrobials, considerable interests' haves been focused on a wide range of functional substances produced by microorganisms. Lactic acid bacteria (LAB) have been utilized in food fermentation to enhance the quality and tastesof food while protecting it from pathogenic microorganisms and spoilage. Derived bioactive macromoleculesfrom probiotic LABrecognized as postbiotics, offer a wide range of antimicrobial and biological activities. Direct application of postbiotics in food models have been shown to possess antimicrobial activities, not only in retarding the growth of food-borne pathogens but also against spoilage bacteria. In a series of our research projects conducted during the recent years, postbioticsproduced bya range of LAB strains isolated from traditionally fermented productswere investigated andtheirfunctional activity in model foods was assessed. These studies, based on the results of antimicrobial effects against food pathogenic indicators and spoilage bacteria plus the functionality of ingredients in improve the texture and quality of model systems, successfully

recommend application of the postbiotics as candidate food preservativesto enhance the food safety, quality, and shelf life.

Improvements to Control the Food Wastes Produced During Hospitality Operations

Shakeel Hussain[1]*, Shehzad Ali[2], Muhammad Hamza Shahid[3]

[1]Department of Food Science &Technology, UCM, Sahiwal, Pakistan
[2]Department of Food Science & Technology, GC University Faisalabad
[3]Department of Food Science & Technology, MNSUAM, Multan
**shakeel.fppt@gmail.com*

Hospitality food waste represents an important societal challenge. It is still under-researched with more studies impending the issue from the perception of viable agriculture and environmental, rather than hospitality, management. Given the specificity of hospitality operations, this is a main shortcoming, which hinders understanding of the determinants of effective modification. This study postulates a critical, analytical account of the information on hospitality food waste made from the perspective of hospitality managers. It revises the disputes in classifying, quantifying and characterising hospitality food waste, deliberates the prospects and obstacles to its modification and, illustration on good business practice examples, and develops a context for managing food waste across the various areas of hospitality operations. The framework is reinforced by such determinants of operative moderation as: core in-house proficiencies; training needs; primary investment costs; and potential economic savings.

Keywords: Food waste, Hospitality, Modification

Application of Potato Peel in the Food Product Development: An Overview

Nabia Ijaz, Shahid Bashir, Muhammad Ahmad, Ali ikram

University Institute of Food Science and Technology, The University of Lahore, Pakistan

Potato (Solanum tuberosum L.) is one of the foremost vital rural items for human utilization, producing a huge sum globally each year. Potato peel waste could be a zero-value residue that happens in huge amounts during industrial potato handling and can shift from 15 to 40% of the initial product mass, depending on the peeling strategy. Potato peel, which is a by-product of potato production, gives around 50% dietary fiber. Diabetes, cardiovascular disease, high blood pressure, obesity, and constipation can all be healed by increasing dietary fiber and engaging in physical activity. Potato peel contains vital organic matter and has the potential to be used as a food preservative, medicinal component, renewable energy source, and animal feed to boost eco-friendly food sectors. On the other

hand, potato peel has a good influence in the baking industry. Because of its high fiber content, potato peel powder is used to give value to bakery goods such as biscuits, cookies, cupcakes, cakes, pastries, bread, and chapatti. With such a considerable addition of potato peel to bakery goods, new prospects for waste management and an eco-friendly atmosphere emerge. The present review focuses on the potato peel utilization in the development of food products.

Keywords: Potato Peel; Food Product Development; Food Processing

Food Waste and By-products: A Chance to Reduce Hunger and Malnutrition

Ali Ikram[1], Farhan Saeed[2], Muhammad Afzaal[2], Awais Raza[1]

[1]*University Institute of Food Science and Technology, UOL, Lahore, Pakistan*
[2]*Department of Food Sciences, GC University, Faisalabad, Pakistan*

A large amount of waste and by-products are produced during agricultural production and agro-industrial processing. More than 50% of by-products produced from fresh fruit and vegetables, such as peels, bagasse, shells, stems, trimmings, seeds and bran, have a higher nutritional and functional value than whole ones. High amounts of waste and by-products are produced during the manufacturing and processing of food in developing countries, which has an adverse effect on the environment and incurs high costs. However, there is a lot of potentials for these biomaterials to generate food additives, reducing poverty and malnutrition in the developing countries where they are produced. Many of these biomaterials are sources of beneficial substances such as proteins, dietary fiber, carbohydrates, lipids, and many other micronutrients. Food fortification is a crucial tactic in the fight against malnutrition, and in many developing countries, significant efforts have been made to make use of leftovers and by-products. Furthermore, antinutritional components in some by-products can be reduced using biotechnological techniques as a food additive or creating balanced diets. Utilizing these biomaterials in this context is difficult but presents a huge opportunity to increase food security. This review aims to assess the potential of wasted food and by-products as a long-term solution to reducing malnutrition and hunger in developing countries.

Keywords: Food Waste; Food By-products; Malnutrition; Hunger

Taurine prevented diabetes-induced apoptosis in spinal cord of diabetic rats

Inam-u-llah[1, 3*], Muhammad Jehangir[1], Muhammad Liaquat[1], Piao Fengyuan[2, 3]

[1]The Department of Food Science & Technology, The University of Haripur
[2]Integrative Laboratory, Affiliated Zhong Shan Hospital of Dalian University, Dalian 116001, China
[3]Dalian Medical University, China
**inam056@yahoo.com*

Diabetes mellitus (DM) is a condition characterized by chronic hyperglycemia, which leads to diabetic neuropathy and apoptosis in the spinal cord. Taurine has been found to ameliorate the diabetic neuropathy and control apoptosisin various tissues. However, there are few reports that discuss the direct relationship between spinal cord and anti-apoptotic effect of taurine. In this study, DM was induced in male SD rats with STZ @ 25 mg/Kg of body weight in combination with high fat diet. After 2 weeks, they were divided into four groups as DM: diabetic rats, T1 (0.5%), T2 (1%) and T3 (2%) taurine solution, while control group was nondiabetic rats (no treatment). The results showed that DM increased apoptosis, decreased phosphorylated Akt and Bad. DM decreased expression of Bcl-2 and increased the Bax. Moreover, the release of cytochrome c into cytosol was increased in DM and activation of caspase-3 was also increased. However, taurine reversed all these abnormal changes in a dose dependent manner. Our results suggested the involvement of Akt/Bad signaling pathway and mitochondrial apoptosis pathway in protective effect of taurine against apoptosis in the spinal cord of diabetic rats. Therefore, taurine may be a potential medicine against diabetic neuropathy by controlling apoptosis.

The effect of tomato juice added to drinking water at different levels on performance, egg quality characteristics and hematological parameters in laying hens

Aamir Iqbal, Shakeeb Ullah, Kamal Shah, Ali Zaman, Muhammad Shoaib, Baseer Ahmad, Nadar Khan, Faiqa Ramzan, Muhammad Khalid, Ismail Bayram

Gomal University, D. I. Khan, Pakistan

Since antibiotics and synthetic feed additives can cause many hazardous effects in animal's and human health, therefore there is an emerging interest to use feed additives from plant and natural source. The novelty of this study is that tomato juice was used first time to investigate its effects on performance, egg quality and blood parameters in laying hens. A total of 128 Babcock white laying hens (50 weeks old) were divided into 4 groups (n=32) with 4 subgroups containing 8 hens in each. Tomato juice was added to the drinking water of the experimental groups with 0%, 1%, 2.5%, and 5% respectively for 4 weeks. The results revealed that

the experimental groups gave higher results than the control group in terms of egg weight and egg mass values ($p<0.05$). For egg quality parameters, Hough unit and egg yolk color values increased significantly ($p<0.05$) in the 5% tomato juice added group compared to the other groups. For biochemical parameters, Vitamin E value increased significantly in 1% tomato group compared to other groups ($p<0.05$). Calcium and TAC values increased linearly in the experimental groups compared to the control group, while the total protein value increased quadratically. As a result, it has been concluded that tomato juice has positive effects on the performance of laying hens, egg quality and blood Vitamin E level without any side effects.

Keywords: Tomato juice, Laying hen, Egg yield, Blood parameters, Intestinal micro flora

Application of Ozone in Fruit Processing

Aqsa Iqbal, Muhammad Nadeem, Faiqa Malik

Institute of Food Science and Nutrition, University of Sargodha, Sargodha

In recent years, there has been an increasing awareness regarding nutritional integrity, as consumers need clean, safe, and healthy food of high quality. This can be achieved by adopting more novel technologies, such as high pressure, ozone treatment and cold plasma, which ensures the quality and safety of items. Ozone, a potent oxidant, kills a variety of bacteria on fruits. The application of ozone to food sector concerns such as mycotoxin and pesticide residues has shown promising outcomes. It is safe in food applications due to spontaneous disintegration without the formation of toxic residues in the treatment media. When employed improperly, ozone can have negative consequences on food items, such as sensory quality degradation. Treatment conditions should be developed particularly for all types of items in order to employ ozone effectively and safely. Ozone technique is an eco-friendly method that extends the shelf life and maintains the quality of fruit products.

Keywords: Ozone treatment, fruits, mycotoxin disintegration, mycotoxin disintegration, eco-friendly

The Nutritional & therapeutical potential of rye: An Overview

Ahsan Iqbal, Ali Ikram, Saadia Ambreen, Muhammad Ahmad

University Institute of Food Science and Technology, UOL, Lahore, Pakistan

Rye is very nutritional and healthy cereal. Rye (*Secale cereale* L.) is, next to wheat, the second most important grain. It is compared to wheat and barley. Rye is nutritionally very interesting because it has very high fiber content. It is grown widely in Europe and North America. About 90% of rye is produced in European countries. The components of rye grain are starch (57.1%–65.6%), fiber (14.7%–

20.9%), protein (9.0%–15.4%) and ash (1.8% -2.2%). Rye proteins are rich in lysine, but its flour cannot form a continuous gluten network like wheat proteins. The dominant proteins in rye grain are albumins and prolamins (34% and 19% respectively), followed by globulins (11%) and glutenins (9%). Whole grain rye flour has been found to have many health benefits due to its high fiber content. Popularity of rye is increasing because of its chemical compositions that have medicinal effects against diseases such as cardiovascular disease, hypercholesterolemia or cancer. The aim of present review is to present the Nutritional and therapeuticall potential of rye.

Quality Evaluation of Processed Cheese Fortified with Olive Oil Emulsion

Shafeeqa Irfan, Mian Anjum Murtaza, Ghulam Mueen ud Din

The olive (Olea europaea L.) is an evergreen plant grown for olive oil and table olives. It has triacylglycerols, phenolics, and other antioxidants that play noteworthy roles in maintaining health and reducing diseases. The purpose of this study was to examine the quality, antioxidant profile, textural profile, and sensory properties of processed Cheddar cheese fortified with 5, 10, 15, and 20% (v/w) olive oil-whey protein isolate emulsion after 60 days of storage. The results showed that processed cheese had significantly higher antioxidant activity, phenolics, and flavonoid content. Whereas, there was a non-significant increase in moisture and acidity but a decrease in fat, protein, ash, and pH. Sensory analysis showed that processed Cheddar cheese with 5 % emulsion had higher taste, aroma, texture/appearance, and overall acceptability scores and also showed the highest mean hardness. In a nutshell, results indicated that olive oil-whey protein isolate emulsion could be beneficial for manufacturing and commercializing processed cheeses, analogues or spreads with improved nutritional value and sensory characteristics.

Keywords: Processed cheese, Olive oil, Emulsion, Antioxidant potential

Phage therapy as an effective biological intervention to improve the quality and safety of meat

Anum Ishaq[1], Qamar Abbas Syed[2], Paul D Ebner[3], Nauman Khalid[4]

[1]School of Food and Agricultural Sciences, UMT, Lahore, Pakistan
[2]National Institute of Food Science and Technology, UAF, Faisalabad, Pakistan
[3]Department of Animal Sciences, Purdue University, USA
[4]School of Food and Agricultural Sciences, UMT, Lahore, Pakistan

In the recent times, bacteriophages have been widely recognized as potential bio-control agents in food industry. The key applications of bacteriophages include their utilization as anti-bacterials in animal health studies, detection of pathogenic bacteria in food systems and bio-preservatives for controlling microbial growth

in food systems. In this regard, the present study was aimed at evaluating the effectiveness of commercial bacteriophage to control the growth of meat-specific pathogens. Before treating the samples with bacteriophage, meat samples were firstly inoculated with Listeria monocytogenes. After that, Halal-certified List-shield (Phage) from Intralytix having initial concentration of 1×109 PFU/mL was applied according to the following treatment plan. A momentous reduction in the growth of L. monocytogenes was seen in phage-treated samples during storage i.e., 5.2 log CFU/g to 2.9 log CFU/g on Day 15. The pH analysis revealed that bacteriophage application did not induce significant variations in the pH values of meat. Similarly, instrumental color values were not significantly affected by the application of bacteriophage on raw beef. Contrarily, water holding capacity, texture and nitrogenous losses were affected in a significant way but positively. The study concluded that application of bacteriophage showed significant microbial reductions in raw beef during refrigeration storage.

Keywords: Phage Therapy, Meat Quality, Meat Safety, Hurdle Technology, Biological Intervention

Preparation and Storage Stability of Natural Peach Drink Powder

Mamoona Ishtiaq, Muhammad Liaquat, Shehla Sammi, Muhammad Jahangir

University of Haripur, Haripur, Pakistan

Peaches belong to Rosacea family and due to its tangy taste and nutraceutical benefits it is widely consumed across the world. Food industries preserve it as pulp to produce liquid products. Whereas its powder drink in market are synthetic, with no added pulp powder. The aim of this study is to develop a natural peach drink powder with no artificial color and flavor and to examine the rice husk ash (RHA) as an anticaking agent in conjunction with tri-calcium phosphate during 50 days of storage. Freeze dried peach powder was used in this study. Different concentration of natural drink peach powder NDPP was prepared (10% PP+2% RHA, 10% PP+4% RHA, 20% PP+2% RHA, 20% PP+ 4% RHA, 30% PP+2% RHA and 30% PP+ 4% RHA) with three different controls without rice husk ash (10% PP+control, 20% PP+control and 30% PP+control). Rice husk ash (RHA) was analyzed for moisture content, total ash content, water soluble ash, acid-insoluble ash and silica determination while natural peach drink powder (NPDP) was analyzed for moisture content, total soluble solids, pH, titratable acidity, sugar/acid ratio, ascorbic acid, powder flowability, total phenolic compounds and DPPH radical scavenging assay. The data was analyzed by applying standard deviation and two-way (ANOVA) using least significance difference at $p<0.05$ and principal component analysis (PCA) was done by using SIMCA-P+ software. On the base of organoleptic and sensory evaluation the results of sample T1 (10% PP+control) and T8 (30% PP+2% RHA) were found best.

Rise in Veganism, a serious threat to the Global Food Industries

Afshan Ismail*, Muhammad Sajid Manzoor, Kanza Aziz Awan, Sanabil Yaqoob, Shoaib Younas, Ali Ijlal Aleem

Department of Food Science and Technology, Faculty of Science and Technology, University of Central Punjab, Lahore, Pakistan
**afshanismailkhera@gmail.com*

Veganism is a dietary practice in which people only consume plant-based foods and evade the consumption of animal origin foods like meat, fish, eggs, milk etc. Veganism has become a hot concern from the previous few years in all around the world. People moving towards the veganism due to religious, ethical, environmental and health issues. The rise in veganism causes major disruption in the food industries in all over the world. The business men and farmers who are dealing with animal-based food industries are worried about the decline in the consumption rate of animal-based products. In 2022, the consumption of vegan protein is high as compare to animal protein and causes loss to the global animal protein industry. In the different parts of Europe, the cow milk sale has declined up to 11% and veganism also threatened the dairy industry of Australia. Many experts gave prediction that if the veganism will rise continuously then the food industries producing food other than vegan products will declined in just 10 years. The famous industries developing alternatives of dairy products are Walls (Cornetto into vegan ice cream cone), Domino's (Dairy cheese into vegan cheese), Nestlé (Vegan KitKat) and Hershey's (Vegan Oat milk Chocolate bars) etc. to cope up vegan disruption in the food industry. Many industries have also produced vegan meat and eggs through culture technique. Finally, rise in veganism not only disrupt the food industries but also interferes in nature

Keywords: Veganism, Disruption, Global animal protein industry, Europe, Australia, Famous industries, Culture, Nature

Impact of Breakfast on Academics Performances in School Going Children activities

Hafiza Madiha Jaffar, Sana Noreen, Hafiza Nazia Koser, Tabussam Tufail

University Institute of Diet & Nutritional Sciences, UOL, Lahore, Pakistan

Introduction: Breakfast has been shown to be beneficial for cognitive and academic performance in school children. However, there is a paucity of studies which examine the relationship between breakfast consumption and academic performance. Breakfast has been found to be a top and necessary as contributor to the daily nutrients' intake. Breakfast has been associated with the best food choices. The healthiest breakfast is a "nutritious" meal rich in complex carbohydrate including fibre, moderate in protein and low in fat, salt and sugar

(sucrose). Aims & Objectives: The research aimed to find the impact of Breakfast on Academics Performances in School Going Children. Place and duration of study: Data was gathered using Google Scholar, Medline, Embase, Science Direct and books from studies conducted between 2010 and 2020. Material & Methods: Systematic analysis was conducted with references to the literature. Results: This review showed a strong link of impact of Breakfast on Academics Performances in School Going Children. Conclusion: Based on the results of this study, the frequency of breakfast consumption is positively correlated with academic performance, physical activity, academic behavior and cognitive skills and attitude in school going children. It is suggested that the academic performance can be improved by highlighting the importance of taking breakfast in schooling going children. Across all the studies, there were a total of 251 associations between physical activity and breakfast consumption.

Purification, Composition and Antioxidant Activity of Polysaccharides from Cress Seed Mucilage

Yusra Jamil[1], Imdad Ullah Khan[1], Aiman Khan[1], Shah Faisal[1], Amjad Iqbal[2]*, Ayaz Ahmad[1]*

[1]Department of Biotechnology, Abdul Wali Khan University Mardan, Pakistan
[2]Department of Food Science & Technology, Wali Khan University Mardan
**ahdayazb5@awkum.edu.pk (AA), amjadiqbal@awkum.edu.pk(AI)*

Elevated levels of reactive oxygen species (ROS) pose severe threats to intracellular environment in terms of oxidative stress and their continuous overproduction causes various clinical disorders. Antioxidant compounds combat oxidative stress in cells and are therefore useful in management of various clinical disorders. Over the past few years, several polysaccharides have been extracted from plants and studied for various biomedical applications. Lepidium sativum, commonly known as garden cress, is a mucilaginous plant whose seeds release mucilage upon soaking in water. The present study aimed to extract and partially purify water soluble polysaccharides from seed coat mucilage of garden cress via size-exclusion chromatography and to evaluate the bioactive fraction. The mucilage was extracted by soaking cress seeds in double distilled water (ddH2O). The mucilage was dried and precipitated in 75% ethanol. The ethanol precipitated fraction was then re-dissolved in ddH2Oand fractionated through Bio-Gel P-10 (90 µm-180 µm). A total of 60 fractions were obtained and processed for quantification of total carbohydrates contents. The results revealed the presence of pentoses, hexoses, saturated, and unsaturated uronic acid contents. Antioxidant potential of the cress polysaccharides was performed by DPPH free radical scavenging, hydrogen peroxide scavenging and Invitro lipid peroxidation assays. The fractionF23 exhibited strong antioxidant potential by scavenging the DPPH free radical with an effective EC50value of 37.93 µg/mL. Similarly, fraction F53 at 200 µg/mL effectively scavenged the H2O2 free radical by 81.89%. Furthermore, invitro lipid peroxidation assay was performed on mice tissue

samples, where fraction F52 was the most effective one having IC50 value of 34.17 µg/mL. The results conclude that the cress polysaccharides have uronic acid as a major monosaccharide unit, which might be responsible for its significant antioxidant potential. Moreover, the polysaccharides from cress seed coat mucilage can be used as potential and effective drug against oxidative stresses.

Keywords: Lepidium sativum, antioxidant, polysaccharides, reactive oxygen species, mucilage.

Identification, Mapping and Network Analysis of Nutrition Stakeholders for Nutrition Policies Development to Improve Maternal and Child Nutrition in Pakistan

Atta Ullah Jan[1], Zahid Hussain, [2] Iftikhar Alam[1], Badar U Zamann[3]

[1]*Department of Agriculture, Bacha Khan University Charsadda, KP, Pakistan.*
[2]*Agriculture, Bacha Khan University Charsadda, KPK, Pakistan*
[3]*National SUN Secretariat, MoPD&SI/Planning Commission*

Background: Child and maternal malnutrition is a widespread problem. To tackle, an understanding of identification of key stakeholders and their interactions is of great importance. Objective: The main objective of this study was to identify and analyze different stakeholders involved in policy making and implementation of child and maternal nutrition support in Pakistan Methods: The study used a cross-sectional design, involving a total of 132 respondents from various fields of expertise related to child and maternal nutrition. Data was collected through NetMap tool for identifying and mapping key stakeholders as well as their roles, influence and interactions along the decision-making chain. NetMaps were subjected to quantitative analysis using Gephi software, and also to measure relationships and influences of stakeholders and examine their relative positions. Results: The results revealed that various stakeholders play multiple roles along the decision-making chain, which determine their position and influence in decision-making about policy making and implementation of child and maternal nutrition support in Pakistan. Health, Agriculture, Academia, social protection and P & D were identified as the main stakeholders however, the most influential actors included Planning and Development (P&D), Federal Ministry of Health (MoH), NGOs and CBOs – they determine access to information, technical and funding resources and decision making process; thus, key in upscaling, out-scaling, monitoring and policy making about policy making and implementation about child and maternal nutrition support in Pakistan in the study areas. Conclusion: Based on the network analysis, P&D, MoH, NGOs and CBOs were the top four most influential stakeholders with attributes of access to information, technical and funding resources and decision-making process about child and maternal nutrition support in Pakistan.

Keywords: Child and maternal nutrition, stakeholders, nutrition policy, network analysis

Fortification of Broccoli sprouts powder in quinoa based gluten free cupcakes

Sadaf Javaria, Musarrat Rasheed

IFSN Gomal University, D. I. Khan, Pakistan

The study conducted in Gomal University, Pakistan in 2022. The purpose of this research is to fortify vegetable into baking products that is new rising trend in the world. It is based on Quinoa cupcakes with broccoli sprouts powder (BSP) as broccoli is rich of anthocyanins and phenolic compounds. It promotes a vital role to boost immunity. The quinoa is included in pseudocereals having a lot of nutritional benefits. It has a high amount of nutrients including fiber lipids, protein, vitamins, minerals, essential amino acids and phytochemicals such as phytosterols, saponins, and phytoecdysteroids that's why it has very effective and positive benefits on health specially on metabolism. It is a good source of antioxidant with highest content of bioactive compounds. Biological, nutritional and stress-tolerant characteristics of quinoa make it as one of the grains of the 21st century. The main advantage of fortified cupcakes is gluten free product. All over the population of world including celiac disease patients consume it without risk of any allergic reactions. The baked product has a good phenolic compounds profile which promote immunity, prevent from risk of various chronic disease without fear of immunoglobulin antigen reactions. The cupcake sample prepare by using three different amounts of BSP with quinoa flour (T1=0/120g, T2=1/120g, T2=2/120g by BSP/ quinoa flour). Compared to T1; T3, T2 was characterized by higher content of nutrients and improved specific volume, color and texture. The results show the successful fortification of BSP in Quinoa based gluten free cupcakes. It is an added value bakery product that provide various health benefits to subject on a gluten free diet.

Technological and Nutritional Properties of Instant Wheat Noodles Enriched with Soy Flour

Muhammad Rizwan Javed, Zulfiqar Ahmad, M. Adil Rehman*, Tahir Mehmood, Faiz-ul-Hassan Shah, M. Waseem, Hammad Hafeez, Umair Ali

Department of Food Science &Technology, IUB, Bahawalpur, Pakistan
**adil.rehman@iub.edu.pk; 92-343-6500-090*

The objective of this study was to improve the quality of wheat-based noodles by introducing soy flour. The soy bean is a Fabaceae dicotyledonous plant in which the levels of proteins, fibers, lipids, and ash are all extraordinary. Composite flour noodles were made by combining soy flour (SF) at levels of 2%, 4%, 6%, 8%, and 10% with wheat flour. All of the components were combined together to make a compact dough that was then pushed through a noodle making machine to produce longer thin noodle-strands. and dried for 5 hours in a hot air oven at 50°C.

The noodle samples were packed in polythene bags and stored at room temperature 23-25°C at 70-75% relative humidity for 45 days. The findings expressed, different concentrations of soy flour had better influence on moisture contents, ash contents, protein contents, fat contents, water absorption index, swelling power, solubility, water uptake ratio, fat absorption capacity, foaming capacity, cooking weight, cooking loss and cooking time. Moreover, cooking quality of samples was analyzed, and results have shown that cooking weight, cooking loss and cooking time were significantly varied. Results regarding sensory parameters including appearance, aroma, texture, taste and overall acceptability have shown significant variation because of addition of soy flour.

Keywords: Noodles, soy flour, composite flour, functional properties, sensory parameters

Formulation and Organoleptic Characteristics of Cantaloupe Jam

Wajeeha Kainat, Syeda Aliya Sherazi

Kinnaird College for Women University, Lahore, Pakistan

Cantaloupe, a highly nutritious variety of muskmelon species, named as “Cucumis melo”, belongs to the family of “Cucurbitaceae”. The aim of this study was the formulation of cantaloupe jam, and to study its organoleptic characteristics. Sensory attributes being evaluated using 9-points hedonic scale were taste, flavor, texture, visual aspects and overall acceptability. Four variations of cantaloupe jam with apple pulp (cantaloupe: apple) were prepared besides control So (100% cantaloupe), which included SA (40:60), SB (50:50), SC (60:40), SD (70:30), were compared with the control So, on the basis of sensory attributes. Sample SB (50:50) was selected due to its best sensory attributes, with a mean score of 8.06±0.18 for overall acceptability. ANOVA was applied using IBM SPSS 21, showing $p<0.05$ for the data to be significant. Selected sample SB was further evaluated thrice by the trained panel for standardization, with $p>0.05$, indicating data to be non-significant. Further evaluation was done by the consumers for the consumer acceptability, with a mean score of 8.03±0.87 for overall acceptability, revealing how eagerly this innovate jam product was accepted by the consumers. Using an amount of sugar half of the amount of cantaloupe pulp, showed better taste in terms of sweetness, since cantaloupe had already a very sweet taste. Textural properties were also improved with the addition of apple pulp due to the presence of natural pectin in it. Hence, this research proves that jam can be formulated from cantaloupe and modifying the control recipe (100% cantaloupe) of the cantaloupe jam with apple pulp enhanced its organoleptic charactertics, making it more desirable by the consumers to be used.

Keywords: Organoleptic Characteristics; Cantaloupe Jam; Muskmelon; Cucumis melo

Technological Advancement in Food Preservation and their Impact on Human Health

Sarah Kainat[1]*, Shakeel Hussain[1], Aamna Shahid*

[1]*Department of Human Nutrition and Dietetics, University College of Montgomery, Sahiwal, Pakistan*
[2]*National Institute of Food Science and Technology, University of Agriculture, Faisalabad, Pakistan*
**Sarahkainat124@gmail.com*

Amplifying the lifespan of food while perpetuating safety and quality is a pedantic matter for the food industry. Food is an organic perishable substance, which is susceptible to spoilage due to microbial, chemical, or physical activities. So, we have generated food preservation Approaches to subdue this matter. Food preservation incorporate the eventualities taken to perpetuate foods with the fancy assets or nature for as long as possible. Food preservation includes mismatched food refining steps to perpetuate food worth at an appropriate level so that utmost advantages and nutrition values can be attained. Food preservation methods contain growing, harvesting, processing, packaging, and distribution of foods. The intentions of food preservation are to get over indecorous planning in agriculture, to fabricate augmented products, and to anticipate variation in diet. To impede chemical and microbial retrogression of foods, conventional and primitive approaches of preserving foods like drying, chilling, freezing, and pasteurization have been stimulated. These techniques are being used comprehensively all over the world. The primary objective of food preservation is to intercept food decay until it can be devoured. Preservation methods fabricates a distinctive opportunity for food producers to retain nutrient content alike to that present in fresh fruits and vegetables. Also retain the natural vitamin A, B, C, phenolic, mineral and fiber content in fruits and vegetables at the time of harvest. By Avoid uninterrupted reheating of food and using minimal amount of cooking liquid we can conserve vitamins retention during cooking. The motive of drying is to attain a solid product with adequately less water content. It is one of the oldest methods of food preservations. Water is the prerequisite for the microorganisms and enzymes to start off food spoilage mechanisms. To make certain food safety and long shelf life of foods, it is important to understand food spoilage mechanisms and food preservation techniques. In conclusion, food preservation has been pivotal to our society since the beginning.

Keywords: Food Preservation Principals, Methods, Nutrient Retention, Vitamin & Proteins Retention, Perspectives.

Food preservation and prevention from environment and seasoning

Farah Kousar Kang, Shakeel Hussain

Department of Human Nutrition and Dietetics, University Collage of Montgomery, Sahiwal, Pakistan
**farahkousar55@gmail.com*

The process of Prevention of food spoilage & ripening occur in food preservation techniques for future use of food in suitable condition. The nutritive value, edibility & quality of food should remain undamaged by preservation process. It should reduce rancidity by retardation oxidation of fat & free from the fungi, microorganism & bacteria growth. It should also prevent from aging, discoloration & re-entry of microbes by sealing. It should ensure that food remain its original state. The oldest method of this process is drying, by which bacterial growth should decrease by reduction of water. By this weight should also decrease. Both wind and sun are used as dryer methods and some modern methods also used like bed dryers, freeze dryer, spray dryer, fluidized bed dryer, household oven and commercial dehydrators. Fruits and meat are examples of these drying method. Freezing should also involve in preservation e.g potatoes storage in dark rooms need to be frozen. In smoking process by burning wood's smoke food should cooked, flavored and preserved. Smoke have antioxidant & anti microbial effects e.g mostly meat and fish smoked. Smoke roasting, smoke baking, cold smoking & hot smoking are methods of smoking. In vacuum packing since there should vacuum created with out oxygen by which bacteria die. By salting we should remove moisture from foods like meat. In pickling oil should use for pickling of food and marination of vinegar used too. Salt should kill microbes. Chemical & fermentation pickling methods should used. EDT & sodium benzoate should add to increase shelf life. In syrup form sugar should also used to preserve foods in crystallized form. For preservation of luxury foods sugar with alcohol used. The process in which sodium hydroxide turns foods into alkaline and fend off bacterial growth is called lye. Canning and bottling should also used, boiling of container should weakens the microbes, time & length should vary in cooking. Food should at the risk of spoilage once the can opened. Shelf life of food should extend through modified atmosphere packaging, inside the package atmospheric air is substituted with preventive gas which should ensure that product remain fresh as long as possible. Pasteurization and irradiation are also used as methods of preservation.

Keywords: Preventive, Drying, Smoking, Canning & bottling, Sugaring, Salting, Pickling, Modified atmosphere packing and Pasteurization.

Vitamin D insufficiency as a predictor in metabolic syndrome

Nasreen Kausar, Fatima Javed, Mahnaz Nasir Khan

Department of Food Science and Human Nutrition, Kinnaird College for Women Lahore, Pakistan

The association between Vitamin D and metabolic syndrome was reviewed. This link is a contentious issue that has caught the attention of many researchers around the world. Metabolic syndrome is a set of conditions that can occur within the human body. This review focuses on diabetes (type 1 & 2), increased blood pressure, cardiovascular disease, and obesity, which is largely based on abdominal obesity. Importance was given to vitamin D supplements. Review research was conducted using Goggle Scholar, PubMed, and Research Gate until December 2020. The key words used as the search engine were: vitamin D, metabolic syndrome, Diabetes, and the role of vitamin D with each of the components. Preference was given to those studies that observed the inverse relation of vitamin D with metabolic syndrome. From the 52 studies examined, 36 studies were related to vitamin D and its connection with the elements of metabolic syndrome. Ten studies were related to a general connection. The link of vitamin D with metabolic syndrome was examined by including 26 studies. The bow tie approach was used in the process of review along with the use of PRISMA flow chart. Based on empirical research, it can be concluded that low vitamin D levels play a vital part in the development of the symptoms of metabolic syndrome whereas the adequate consumption of vitamin D lowers down the risk of hypertension, diabetes, cardiovascular disease, and obesity.

Utilization of Apple Pomace as a Functional Ingredient in Various Products: A Review

Samina Kauser*, Muhammad Nadeem, Mian Anjum Murtaza, Tusneem Kausar

Institute of Food Science and Nutrition, University of Sargodha, Sargodha

**saminaa.kauserr@gmail.com, 92-346-8630970*

Apple Pomace remains the handling discarded produced subsequently apple liquor industrialized and characterizes active to 30% of the innovative fruitlet produce. In huge measure apple fruit fluid manufacturing, approximately 75% of apple produce exists developed for production of liquor as well as the residual 25% remains or used as a by-product that is known as apple Pomace. This compacted deposit comprises of a compound combination of skin, central, kernels, calyx, shoot as well as soft tissue. It is used for the production of various bioprocess and industrial products. There are the many products where the Pomace of Apple used as a functional ingredient in which includes bakery product like bread, cookies etc. and act as nutritional component, antioxidant properties,

also used as food additives or preservatives. Permitting to epidemiologic revisions, foods amusing in produces besides tubers ensure been accompanying by means of reduction or decreasing threat of unindustrialized prolonged syndromes like circulatory infection, malignance disease, diabetes and Alzheimer's syndrome. Accordingly, Observers or researchers estimated that the actual discarded disposal must implement in apple fruit liquor for decreasing the ecological problems.

Keywords: Apple, Pomace, Waste, Production, Syndromes, Liquor

Evaluation of Patulin in Mango and Citrus Fruits, Juices and their By-product by Using Liquid Chromatography

Nisha Khalid[1], Shabbir Hussain[1], Muhammad Adil Rehman[1], [2]*, Zulfiqar Ahmad[2], Tahir Mehmood[2], Faiz-ul-Hassan Shah[2], Muhammad Waseem[2], Hammad Hafeez[2], Umair Ali[2]

[1]Nuclear Institute for Agriculture and Biology College, Pakistan Institute of Engineering and Applied Sciences, Faisalabad, Pakistan
[2]Department of Food Science &Technology, Faculty of Agriculture and Environmental, The Islamia University of Bahawalpur-Pakistan
**adil.rehman@iub.edu.pk, 92-343-6500090*

Fruits are essential component of our life because they are rich source of flavonoids, carotenoids, vitamins and minerals. The environment in Pakistan is hot and humid and very conducive for the fungal attack on fruits and vegetables, resulted the production of different kinds of mycotoxin. Patulin is a mycotoxin produced by different fungi species i.e., Penicillium Expansum, Byssochlamys and Aspergillus. European countries set patulin intake level in the range 10-50 ng/g in fruits, juices and infants products, whereas WHO limit is 0.4 ng/g per kg body weight per day. By keeping this important aspect in mind, a method is validated to determine the patulin in fruits and their by-products by using HPLC-UV at 276 nm wavelength in isocratic mode using C18 column. Fruits, juices and their value-added products were collected, extracted and analyzed for the determination of patulin. Mango samples from different area were collected and analyzed for the presence of patulin, samples collected from Shorkot was found to be highly contaminated (2030.47 ng/g) and Multan and Bahawalpur samples were observed to be least contaminated (12.76 ng/g) with patulin. Patulin was analyzed in orange samples taken from different area and concentration of patulin was found to be in the range of 0 – 61.07 ng/g. Samples collected from Layyah were observed to be highly contaminated whereas Sahiwal samples were less contaminated with patulin.

Keywords: Mycotoxin, Patulin, HPLC, Mango, Orange

In-Vitro Antioxidant characterization and assessment of Phenolic Profile of Microwave assisted Black Cumin Seed extract at different power intervals

Ahood Khalid, Shahid Bashir, Anees Ahmed Khalil*, Ammar Ahmad Khan, Ayesha Aslam, Quratul Ain Shahid

Microwave assisted extraction is an emerging technique that is simple, efficient and economically cost-effective, which provides with better extraction parameters leading to high yield extraction of bio-active compounds. The current study was carried out to assess the effect of microwave assisted black cumin seed extract on the total phenolic contents (TPC), total flavonoids (TFC) and antioxidant characterization using different powers (150, 300 and 450W). The microwave assisted black cumin seed extract obtained at different power intervals showed variations in TPC (26.99 - 35.01mg GAE/g), TFC (15.82 - 24.41 mg QE/g) respectively. Moreover, the in-vitro antioxidant capacity of the extract differed from 98.55 to 157.33 µM Fe (II)/100mg, 41.87 to 63.09% and 26.13 to 49.38% as analyzed by FRAP, DPPH and β- carotene bleaching assay, respectively. The results verified the higher values of TPC, TFC, FRAP, DPPH and β-carotene assay microwave assisted black cumin seed extract at 450W power interval in comparison to the ones obtained at lower power intervals.

Keywords: Microwave assisted extraction, antioxidant characterization

Assessing the antioxidant potential of 'microwave assisted Tribulus terrestris extract operated at different power intervals

Anees Ahmed Khalil*, Shahid Bashir, Ammar Ahmad Khan, Fizza Mubarak Ahood Khalid, Sajid Maqbool

The current study highlights the utilization of microwave assisted extraction technique, which is known for its efficient results, short time period and rapid heating process. In this study the effect of microwave assisted extraction was assessed on the total phenolic and total flavonoid content (TPC and TFC) along with the in-vitro antioxidant characteristics. The power intervals used for the purpose of extraction were 150, 300 and 450W respectively. The values of TPC and TFC were observed to be varied in microwave assisted Tribulus terrestris extracts as (28.91 – 34.32mgGAE/g) and (203.09 – 478.10mgQE/g), respectively. The significant peak values were obtained at 450W for the in-vitro antioxidant characteristics including DPPH, FRAP and ABTS assays to be (50.14 to 66.92%), (786.01 to 940.90mMFe+2/G) and (45.88 to 70.24%), respectively. The results obtained for the microwave assisted extracts were higher as compared to the non-microwave extracts.

Keywords: microwave assisted extraction, in-vitro, flavonoids

Fenugreek: A review on nutraceutical properties and applications in food

Huda Khalil, Maryam Nadeem, Amal Shaukat, Sanabil Yaqoob, Kanza Aziz Awan

Department of Food Science and Technology, Faculty of Life Sciences, University of Central Punjab, Lahore, Pakistan

Fenugreek (Trigonella foenum-graecum), one of the spices that are esoteric food adjuncts that are used to enhance flavor and color, also changes the texture of food. This seed spice is also used as an antibiotic, stomach stimulant, anorexia treatment, antidiabetic medication, and galactagogue in many traditional systems. Several health-promoting physiological properties of fenugreek seeds have been discovered in animal studies and human trials in recent decades. Antidiabetic action, hypocholesterolemia impact, antioxidant efficacy, digestive stimulating action, and hepatoprotective effect are just a few of them. Among these favorable physiological effects, fenugreek's antidiabetic and hypocholesterolemia properties, both of which are primarily due to the intrinsic dietary fiber content, have nutraceutical potential. The nutraceutical potential of fenugreek seeds is discussed in this article.

Enhancement of nutritional profile, rheological and quality features of wheat flour biscuits supplemented with lentil-oat flour

Amara Khan[1], Sadaf Javaria[1], Noor ul Ain[1], Muhamad Nadeem[2]

[1]FSN, Gomal University, Dera Ismail Khan, Pakistan
[2]IFSN, University of Sargodha, Pakistan

The prospective of supplementation of composite flour (lentil and oat) in wheat based biscuits was investigated. In composite flour biscuits, wheat flour was supplemented with 5 %, 10%, 15%, 20%, 25% levels of lentil and oat flours. Supplementation of lentil and oat flours significantly affected the farinographic characteristics of dough. As the addition of lentil and oat flours increased dough development time (DDT) increased from (1.33 min to 4.70 min), departure time (DT) from (2.60 min to 7.10 min), Farinographic quality number (FQN) from (26.00mm-71.00mm), Mixing tolerance index (MTI) from (33.00min-93.00min) and Farinographic water absorption capacity (FWAC) from (54.20-63.30%), while dough stability (DS) decreased from (3.50 min-0.86 min). The gluten content (%) of composite flour was also affected significantly by the supplementation of lentil and oat flours. The wet gluten and dry gluten decreased 22.30 %-14.37% and dry gluten 8.20%-3.80% respectively. Biochemical analysis of biscuits revealed that these was a significant increase in ash content (0.54-1.72%), crude fat (29.50-42.99%), protein (5.32-8.80%), fiber (0.25-2.59%), iron

(9.21-78.90%), zinc (8.40-41.72%) and energy value (526.11-583.97kcal) with increasing concentration of lentil and oat flours, while moisture (4.55-3.43%) and total carbohydrates (59.82-40.440%) decreased. Data regarding to storage revealed that moisture (3.70-4.34%), ash (1.04-1.05%) and total carbohydrates (51.46-51.77%) increased while crude fat (35.37-34.67%), protein (7.04-6.80%), fiber (1.46-1.26%), iron (44.54-43.80%), zinc (22.96-22.48%) and energy value (554.44-546.28kcal) decreased significantly as the storage period proceeded. The results also showed that width of biscuits decreased (27.72mm-25.46mm), while thickness (4.71mm-5.35mm) and spread factor (58.88mm-47.58mm) increased significantly with trends. Sensory attributes of biscuits improved with the supplementation of oat and lentil flours. However, higher levels of oat and lentil flours in biscuits negatively affected the color, aroma, texture, taste and overall acceptability of final product. Among all the treated samples T4 (Wheat 70% + Lentil flour 15% + Oat flour 15%) was found to be the best and most acceptable among all the treated samples.

Hypokalemia in Severely Acute Malnourished Children Age 6-59 Months Admitted in Nutritional Rehabilitation Unit of Lady Reading Hospital, Peshawar: A Cross Sectional Study

Aimal Khan, Shehar Yar Shafi

The University of Agriculture, Peshawar, Pakistan

Potassium is very important to regulate fluid balance, muscle contraction and nerve signals in human body. The present study was conducted at Lady Reading Hospital (LRH) Peshawar. A cross sectional study design was selected to find out the prevalence of hypokalemia in severely acute malnourished children age 6-59 months. A questionnaire was designed for the collection of data and nutritional status was assessed through anthropometry, family history, clinical and dietary methods. Data was collected randomly from 20 severely acute malnourished children admitted in Nutritional Rehabilitation Unit (NRU) of LRH. Among 20 patients 12 were male and 8 were female. Data were analyzed in SPSS v.20. The data showed that 20% children were hypokalemic in which half were male and half were female. 75% Hypokalemic children were suffering from constipation and 50% of them were edematous. The data further showed that 55% children were vaccinated while 15% children were not vaccinated. It has been observed that 30% children were exclusively breastfed up to 6 months and 30% were giving mixed breastfed up to 12 months of age in which most of the mothers were giving formula milk and cow's milk with improper dilution. The most common risk factors of hypokalemia were no exclusive breast feeding and delayed starting of complementary food i.e. 70% children were not exclusively breastfed and 55% started complementary food at age of 12 months in which most of the children consumed non-nutritional and junk food.

Evaluation of Antibacterial Potential of Polysaccharides Extracted from Cress Seed Mucilage

Aiman Khan[1], M. Ihtisham[1], Murad Ali[1], Amjad Iqbal[2]*, Ayaz Ahmad[1]*

[1]*Department of Biotechnology, Abdul Wali Khan University Mardan, Pakistan*
[2]*Department of Food Science & Technology, Wali Khan University Mardan, Pakistan*

**ahdayazb5@awkum.edu.pk(AA); amjadiqbal@awkum.edu.pk(AI)*

Pathogenic diseases share reasonable burden on human health. Emergence of resistance to antimicrobial drugs is one of the major concerns because of their indiscriminate utilization. Besides plants have supplied mankind with all the basic nutrients requirements, they have also served as a good source of bioactive compounds that serve as a medicine. Lepidium sativum, commonly known as garden cress is a medicinally important plant that comprises of bioactive compounds to promote human health. Polysaccharide is one of such bioactive ingredients that is abundantly present in garden cress. The aim of the study was to isolate the water-soluble polysaccharides from cress seed mucilage through gel permeation chromatography and to evaluate their antimicrobial potential. Mucilage from the cress seeds was obtained by soaking the seeds in autoclaved distilled water for overnight. The polysaccharides were then collected in the form of precipitates after treating the mucilage with 75% ethanol. The precipitated fraction was re-dissolved in double distilled water (ddH2O) and fractionated through Bio-Gel-P-10 having pore size of 90 µm-180 µm. A total of 60 fractions were obtained and each fraction was screened for its biochemical composition. The results showed the presence of total carbohydrates, saturated and unsaturated uronic acid, pentoses and hexoses. The antibacterial potential of the selected fractions was determined by using agar well diffusion, microbial biofilm and minimal inhibitory concentration assay against five different human pathogenic strains. The results showed that fraction Cr20 at 100 µg/mL was able to induce 6.78 mm and 6.7mm zone of inhibition against S. aureus and S. typhi. Inhibition of the microbial biofilm formation was investigated for all the selected 60 fractions, where Cr22 fraction exhibited significant (P=0.05) activitywithIC50 value of 14.67 µg/mL against Klebsiella. The results of minimal inhibitory concentration assays revealed that the fraction Cr20 inhibited the growth of Shigella, Klebsiella and Salmonella at a concentration of 57.59 µg/mL. The findings concluded that water soluble polysaccharides from cress seed mucilage can work best against the human pathogenic microorganisms. Further elucidation and tests of the potent fractions may lead to the development of novel antimicrobial drugs.

Keywords: Cress seed, mucilage, antimicrobial, polysaccharides

Walnut Breakfast Snacks Reduce Meal-Time Hunger and Calorie Intake among University Students

A research report submitted to Kinnaird College for Women in fulfillment of the requirements for the degree of BSc (Hons.) in Food Science and Human Nutrition

Murwa Khan, Qurat-Ul-Ain Aleem

Kinnair College for Women, Lahore, Pakistan

University students consume large amounts of sugar and saturated fat during their time at university; this is due to the fact that they do not eat breakfast in the morning, owing to shortage of time. Development of quick and healthy bites is on the rise. These products are usually high in satiety and are made of healthy nuts such as almonds, dates, walnuts and figs etc. Incorporating all these ingredients together not only gives rise to a delicious snack and it is also high in satiety, has a good texture and aroma. Nuts are a good source of fiber, omega 3, vitamins, minerals, and other micronutrients that the body needs to function properly. It is common for teenagers to consume sugary foods and beverages; this snack made entirely of nuts and dates is sweet in taste, satisfying sugar cravings while also providing nutrients necessary for the body's healthy functioning. Furthermore, they are easy to prepare and suitable for all age groups. Controlling the sensory and textural features, as well as the perceptions of a new low-calorie product, is employed to produce it. Different ingredients are being mixed in order to get the proper balance. The sensory qualities of walnut bites were assessed in order to determine which sample was the most popular. A rating scale was employed for these evaluations. The walnut bites was standardized and evaluated by an expert panel of judges based on the results. The untrained panelists also assessed consumer approval using a 9-point hedonic scale. Most of the panelists like the walnut bites.

Nutritional and Organoleptic Evaluation of Some Pakistani Sweet Dishes using Different Natural Sweeteners

Nida Tasneem Khan, Mahnaz Nasir Khan

Department of Food Science & Human Nutrition, KCW, Lahore, Pakistan

Desserts are an important component of Pakistani's daily meal, thus they cannot be ignored. The most desirable of all flavors is a sweet taste which affects our senses and often determines the acceptance or rejection of the food product. However, sugar having various effects on one's health needs to be consumed in appropriate amounts. The purpose of the study was to modify selected sweet dishes using natural sweeteners. The objectives of the study was to select and standardize some commonly consumed sweet dishes in Pakistan prepared using

different natural sweeteners for their organoleptic and nutritional comparison. Fish bowl method was used for selection of sweeteners which included traditional sweetener (shaker), stevia and date paste. Whereas online survey was conducted to identify eight most commonly consumed sweet dishes while the base recipe for each dish was selected again using fish bowl method. The standardized recipes were than modified using the selected natural sweeteners and evaluated for their macronutrient content as well as their acceptability in term of organoleptic characteristic using a 5-point hedonic scale. The findings regarding comparison and acceptability of the sweeteners illustrated that there was a positive significant (p-value< 0.05) difference existed. Similarly, the nutrient analysis also showed a significant relationship between the sweeteners with a p-value of< 0.05. Dishes prepared with the natural sweeteners have a lower caloric content as compared to that prepared with regular sugar. Concluding replacement of table sugars with natural sweeteners in local sweet dishes is acceptable in term of nutritional as well as sensory parameter having appositive effect on health.

Keywords: Natural Sweeteners, Stevia, Date Paste, Shaker, organoleptic properties

Culinary Discourse in South Asian Literary Texts

Saiqa Siddiq Khan

Gomal University, D. I. Khan, Pakistan

Drawing on Michelle T. King's notion of "culinary nationalism" and Anita Mannur's conceptualization of "culinary nostalgia" I intend to explore that how the characters in the selected narratives-Shelina Zahra Jan mohamed's Love in a Headscarf: Muslim women Seeking One and Jhumpa Lahiri's Name sake present culinary nationalism as a process of creation and contestation and show how food takes on a nostalgic significance in diaspora. Cuisine and nation intersect all over the world, but nowhere, arguably, with as much depth and intensity as in diaspora. The impetus in this article is to interrogate how the selected narratives involve culinary practices in the definition, preservation, transformation, dismantling, and even imagining national identities. Food becomes both intellectual and emotional anchor for the immigrants physically transporting them to their geographically and temporally distant childhood home and giving them a sense of rootedness in diaspora. The desire to remember home by fondly re-creating culinary memories cannot be understood merely as a reflectively nostalgic gesture; rather such commemorative acts must be read as a commentary on what it means to inhabit different diasporic locations while constantly battling the implications of routing memory and nostalgia through one's relationship to culinary practices. The selected narratives show the increasing importance of culinary narratives in contemporary postcolonial discourse.

Keywords: Culinary Narratives, Nationalism, Nostalgia, Pakistan

Isolation of Zinc Solubiliing Bacteria from the Rhizospheric Soil of Sugarcane Collected from District Dera Ismail Khan

Muhammad Nawaz Khan, Muhammad Shakeel*, Zahra Shahzeen, Usman Khan, Anum Abbas , Amjad Ullah Khan, Zahida

*Gomal Center of Biochemistry & Biotechnology, Gomal University D.I.K, *shakeelimperial611@gmail.com, 03477724021*

There is a crucial and incessant need to discover environmental safe fertilizers and the reason behind this is the highly toxic nature of chemical fertilizers. Plants need nutrients for their growth and functions. Zn is one of the important micronutrient and its adequate amount is considered to be indispensable for growth, development and functioning of plant. Zinc deficiency is widely reported in agricultural production as its unavailability can badly affect plant yield. The principal aim of this study was to screen eco-friendly source through which a plant can get its unavailable form of Zn from soil. Plant growth promoting rhizobacteria (PGPR) have been known for long to be involved in plant growth promotion via different mechanisms. A survey was conducted, according to that, the soil of D.I.Khan is deficient in zinc and plants are badly affected by this deficiency. The purpose of the present study was to isolate a special group of bacteria that can solubilize zinc and make it available for plants. A total of forty-four bacteria were isolated from the rhizospheric soil samples of sugarcane, collected from different fields in and around district Dera Ismail Khan. Bacteria were isolated using serial dilution and platting assay. Isolates were inoculated on Bunt and Rovira agar media to evaluate the zinc solubilization potential. Out of forty-four isolates only eleven isolates show solubilization. ZSB6 was found to be the best strain that show maximum zinc solubilization. Further study will evaluate the characterization of these strains and can be a good initiative for the production of bio-fertilizers.

Preparation and Characterization of Whey Protein Concentrate-Diindolylmethane Nanoparticles

Abbas Khan*, Asmaa Bilal, Wahab Ali Khan, Syed Abdul Wadood, Aiza Qamar

Diindolylmethane is a bioactive metabolite found in cruciferous vegetable and has anticancer potential. The major challenge to use Diindolylmethane for pharmaceutical application is stability and sensitive to the environment. This study aimed to develop the microgel of whey protein concentrate (WPC) to microencapsulate the Diindolylmethane (DIM) Solutions with different ratios of Diindolylmethane to whey protein (1:12, 1:6, 1:4, 1:3, w/w) with constant whey protein concentrate level at 12% (w/v).The samples were heated to 85˚C for 30min and then treated with ultrasound for 15min or 30min, respectively. Changes in zeta potential, particle size, and rheological property were studied. Results

showed that ultrasound treatment significantly reduced particle size of samples 1:12 (456.08±24.87 nm), 1:6 (537.25±29.55 nm), 1:4 (565.73±10.20 nm), and 1:3 (580.44 ±18.29 nm) to 285.67±3.08 nm, 340.03±10.52 nm, 391.47±5.44 nm, and 448.88±15.36 nm respectively by 15 minutes and 270.21±4.75 nm, 325.04±7.72 nm, 367.78±11.51 nm, and 416.85±16.28 nm respectively by 30 minutes of ultrasound ($P<0.05$).The PDI value of the samples without ultrasound was found 0.755±0.132 as compared to 15min (0.4720±0.50) and 30min 0.476±0.046. which shows that samples with ultrasound treatment had relatively narrow size distribution. Among different ratios the ultrasound treatment significantly ($P<0.05$) decreased the zeta potential of the native sample 1:4 (-28.54 ± 54 mV) to (-33.36 ± 0.85 mV) with 15 min and (-31.13±1.02 mV) with 30min ultrasound. This shows more colloidal stability with ultrasound treatment. Flow ramp data showed that the viscosity of the ultrasound treatment samples for 15 and 30min time was significantly ($P< 0.05$) decreased as compared to untreated samples. The apparent viscosity of the all samples exhibited shear thinning behavior in the range of (50-1000 s-1). All the flow behavior of samples was fitted with Sisko models ($R2>0.997$). The flow behavior index of the samples showed the pseudoplastic behavior ($n< 1$) and remained pseudoplastic after ultrasound treatment. The consistency index (Ks) of the samples was increased by ultrasound treatment.

Influence of Probiotic strains on cottage cheese produced from *Lactobacillus acidophilus* and *Lactobacillus casei*

Rehana Khanam[1], Muhammad Saeed[1], Zulfiqar Ahmad[2], Hammad Hafeez[2]*, Muhammad Adil Rehman[2], Uamir Ali[2], Muhammad Azam[1], Faiz-ul-Hassan Shah[2], Tahir Mehmood[2]

[1]National Institute of Food Science and Technology, University of Agriculture, Faisalabad, Pakistan
[2]Department of Food Science &Technology, Faculty of Agriculture and Environment, The Islamia University of Bahawalpur, Pakistan
**hammad.hafeez@iub.edu.pk, 92-308-7998868*

Cottage cheese is a fermented dairy product that contains a variety of microbes especially probiotics that are used as starter culture in the fermentation process. Isolated Lactobacillus acidophilus and Lactobacillus casei strains were characterized for biochemical and physiological viability and survived almost all conditions i.e., temperature, NaCl, pH, sugar fermentation and bile tolerance test that possibly can hinder their growth during cheese making and storage. The probiotic cottage cheese was prepared and stored at refrigeration temperature at 4°C for 28 days period segmented as 0, 7, 14, 21 and 28. The impetus behind this study was to assess the outcomes of probiotics as single and mixed cultures on the compositional, rheological, shelf life and finally the consumer acceptance of cottage cheese. The results depicted that combined culture of L. acidophilus and L. casei was considered most favorable among all treatments for their protein and

fat content, rheological and sensorial attributes and overall acceptability during the storage period of 28 days. Conclusively, it can be recommended by observing the results that the combine culture of L. acidophilus and L. casei has potential use for better development of probiotic cottage cheese.

Keywords: cottage cheese, probiotics, L. acidophilus, L. casei, rheology, sensory analysis, dairy product,

An overview of phenolic composition of Rsveratrol and its therapeutic activities

Hafiza Nazia Koser, Hafiza Madiha Jaffar, Bahisht Rizwan, Sana Noreen

University Institute of Diet & Nutritional Sciences, Faculty of Allied Health Sciences, University of Lahore, Lahore, Pakistan

Resveratrol, a naturally occurring polyphenolic compound that performs as a phytoalexin, was isolated for the first time ever in 1940 and has gained attention of the scientific world ever since. Its miraculous properties have made it a phenolic prodigy, and the absence of any negative clinical experimentation or research just goes to prove its never-ending benefits. The conduction of more than 130 clinical trials with the administration of varying doses of resveratrol has showed different results in different settings. The failure to procure established and lasting results has led to a deferral in its use as dietary supplements which could be the reason of its unpopularity. The ultimate fate of resveratrol remains an open-ended question but there is no doubt that this compound certainly has inspired many scientific innovations and advances.

Nutritional composition of *Phoenix dactylifera* and its pharmacological activities

Hafiza Nazia Koser, Hafiza Madiha Jaffar, Bahisht Rizwan, Sana Noreen, Shahnai Basharat

University Institute of Diet & Nutritional Sciences, Faculty of Allied Health Sciences, University of Lahore, Lahore, Pakistan

Phoenix dactilifera L. (ajwa dates) is a soft dry fruit mainly cultivated in Medina al Munawara. Dating back to 5000 B.C., It was also a part of Tibwe – Nabwi (The Prophet (PBUH)'s the way of using plants and naturals as medicine), and ajwa was dominant in this field. It was used to cure different diseases and was also used for protection against evil. The use of date fruit taught by the Prophet is now being supported with strong scientific evidence and is trending research worldwide. The amount of macro and micronutrients, phytochemicals, and a considerable number of bioactive components make Ajwa effective against diabetes, PCOS, various types of cancers, liver and heart diseases, against different toxicities, fertility, and

infertility in both men and women, altering hormonal activities in the brain and is still further researched for various other benefits.

Evaluating Therapeutic Potential of Button Mushroom (*Agaricus bisporus*) against Breast Cancer

Anam Latif

The nutritional approaches are becoming a core element in the prevention of chronic diseases. In this perspective, white button mushroom (Agaricus bisporus) with a variety of untapped potent phytoceutics exhibit promising health-enhancing potential. The research work was designed to evaluate the therapeutic potential of white button mushroom against breast cancer. The breast cancer was induced in rats by the administration of a single dose of 50 mg/kg DMBA via gavage. The rats were divided into four groups: G1 (negative control group), G2 (positive control group), G3 (rats receiving mushroom extract) and G4 (rats administered with doxorubicin). The physical parameters were assessed daily and biochemical parameters were evaluated at three intervals during the study. The Cancer Embryonic Antigen (CEA) level increased maximum (84%) in G2 followed by G3 (71%) and G4 (68.8%). The maximum increase (75%) in CA 15.3 level was measured in G2 followed by G3 (45%) and G4 (27.3%). Similarly, the increase in CRP level (68.3%) in G3 was less than increase in C-reactive protein (CRP) in G2 (93.43%). The measurements of serum antioxidants level revealed that plasma Superoxide dismutase (SOD) concentration decreased maximum (54.83%) in G4 as compared to reduction of SOD level (10.83%) in G2. The SOD level in mammary and liver tissues reduced (31.99% and 35.20%) the most in G2 as compared to G3 (13.85% and 8.79%). The mushroom extract in G3 also effectively controlled catalase and glutathione level. Liver function enzymes were also raised in G2 and G4 as compared to G3. Besides, the Red Blood Cells (RBCs) and hemoglobin (Hb) also reduced maximum in G4 while, in G3 the mushroom extract effectively controlled the level of RBCs and Hb. Conclusively, the mushroom extract contains a variety of phytochemicals possessing therapeutic potential against DMBA-induced breast cancer. Based on the health promoting potential of mushrooms, it is recommended that mushroom should be included as a part of daily diet.

Keywords: Therapeutic Potential; Button Mushroom; Agaricus bisporus; Breast Cancer

Impact of Pesticides and Fungicides on Heavy Metal Status of Seasonal Vegetables Grown in Multan Region

Muhammad Mueed Tanveer Malika, Muhammad Sameem Javed*, Adnan Amjada, Muhammad Amira, Muhammad Junaid Anwara, Usama Nasira

Institute of Food Science and Nutrition, BZU, Multan, Pakistan
**sameemjaved@gmail.com*

Food safety is vital and most important issue nowadays. The addition of heavy metals in agricultural system is a major concern because they may create problems, affect human health and environmental integrity. Levels of heavy metals such as As, Fe, Cu, Zn, Pb, Ni and Cd in the soil is elevated as a result of use of sewage effluents and pesticides that are rich source of organic nutrients and metallic contents. Okra, Cauliflower and Bitter gourdwere evaluated for different heavy metal residues which are enlisted above using atomic absorption spectroscopy. It was found that arsenic content in the weedicide glyphosate isopropyl was greater among all pesticides used by the farmers for vegetables. Crops in which there is significant use of weedicide, showed greater content of As metal as compared to those in which no pesticide was used. Vegetables irrigated with turbine water and sprayed with chlorothalonil showed greater concentration of cadmium as compared to those vegetables which did not receive any chemical. Lambda cyhalothrin showed maximum concentration of lead among profenofos and mefenoxam. Lead was observed in vegetables which are irrigated with canal water or irrigated with turbine water along with the use of lambda cyhalothrin. It was concluded that heavy metals concentration in the vegetables can be minimized by reducing the use of agrochemicals and use of clean water.

Keywords: Food safety, Vegetables, Heavy metals, Arsenic, Lead, Agrochemicals

Oat with Exceptional Polyphenols: A Nutritious Cereal having therapeutic Health Benefits

Muhammad Sajid Manzoor[1]*, Imran Pasha[2], Meijun Zhu[3], Sanabil Yaqoob[1], Ukasha Arqam[1], Kanza Aziz Awan[1]

[1]Department of Food Science and Technology, UCP, Lahore, Pakistan
[2]National Institute of Food Science & Technology, UAF, Faisalabad, Pakistan
[3]School of Food Science, College of Agriculture, Human and Natural Resource Sciences, Washington State University

Oat (Avena Sativa) ranked sixth in terms of production and consumption after wheat, maize, rice, barley and sorghum. Oat, an annual plant, is locally known as “jai or javi” and is planted both in the spring and winter. The world has deliberately focused on oats and their products as they contain more soluble fiber

and are rich in phytochemicals, which gives them strong antioxidant activity. The worth of oat is unique in cereals because of its exceptional health benefits with ample amount of natural antioxidants, such as phenolic acids and their derivatives, alk(en)ylresorcinols and tocopherols. Moreover, oats have the extra advantage of valuable components, including avenalumic acids and distinctive treasure; avenanthramides (AVAs) are present only in oats among all cereals. AVAs, naturally occurring in about 40 different types, are comprised of linked derivatives of anthranilic acid and hydroxycinnamic acid. Oats and its products are beneficial for vital organs of body and act as the source of energy to combat malignancies. Studies depicted the presence of AVAs in products and proved their availability to consumers for potential health benefits. In addition to different bakery products, preparing chapattis with oat-wheat composite flour proved a valuable source of a bunch of antioxidants. These products significantly lowered hypercholesterolemic and hypertensive ailments in specimens and subjects during different in vitro and in vivo studies. Conclusively, it is time to motivate the farmers to promote the cultivation of oat to benefit from this worthy cereal in staple food.

Keywords: Oat, cereal, polyphenols, avenanthramide, oat-wheat composite, chapatti

Development and Assessment of Frying Quality Attributes of Vegetable Enriched Snacks

Asadullah Marri*, Aijaz Hussain Soomro, Nida Shaikh, Nasir Badeni

Institute of Food Sciences & Technology, SAU, Tando Jam, Sindh, Pakistan
**asadullahmarri@sau.edu.pk*

The snack foods are gaining great much popularity due to their desirability and palatability. An innovation of developing more nutritious and tasteful snack foods is becoming a continuous subject in the field of food processing. Present study was therefore undertaken to develop a popular local snack food called papad using different dried vegetable powders (garlic, ginger mushroom, and tomato) to examine the impact of adding dried vegetables on their frying quality attributes, physicochemical and sensorial properties. For this reason, ginger, garlic, mushroom, and tomato powder were developed and were individually used for developing different treatments of vegetable-based rice papad (i.e., T0= control, T1= ginger papad, T2= garlic papad, T3= mushroom papad and T4= tomato powder). The results regarding frying quality attributes, physicochemical and sensorial properties of all papad treatments remained statistically different ($p< 0.05$) from one another. The results revealed that T2 showed to have significantly higher average values for linear expansion (24.66%), diameter increase (18.33%), puffiness (42.33%), ash (1.63%), and fiber (2.56 %), T4 found to have significantly higher average values for frying time (sec), moisture gain after frying (4.10%), frying temperature (180.53 ○C), and oil uptake (26.10%). T1 remained significantly higher for pH (7.27), T3 for moisture (4.69%) and T4 for fat (18.08%). The average sensory score was better perceived by T2 for color (8.33),

flavor (8.66), appearance (9.00) and overall acceptability (8.66), crispness (8.66) and taste (8.66). It is concluded form the present study that all T2 attributed for suitable frying attributes, physicochemical properties and sensorial properties.

Irritable Bowel Syndrome of Functional Gastrointestinal Disorder and its Impact on Nutritional Status: A Review

Syeda Maryam, Fasiha Ilyas

Irritable bowel syndrome (IBS) sufferers frequently correlate their symptoms with the consumption of certain foods. As a result, scientific study has increasingly focused on the role of nutrition in IBS in recent times, and dietary management is now seen as an essential strategy in the treatment of IBS. The objective is to summarize the best available data on the epidemiology, pathophysiology, and diagnosis of IBS, along with its impact on social life and health, and to provide practical treatment and dietary recommendations for generalists and specialists. IBS has been discovered to be a symptom cluster resulting from a variety of diseases rather than a single condition. Alterations in the gut microbiota, intestinal permeability, gut immune function, motility, visceral sensation, brain-gut interactions, and psychosocial status are all essential factors in the development of IBS. The choice of diagnostic tests and therapies is affected by the major symptom (IBS with diarrhea, IBS with constipation, or mixed IBS). In randomized clinical studies, a variety of nutritional, lifestyle, medicinal, and behavioral interventions have been found to be helpful. An personalized, holistic approach to IBS management that includes dietary, lifestyle, medicinal, and behavior therapy is most effective.

Screening of Biochemical Properties and Effect of Organic (Edible) Inhibitors of Partially Purified Oxidative Enzymes from *Solanum melongena*

Saima Mashala, Aisha Siddiqua*, Fatimaa, Laraib tahiraa

Gomal Center of Biochemistry and Biotechnology, Gomal University, D.I.Khan
**draisha@gu.edu.pk*

Polyphenol oxidase (PPO) and Peroxidase (POD) enzymes lend brown color to vegetable by oxidizing phenolic substrates accompanied by oxygen and change di-phenol into melanin pigments. Therefore, the enzymatic browning can be inhibited by using antioxidant commercial chemical inhibitor and organic edible inhibitor. PPO and POD enzymes were obtained from Solanum melongena by saturating with 30% and 70% (NH4)2SO4 and then purified through Sephadex G-300 Colum. Apparent molecular weight was determined by SDS-PAGE. The molecular weight of PPO from Solanum melongena was determined to be 50 kDa. The highest activity of the enzymes was noted at 50oC temperature and above 50oC most of the PPO activity was lost. The enzyme obtained was found to be

stable at 30-70 oC. The optimum pH of PPO of Solanum melongena was turned out to be 7.2. The enzyme was originated to be more stable at pH range of 6.2-8.2. Different commercial chemical inhibitors and organic edible inhibitors were used to inhibit the activity of enzyme. In Solanum melongena, the enzymatic activity was inhibited more efficiently by cinnamon powder and coffee (edible inhibitors), ascorbic acid and acetic acid (commercial inhibitors),

Fabrication and Characterization of Oil-In-Water Beta Carotene Nanoemulsions Prepared by Ultrasonication

Tahir Mehmood[1]*, Anwaar Ahmed[2], Zulfiqar Ahmad[1], Muhammad Adil Rehman[1], Faiz-ul-Hassan Shah[1]

[1]Department of Food Science and Technology, Faculty of Agriculture and Environment, The Islamia University of Bahawalpur, Pakistan
[2]Institute of Food and Nutritional Sciences, PMAS-Arid Agriculture University, Rawalpindi-46300, Pakistan
**tahiraridian@gmail.com*

Beta carotene have number of health benefits such as decreased risk for heart diseases, cancer, cataracts, colorectal adenomas and macular degeneration. In this study, we have developed nanoemulsions for the fortification of foods and beverages with beta carotene. The beta carotene nanoemulsions were prepared by ultrasonic homogenizer. These nanoemulsions were stabilized by using mixture of surfactant instead of single surfactant. The effect of composition and operating parameters on the stability of nanoemulsions was investigated using particle size analyzer. The mean droplet size of beta carotene nanoemulsions ranged from 120-160 nm and particle size distribution of these particles was unimodal. The storage intervals and temperature exert significant effect ($p < 0.05$) on the droplet size of nanoemulsions. The droplet size of nanoemulsions increased from 120 nm to 140 and 160 nm during one month storage at 4 °C and 25 °C. The oxidative stability of beta carotene was significantly improved in nanoemulsions based fortification system compared with beta carotene enriched olive oil. These nanoemulsions remain stable against different range of pH, salt concentration and temperature. The beta carotene degraded during storage and antioxidants significantly ($p < 0.05$) improved the retention of beta carotene. The findings of this study will be helpful for the food industries for the development of food grade fortification system to incorporate beta carotene in food products.

Keywords: Fabrication; Beta Carotene; Nanoemulsions; Ultrasonication

Nutritional Claims & Food Labels of Commercially Available Snack Foods

Fatima Muiz Mian, Nida Tasneem

Kinnaird College for Women, Lahore, Pakistan

Snack foods are on the most widely manufactured, and most widely bought food products in all of food industry. The usual image of snacks is that of an unhealthy product but if we look deeper into the market and study the demographics, it shows that snacks are available in uncountable forms of shape, color and taste. Moving beyond that, now snacks are produced with nutritional claims that make them a healthy choice for the people looking for better, medically prescribed, or go-to snacks. The methodology of the research has been studying previously present researches and finding authentic and genuine data to go with and by studying various researches and papers to find the difference between the branded and local snack foods. There are uncountable options in both the divisions now. Same nutrition claiming snack will be available in branded and local streams. By conducting the research that is supported and authenticated by senior panelists we have found that the guidelines made for nutritional labels and claims is better followed by the branded snacks in comparison to local snacks. That is proven via many methodologies like branding, customer value and personal research. This study can help the government and related departments to make proper laws and order for the small scale and large scale food business working in snacks to have a uniform produce that can be valuable to the buyers. It will in return support everything else that has been studied. Governmental support in bringing about changes like this is important.

Characterization of the nutritional, physio-chemical and phytochemical profile of multi-functional cucumber-ginger drink during storage

Maryam Muhammad Ali Mubarak[1], Muhammad Rizwan Tariq[1]*, Shinawar Waseem Ali[1], Sajid Ali[2], Muhammad Shafiq[3], Moazzam Anees[3]

[1]Department of Food Sciences, University of the Punjab, Lahore, Pakistan
[2]Department of Agronomy, University of the Punjab, Lahore, Pakistan
[3]Department of Horticulture, University of the Punjab, Lahore, Pakistan
**Rizwan.foodsciences@pu.edu.pk*

Cucumber-Ginger drink is a healthy and combination beverage between cucumber, ginger, mint, lemon, and honey. The blend of Cucumber (Cucumis sativis L.), mint (), lemon (Citrus limon) and honey with ginger (Zingiber officinale) juice at 0% (C1), 2% (C2), 4% (C4), 6% (C4) and 8% (C5) (w/v) respectively to develop a new vegetable drink contain nutrients and phytochemicals that are beneficial to health. The drink blend without ginger

extract but with water (Co) was used as control sample. This work was designed at formulating a healthy vegetable drink. Five different vegetable blends (formulae) with different ginger juice concentration were made and subjected to sensory evaluation, fromwhich the best formulated drink was selected using a 9-point hedonic scale. These were then subjected to physicochemical, nutritional, phytochemical, microbiological analyses and shelf-life studies. They were analyzed for ˚Brix, pH, acidity, moisture, total solids and ascorbic acid (vitamin C). The results of the research showed significant reduction in pH (4.32 - 3.35), total soluble solids (11.66 - 9.42 %), reducing sugars (2.55 - 2.13 mg/mL) and non-reducing sugar (2.06 - 0.21 mg/mL). The results of the research showed significant increase in titrable acidity (0.04–0.21 citric acid mg/100mL), Vitamin C (0.137-0.198 mg/ml). The results of proximate analysis showed are significant includes moisture (96.08% to 99.08%), protein (0.013 - 0.103 g/100mL), fat (0.02 g/100mL to 0.13 g/100mL, ash (0.563 - 1.180 g/100mL), fiber (0.02 - 0.12 g/ 100mL) and available carbohydrate contents ranged from 9.81 to 14.08 g/100mL. There was a significant difference ($P \leq 0.05$) in proximate analysis between treatment means at 95% confidence interval. The macro (K, Ca, P, Na) and micro (Zn, Fe) minerals varied significantly different with Potassium(K) and Calcium (Ca) being the most abundant. The types and quantities of phytochemicals like TPC (0.13 – 0.30mg GAE/100ml) and TFC (0.12 – 0.16mg Quercetin/ml) present in the drinks were influenced by the formulation of the products. Amongst the formulated drinks, C2 (2% ginger juice) was the most organoleptically accepted. Alternatively, C5 (8% ginger juice) had the least overall acceptability amongst the formulated drink, was shown to be the most nutritive.

The Impact of Green Banana (*Musa paradisiaca*)-Mixed diet on Children with Acute Watery Diarrhea Without Dehydration- A Randomized Controlled Trial

Hira Mubeen

University of Agriculture, Faisalabad, Pakistan

In low and middle-income nations, diarrhea is the second most common cause of death among children under the age of five. It has been found that green bananas (*Musa paradisiaca*) can shorten a child's diarrheal illness's duration. The focus of the research is to determine how well cooked rice-mung bean with green banana (GB-RM) treats watery diarrhea (WD) in children between the age of 6 and 36 months. Children in the control group in this open-labeled, randomized, controlled trial received standard care, whereas children in the intervention group got cooked GB-RM in combination with standard care while being monitored in the hospital for 72 hrs., followed by continued administration at home until diarrhea stopped. The primary objective was the percentage of children who had improved after the intervention (passing firm stools on a regular basis) and the secondary objective was the frequency of problems including dehydration and chronic diarrhea. This study is anticipated to elucidate on how green bananas can be incorporated into

WD dietary management. Cooked green bananas can be added to a child's diet to help them recover more quickly if they have acute watery diarrhea without dehydration.

Keywords: Diarrhea, Green banana, Children, Dietary Management

A Comparative Study on Dietary Pattern and Nutritional Status Among Working and Non-Working Women in Lahore City

Asfa Muhammad, Syeda Aliya Shirazi

Department of Food Sciences and Human Nutrition (FSHN), Kinnaird College for Women Lahore, Pakistan

Dietary patterns are combination, quantities, Proportions and variety of various foods and drinks in diets and the frequency with which they are habitually consumed. Many factors affect the health and nutritional status of women to a great extent. Consumption of the nutrient through the diet and the dietary patterns have a great affect on women health and hence nutritional status of women also depend on these factors and it varies in both working and non-working women because of change in their dietary pattern. The universe selected was working and non-working women of Lahore city, Pakistan. The sample size was 354 including the working and non-working women of Lahore city. The inclusion criteria was women that are working as well as Non-Working in Lahore. Descriptive study design was used in this study. A questionnaire was formulated to record the demographic data, nutritional status, dietary intake work and lifestyle, food frequency questionnaire and 24 hour recall from the respondents. Demographic factors were used to evaluate data on the selected population. The city of data collection was Lahore where the data was collected from Kinnaird College for women, Doctor's Hospital, Forman Christian College where working and non-working women were present. The duration of this study was of two months. Data was entered and evaluated using SPSS software. The research showed detrimental impact of pandemic on food choices and lifestyle of working women as compared to non-working women as they eat home-made food and have a healthy lifestyle as compare to working women.

Keywords: Dietary Pattern; Nutritional Status; Working women; Non-Working Women; Lahore; House wives

Dietary intake during first 100 days of life and its impacts on growth and metabolism of an infant

Farwa Munir[1], Nida Islam[2], Maniha Javaid[2], Mubashira Sajid[2], Asra Abbas[3], Suman Naushad[2]

[1]Universiti of Sultan Zainal Abidin, Malaysia
[2]University of Management and Technology, Lahore, Pakistan
[3]Lahore institute of Science and Technology, Lahore, Pakistan

Initial days of life are crucial for the growth and metabolism of infant. This study is planned to compare the impact of breastfeeding or formula milk on infant growth in first 100 days of life. An observational quantitative research study was planned in which data was collected from 10 infants in 3 visits; immediately after birth, on 50th day and then on 100th day from five different hospitals of Lahore through convenient sampling. Six infants were breastfeeding, and four were on formula milk feeding. For data collection, a questionnaire was used with other various anthropometric measurements to check the growth that included weight, length, MUAC, chest circumference and head circumference, whereas, for metabolism, stool frequency per day was checked. The sample showed a different pattern of growth. Average weight gain of formula-fed infants (3.2 ± 0.83) was higher than that of breastfed infants (2.42 ± 0.32). The average length gains also seemed lower in breastfed infants. The average head circumference of formula-fed infants was higher than in breastfed infants. As there was a difference in weight gain, breastfed infants were leaner than formula-fed infants. There was no significant variation in chest circumference and MUAC between formula-fed and breastfed infants. The metabolism was higher in formula-fed infants as their stool frequency was more than that of breastfed infant. Further research should be done to find thereasons of differences in growth and metabolism because of particular feeding pattern.

ACE-inhibitory activity of buffalo milk peptides in yogurt made with adjunct cultures

Mian Anjum Murtaza[1,*], Iram Hafiz[2], Muhammad Anees-Ur-Rehman[3] and Shazia Yaqub[1,4]

[1]Institute of Food Science and Nutrition, University of Sargodha, Sargodha
[2]Institute of Chemistry, University of Sargodha, Sargodha, Pakistan
[3]Ruth Pfau College of Nutrition Sciences, LMDC, Lahore, Pakistan
[4]Punjab Food Authority, Lahore-54000, Pakistan
** anjum.murtaza@uos.edu.pk*

Proteolytic activity is an imperative characteristic of Lactic Acid Bacteria since they provide therapeutic benefits by increasing physiologicalactivity of cultured dairy products. They liberate bioactive peptides andsuch peptides have plentiful

health benefits including angiotensinconverting enzyme (ACE) inhibition. Buffalo milk is the most suitable for manufacturing of fermented products owing to its buffering capacity. The workwas aimed to assess the influence of probiotic adjuncts on production of ACE-inhibitory peptides in buffalo milk yogurt during storage. Buffalo milk was standardized at 4% fat level and yogurt samples were prepared using yogurt bacteria i.e. *Lactobacillus bulgaricus* and *Streptococcus thermophilus*as control and *Lactobacillus helveticus* and *Bifidobacterium bifidum*singly and in combination as adjuncts to starters. The samples were stored at refrigeration temperature for 21 days and ACE-inhibitory activity andIC_{50} values of peptides along with compositional profile wereevaluatedon weekly basis. Yogurt samples having probioticadjuncts exhibitedsignificantly higher ($p<0.05$) ACE inhibitory activity as compared to control sample. The activity reduced after 7 days but again increased slightly after 14 days of storage. However, the decrease was non-significant in the yogurt with adjunct cultures even after 21 days. The IC_{50} value of control sample (yogurt) was considerably higher than the yogurt containing probiotics. The values increased in first 7 days and then significantly ($p<0.05$) decreased throughout the 21 days of storage. The ACE inhibitory activity is the result of proteolysis and peptide fractionation during casein degradations. The differences in activity and time craving showed the variation in the proteolytic pattern of adjunct bacteria as compared to yogurt starters. Hence, probiotic adjunctsillustratedthe considerably higher inhibition activity that can lead to a naturalalternative of the ACE-inhibitory drugs.

Keywords: Buffalo milk, Yogurt, Probiotics, ACE inhibition activity, bioactive peptides

Changes in enzymatic activity of polyphenol oxidase and its structural modification in apple juice subjected to high pressure carbon dioxide

Ayesha Murtaza[1]*, Aamir Iqbal[2], Shinawar Waseem Ali, [3], Muhammad Usman[3], Sarah Murtaza[4]

[1]Department of Food Science and Technology, UCP, Lahore, Pakistan
[2]College of Agriculture & Life Sciences, Cornell University, Ithaca, New York, the United States
[3]Institute of Agricultural Sciences, University of the Punjab, Lahore, Pakistan
[4]Department of Economics and Business Administration, Central China Normal University, Wuhan, China

This study investigated the effect of different states of CO2 on the activity and structural modification of purified polyphenol oxidase (PPO) from apple juice. Result showed that PPO retained most of its residual activity at gaseous and liquid states even at a high temperature of 40 °C for 5 MPa. CO2 in the critical (31.1 °C for 7.38 MPa) and supercritical states (55 °C for 25 MPa) strongly inhibited the PPO activity up to 64.88% and 3.20%, respectively. Dynamic light scattering

analysis showed that the two peaks depolymerized into three peaks at 8.72, 37.8 and 220 nm in the critical state, demonstrating the dissociation and aggregation of small particles. In the super critical state, the peak transferred to 531 nm, indicating the aggregation of large particles. Circular dichroism spectral analysis revealed that the secondary structure deformed because of the loss of α-helix contents in the critical and super critical states of CO2 compared with those of the native structure. Fluorescence intensity dramatically decreased to 251.3 (λmax 312) in the critical state, showing unfolding of PPO molecules thereby resulting in quenching and blue shifting of λmax. Polyacrylamide gel electrophoresis analysis indicated that large molecular aggregates did not run into the gel at supercritical state. Hence, High pressure CO2 treatment in critical and super critical states could induce the aggregation, deformation and structural changes in catalytic active center of PPO. These structural modifications might be the causes of PPO inactivation after processing was accomplished.

Impact of inulin on the quality parameters of low fat cheddar cheese

Shamas Murtaza*[1], Aysha Sameen[2], Muhammad Sahhbaz[1], Mian Anjum Murtaza[3], Umar Farooq[1], Naveed Akram[1]

[1]Department of Food Science and Technology, MNSUAM, Multan
[2]National Institute of Food Science and Technology, UAF, Faisalabad, Pakistan
[3]Institute of Food Science & Nutrition, University of Sargodha, Sargodha
** shamas.murtaza@mnsuam.edu.pk*

Low fat cheese is the demand of this era due to overconsumption and sedentary life style and increase in diseases like hypertension, obesity, cardiovascular diseases etc. Inulin is a food ingredient that belongs a class of carbohydrates known as fructans with degree of polymerization range from 2-70. It has functional and health-promoting properties as they reduce caloric value, add dietary fiber and endorse prebiotic effects. Inulin is frequently used in industrially processed dairy as a bulking agent for fat replacement, textural modifications and organoleptic improvements. Hence, inulin can fruitfully be used in manufacturing different kind of cheeses to have reduced or low fat, texturized or symbiotic product. Present study was designed to evaluate the effect of different levels of inulin in low fat Cheddar cheese to improve its quality. Different levels of inulin have significant effect on the physic-chemical (moisture, fat, protein, ash) characters. Melt-ability and flow-ability showed inverse relationship with levels of inulin. Melt-ability and flow-ability decreased by increasing inulin and increasing hardness. Maximum melt-ability and flow-ability was noted in I1 as 54.00 mm and 18.70% respectively. Yield calculation showed non-significant effect within levels but significant effect as compared with control. The fat substituting property is based on its ability to stabilize the structure of aqueous phase which creates an improved creaminess. The addition of inulin as fat replacement improved the sensory characteristics of low-fat cheese samples when

added up to the level of 0.5% inulin. Increase in inulin levels in cheese samples decreases the scores awarded for various parameters.
Keywords: Melt-ability, Flow-ability, Gumminess, Cohesiveness, Hardness.

Preparation of *Aloe vera* Juice and Its Effect on Osteoarthritis

Sameera Mustafa[1]*, Hajra Ahmed[2]

[1]Department of Food & Nutrition, Faculty of Allied Health Sciences, University of South Asia
[2]Ed, H & N Sciences, Allama Iqbal Open University, Islamabad, Pakistan
**sameera.nawazish@hotmail.com*

Osteoarthritis is the degenerative disease of cartilage that led to disability which can impair the quality of life of an individual. Aloe Vera contains bradykinin, salicylate, and other natural steroids and vitamins that reduce inflammation. The benefits of using Aloe Vera for osteoarthritis are twofold, since it is an anti-inflammatory agent, and has prophylactic properties against the gastrointestinal irritant effects of non-steroidal anti-inflammatory drugs. The single blinded, randomized controlled trial with the sample consisted of 90 osteoarthritic participants (30 in each group), with age range of 45 to 65-year recruited through purposive sampling, from two public and two private hospitals of Lahore. The participants were randomly divided into three treatment groups including two experimental groups (Group A & B) and one control group (Group C). The individuals in group A were provided aloe-vera drink and group B was provided with placebo drink, the individuals of group C were not provided any drink and they were asked to continue the medical intervention provided by physician. Baseline score of outcomes variables such as pain intensity and functional status was measured through Visual Analogue Scale and Patient Specific Functional Scale respectively. The pain intensity, functional status was again assessed by the assessor at 20th day, 42th day and one month after the discontinuation of treatment. There was significant reduction in pain score and improvement in functional status among the Group A participants were observed. The mean score of pain at VAS of study participants was 5. 2 ± 2.3. There was a significant difference in mean of pain score within- group effect p=0.001 and between-group effect with p= 0.02, which represented that aloe-vera has positive effects in reducing pain score in participants with knee osteoarthritis. A statistically significant within group effect (p=0.000) and between-group effect (p= 0.015) of aloe-vera was found on physical function of participants.

Keywords: Osteoarthritis, aleo vera, BMD

Cowpea: A review of the thermodynamic properties and nutritional factors as well as benefits

Maryam Nadeem, Huda Khalil, Omaima Maryam, Amal Shaukat, Sanabil Yaqoob, Kanza Aziz Awan

Department of food science and technology, Faculty of life sciences, University of Central Punjab, Pakistan

Cowpea is an enriched protein, high-carbohydrate food legume that could be used to alleviate food and nutritionary problems in numerous regions of the universe. Some cowpea types, on the other hand, are difficult to cook, resulting in higher energy consumption and greater nutrient loss. Cowpea starch, which makes up the majority of the carbohydrate in the plant, could be used as an alternative starch source in a variety of industrial applications, especially because it's high in resistant starch, which has several physiological benefits. Cowpea breeding programs have spent a lot of time studying the crop's qualitative and quantitative genetics to improve it. The creation of cowpea genetic resources has been aided by several initiatives, including the Tropical Legumes projects. We also find flaws in the hazard recognition of prospective gene flow and uncontrollable spreading of transgenes and cultured types, as well as germ collection upkeep

Keywords: Cowpea starch, nutrients, modification, legumes, physicochemical characteristics

Consequences of Ketogenic Diet in Young Adults: A Cross-Sectional Study

Suffah Nadeem, Rimsha Shahid, Bahisht Rizwan, Bilal Adil, Shehar Bano, Naila Shahid, Osama Basharat, Asra, Mishqat Mubarak

University Institute of Diet and Nutritional Sciences, The University of Lahore, Lahore, Pakistan

Background: The ketogenic diet is also known as the keto diet was designed to cure epilepsy in young children during the 1920s. The ketogenic diet (KD) has recently been proposed as an effective way of life mediation for metabolic disorder, and while the valuable impacts on weight loss and glucose digestion are well-founded, the effects of a prolonged KD on the capacity to perform distinct types of activity, as well as the effect of KD on pulse (BP) levels, both in key situations, have yet to be studied. The common short-term side effects of the ketogenic diet include a bunch of symptoms like vomiting, nausea, fatigue, tiredness, reduced exercise tolerance, insomnia, dizziness, and constipation also known as keto flu. Long-term side effects include hypoproteinemia, liver incapability, kidney stones, and micronutrient deficiencies. Objectives: To assess the cross-sectional survey on consequences of ketogenic diet in young adults. Methodology: A cross-sectional survey and existing literature were reviewed to

assess the consequences of ketogenic diet in young adults. Results:100 participants, fifty-two males and forty-eight females, aged between 18-48 were assessed. Significant associations having p-value<0.05 were found between the participants following a ketogenic diet, constipation (57 %), fatigue and weakness (70%), keto flu (76 %), body aches (64 %) and insomnia (68 %). The duration of following keto diet varied from less than 1 week to more than 4 weeks. 13 % participants followed ketogenic diet for less than 1 week, 16 % participants followed ketogenic diet for 1 – 2 weeks, 33 % participants followed ketogenic diet for 2 – 4 weeks and 38% participants followed ketogenic diet for more than 4 weeks. Conclusion It was concluded that most of the people who followed a ketogenic diet experienced multiple side effects such as keto flu, constipation, diarrhea, fatigue, and tiredness. People lost weight because of a ketogenic diet but most of them do not recommend it.

Keywords: ketogenic diet, ketoacidosis, low-carb diet, high-fat diet.

Cow's Milk Fortification with Conjugated Linoleic Acid to Mitigate the Malnutrition among Pakistani Children

Sadia Naeem, Farhana Nosheen, Nazir Ahmad

Department of Home Economics, Government College University (GCUF), Faisalabad, Pakistan

Hunger related to malnutrition is a serious issue and has continuing to plaque hundreds of people around the globe. One the main cause of malnutrition is hunger. It has been increasing day by day especially among children. In Pakistan, there is a highest level of prevalence of child malnutrition. Though, the average food intake of its people is quiet less as compare to Pakistan's National Food Security Standards. The research has been conducted to gauge the malnutrition among children in early years (3-5 yrs). A well-structured survey along with anthropometric tests was applied to relate the findings accompanying to malnutrition among children in Pakistan. Purposing sampling technique was established and one hundred fifty-four (154) sample size was taken. Survey was conducted during the months from March to May 2021. The data revealed that children were severely malnourished with BMI 13 Kg/m2 – 16 Kg/m2 which is less than average BMI of this age. In this study cow milk was evaluated and fortified with Conjugated Linoleic acid (CLA). Results indicated that cow's milk was comprised of fat (4.03±0.03g/100g) and protein content (3.19±0.09g/100g), caloric values (0.5±2.66g/100g), minerals such as Ca (118.90±3.70mg/100g), P (95.05±5.71 mg/100g), Mg (12.42±2.23mg/100g), K (146.01±4.50mg/100g), Na (48.65±3.69mg/100g), Fe (0.07±0.01 mg/100g), Zn (0.37±0.00 mg/100g) and CLA content (2.4±0.01%wt) respectively,. Because of easy availability and accessibility of milk, it is the best food for children with malnutrition. It is recommended that the nutritional intervention strategy should be develop from cow milk fortification with CLA to nourish the children as per standards.

Therapeutic utilization of agro-industrial waste in relation to improving nutritional Security

Usman Naeem[2], Ali Imran[1], Muhammad Umair[1], Muhammad Sajid Arshad[1], Sumayya Naseer[1], Muhammad Arslan Aslam[1]

[1]*Department of Food Science, Government College University, Faisalabad, Pakistan*
[2]*University Institute of Diet and Nutritional Sciences, University of Lahore, Pakistan*
**usman.naeem@dnsc.uol.edu.pk*

Corn silk is considered a waste in the manufacture of sweet corn and discarded by most industrialized food manufacturers. It is rarely utilized as raw food materials due to the lack of knowledge of its nutritional value and possible functional properties. However, both immature and mature corn silks are good sources of nutritional compositions. Corn silks are a bundle of silky, long and yellowish strands which could be seen on top of both baby corn and corn fruit. The utilization of corn silk for commercial production of functional food is worth exploring to convert waste agricultural products into value-added products. Corn silk is ground and used as a food additive and flavoring in several regions of the world. Corn silk has various essential nutritional substances including proteins, vitamins, carbohydrates, Ca, K, Mg and Na salts, fixed and volatile oils, steroids such as sitosterol and stigmasterol, alkaloids, saponins, tannins, some natural antioxidants and phytochemicals. These natural bioactive compounds confer health benefits which include protection against cardiovascular diseases (CV), cancer, degenerative diseases, stroke, obesity and other illnesses. Moreover, corn silk has been used traditionally as diuretic, antilithiatic, uricosuric and for curing cystitis, gout, kidney stones, nephritis and prostatitis. Corn silk flour can be added in little quantities to bread, cookies, cakes, etc to improve the nutritional aspects without affecting the original characteristics of the product. Corn silk can be ground and used as a dietary supplement. Scientifically, corn silk has been reported to exhibit a positive effect on glycemic metabolism by increasing the insulin level whereby the increase of insulin level and recovery of b-cells were known to be the mechanism involved in the glycemic metabolism. So that, it has been consumed for a long time as a therapeutic remedy for various illnesses and is important as an alternative natural-based treatment. Corn silk improves blood pressure and supports liver functioning as well as producing bile. It reduces blood clotting time and acts as a good emollient for ulcer, wound and swelling. In some places decoction of corn silk and parched corn is extremely useful in nausea and vomiting. For medicinal purposes, corn silks have to be harvested just before pollination occurs and can be used in fresh or dried form.

Keywords: Agro Industrial waste, polyphenols, food security, functional food

Impacts of active packaging on bakery products

Momina Noor[1], Sanabil Yaqoob[2], Aima Tariq, Shoaib Younas[3]

[1]Department of Food Science and Technology, Faculty of Science and Technology, University of Central Punjab, Lahore, Pakistan
[2]University of Central Punjab, Lahore, Pakistan
[3]National Institute of Food Science and Technology, UAF, Faisalabad, Pakistan

Continuous work has been done to enhance the world's food and health systems in the pursuit of a world where everyone has access to safe and wholesome food. While these systems appear to be stabilized in the industrialized nations, there are still significant difficulties in various regions of the world. Active packaging (AP), as a promising technology, is designed to deliberately incorporate active components that can release or absorb substances into or from the packaged food or the environment surrounding the food. In recent times, some active food packaging innovations have emerged such as nanomaterial packaging, which incorporates metallic nanoparticles, and biodegradable packaging, and edible coatings/films containing essential oils have been developed. Bakery products are perishable commodities that require proper intervention to prevent deterioration and prolong their shelf-life, and most especially, avoid the growth of spoilage and pathogenic microorganisms. Despite the extensive advantages of these novel techniques and materials in enhancing product quality and extending shelf life, most reviews published so far focused more on the development and potential application of these packaging materials in meat, fresh fish, fresh produce and dairy products.

Keywords: Bread, Bakery technology; Active packaging, Bioactive compounds; Storage proteins; Therapeutic potential

Quality and safety evaluation of conventional and organic eggs from different supermarkets and bakeries in Lahore, Pakistan

Ayesha Noor-ul-Ain, Aqsa Akhtar, Nauman Khalid

School of Food and Agricultural Sciences, University of Management and Technology, Lahore, Pakistan

Eggs are considered highly nutritious food in the human diet but the poor quality and safety of eggs is a major public health hazard globally. The present research was conducted with the aim to evaluate the quality and safety aspects of conventional and organic eggs from different markets in Lahore, Pakistan. In this study, 12 egg samples were randomly collected from different supermarkets and bakeries in Lahore. The quality attributes of eggs were evaluated including the egg weight, egg shape, eggshell appearance, egg yolk index, Haugh's unit, and albumen freshness, and graded as per the standards recommended by USDA. Moreover, collected egg samples were also evaluated for microbial contamination

using total plate count media and selective media. The results were statistically analyzed by using the paired comparison t-test, correlation, and univariate analysis ($p< 0.05$). From the quality point of view, the majority of egg samples collected from supermarkets including conventional and organic eggs were found to be of poor exterior and interior quality. The t-test showed a significant difference between the mean values of the weight of the conventional and organic eggs ($p = 0.00$) showing the availability of poor quality and low-grade eggs in markets. Based on the safety evaluation, 10 out of 12 egg samples were highly contaminated with microbes. The results indicated that the eggs available in markets of Lahore were highly contaminated and also compromised USDA quality standards ($p< 0.05$). The availability of poor-quality eggs indicates the poor implementation of food regulations and lack of training programs for farmers or workers.

Keywords: Conventional and organic eggs, bacterial contamination, safety, quality, USDA standards

Effect of different effluents on the yield, yield contributing traits, quality and heavy metal accumulation of Radish (*Raphanas sativus* L.).

Noor ul Ain, Sadaf Javaria, Muhammad Nadeem

Department of Food science and Technology, Faculty of Agriculture, Gomal University, D.I.Khan; University of Sargodha, Sargodha, Pakistan

A study was conducted to see the impact of different effluents on the growth, yield and heavy metals content of spinach grown in pots. The pots were arranged in a completely randomized design (CRD) with six treatments (effluents) replicated four times. The treatments included 10% effluents of sugar mill, sewage water, soap factory, ghee mill, slaughterhouse and Control. Data on weight of leaves plant-1 (g), number of leaves plant-1, leaf area, yield ha-1, pH, Vitamin C and heavy metals (Fe, Pb, Zn, Ni, Cd) were recorded and statistically analyzed by computing Analysis of variance (ANOVA) and using Least Significant Difference (LSD) test. The results indicated that irrigation with effluents significantly affected all parameters studied. Sewage water, sugar mill effluent and slaughterhouse wastage significantly improved the yield and growth characteristics while ghee mill and soap factory effluents reduced these traits. The highest yield and related characteristics were recorded with sewage water followed by slaughterhouse wastage and sugar mill effluent. Irrigation with sewage water increased 10.47% yield while the increment with slaughterhouse wastage and sugar mill effluent was 6.64% and 1.41%. Ghee mill and soap factory effluents reduced 29.69% and 22.65%, respectively. Heavy metal concentrations were increased with all types of effluents. The highest values for Pb, Zn and Cd were reported in plants irrigated with sewage water while Fe and Ni were highest in slaughterhouse wastage and ghee mill effluent applied plants, respectively. The

transfer factors showed that the accumulation of metals was in the order of Pb >Fe = Zn >Ni >Cd.

Keywords: Radish (Raphanas sativus L.), effluents, growth, yield, composition, heavy metal accumulation.

Effect of Fish Oil Emulsion on Cardiovascular Disparities

Rabia Noreen, Farhana Nosheen, Muhammad Hammad Raza

Department of Home Economics, GCU, Faisalabad, Pakistan

The aim of this study is to check the effect of fish oil emulsion on cardiovascular disease (CVD) in rats. For efficacy studies, hypercholesterolemia was induced in the rats by extra doses of cholesterol and cholic acid to raise their lipid profile. CVD induced rats were fed on specified diets in 4 groups along with one control group for 12 weeks. The blood samples were collected and tested for the effect of fish oil emulsion on rats. The acquired data were analyzed through standard statistical procedure. The results revealed that the lower amount of fat contents as T5 has 9.90±0.55% crude fat as compared to control treatment T0 containing 18.02±0.81% fat. The protein contents of T0 is 30.31±1.33% and of T5 is 31.27±1.38%, fiber contents of T0 is 1.75±0.09% and of T5 is 1.80±0.09%, moisture contents of T0 is 21.35±0.81% and of T5 is 25.15±1.09% and ash contents of T0 is 1.21±0.06% and of T5 is 1.28±0.07%. Efficacy trials, body weight was significantly higher in all groups in contrast to control. Regarding lipid profile resulted 1.5%, decrease in plasma cholesterol level. LDL level was substantially affected by fish oil emulsions in all studies except in control group is 1.80% decreases in LDL. Triglycerides in control increased from 70.91 to 71.50mg/dl and were significantly affected. Conclusively, fish oil emulsion normalizes plasma lipid profile, fish oil emulsion was more potent and can be provided as curative tool against CVD caused by high cholesterol level among Cardiovascular Patients.

A pharmacological overview of *Bombax ceiba* activities

Sana Noreen, Hafiza Madiha Jaffar, Bahisht Rizwan, Hafiza Nazia Koser, Shahnai Basharat

University Institute of Diet & Nutritional Sciences, Faculty of Allied Health Sciences, University of Lahore, Lahore 54000, Pakistan

Traditional medicine has employed plants to treat a wide range of human disorders. *Bombax ceiba* Linn. is a medicinal herb that has been used in Unani medicine since the beginning of times. It is a massive tree, standing over 150 feet tall. It is found in temperate Asia, tropical Asia, Africa, and Australia. It may be found in India at elevations of up to 1500 meters. Many plant components (root, stem bark, gum, leaf, prickles, flower, fruit, seed, and heartwood) are employed by tribal communities and forest dwellers to treat a variety of ailments. as well as

antimicrobial, hypotensive, hypoglycemic, and antioxidant properties. Bombax's active ingredient is -sitosterolglucoside, which has pharmacological effects such as cholesterol reduction, blood pressure reduction, and anticancer action. Because it is hydrophilic, the glucose moiety is particularly efficient in preventing cholesterol from entering the esterification process. According to other ethnobotanical studies, it is also used to cure diarrhea, wounds, leprosy, acne, and a number of other skin disorders. Since ancient times, it has been utilized as an anthelmintic. Various parts of this plant have been evaluated for hypotensive, antioxidant, analgesic, anti-inflammatory, antipyretic, antiangiogenic, antioxidant activity, anti-bacterial, anti-diabetic, hepatoprotective, antidiabetic, anticancer, and anti-helicobacter pylori activities, confirming its use in traditional medicine.

Evaluating the Effect of Different Parts of Papaya (Leaf, Fruit, Seed) Extract in Thrombocytopenic Patients

Muhammad Nouman[1]*, Bushra Niaz[2], Farhan Saeed[2], Muhammad Umair Arshad[2], Tabussam Tufail[3], Muzzamal Hussain[2]

[1]University Institute of Food Science & Technology, University of Lahore. Lahore, Pakistan
[2]Department of Food Sciences, Government College University Faisalabad, Pakistan
[3]University Institute of Diet & Nutritional Sciences, University of Lahore, Lahore, Pakistan
**muhammad.nouman@uifst.uol.edu.pk*

Therapeutic plants are a rich wellspring of bioactive phytochemicals. Phytochemicals present in various pieces of the plant, for example, in the roots, stems, leaves, seeds, and fruits. Phytochemicals are named essential or optional constituents, contingent upon their role in plant metabolism. Essential constituents consist of the normal sugars, amino acids, proteins, purines, pyrimidines, nucleic acids, and chlorophylls. The aim of the present study was to elucidate the effect of different parts (fruit, leaves, and seed) of papaya on thrombocytopenia. For the Purpose, the papaya fruit, leaves, and seeds were procured from Botanical Garden of University of Agriculture Faisalabad. Afterwards, the papaya fruit, leaves, and seeds were converted to powder followed by extraction of polyphenol with various solvents (aqueous ethanol and methanol). The obtained extracts were characterized for total flavonoid contents, polyphenols as well as anti, nutritional compounds, such as tannins and saponins. Moreover, efficacy trials were carried out to explore the effect of papaya parts (fruit, leaves, and seed) on the platelets count of potassium bromate-induced (PBI) rats. The PBI rats were fed with extract enriched diet for a time period of 56 days. Results showed that maximum extraction was obtained with ethanol. In addition, a higher bioactive profile (polyphenols) was observed in papaya leaves extract followed by fruit and seed extracts. Papaya leaves extract (PLE) treatment showed a maximum increase in platelets count from 169.9 ± 2.1 × 109/L to 231.1 ± 6.1 ×

109/L in PBI rats as well as WBCs and RBCs 521 ± 16.8 × 107/L to 594.5 ± 11.2 × 107/L and 469.2 ± 13.2 × 107/L to 562.2 ± 14.2 × 107/L. But for hemoglobin, the papaya fruit extract treatment showed a higher value of 6.4 ± 0.1 to 7.4 ± 0.2 (mg/dL). Conclusively, papaya leaves should be included in dietary regimens for health promotion to combat thrombocytopenia and related diseases.

Keywords: Papaya, Nutritional, compounds, Phenolic Extract, Thrombocytopenia

Proximate and sensory analysis of wheat bread supplemented with *Nigella sativa* oil and *Nigella sativa* extract

Palwasha Khalil, Sara Masood, Attiqur-Rehman, Ayesha Zafar Iqbal, Zeenat Islam, NidaJavaid, Amina Ilyas, Shanzay Qamar, Aurang Zeb

Wheat is one of the important food crops worldwide while wheat bread is the most commonly consumed form of it in different populations. As Nigella sativa is rich in several phytochemicals that possess disease preventive properties hence, the proximate and sensory analysis of the breads supplemented with Nigella sativa extract and oil have been discussed in this study. Nigella sativa is one of the famous medicinal plants that has been used for treatment of various illnesses in different parts of the world. Compositional analysis revealed that Nigella sativa extract supplemented bread contains 14.75% moisture content, 10.32% crude fat content, 4.40 % ash and 3.55 % crude fiber, 11.89% crude protein and 55.09% Nitrogen Free Extract (NFE). In comparison, analysis of Nigella sativa oil supplemented revealed that it contains 14.23%, moisture content, 10.53% crude fat content, 4.10% ash and 3.20 % crude fiber, 11.79% crude protein and 56.15% NFE. Sensory evaluation was evaluated using 9 points-hedonic scale. Maximum score for overall acceptability was recorded for Nigella sativa extracts fortified bread. In the meantime, the requests for wheat-based items with value addition are developing quickly in the previous couple of decades, as customers understood that eating foods with medical advantages is superior to taking medicine. The breads fortified with Nigella sativa will not only meet the consumer demands in terms of sensory attributes but might also aid in improving their health.

Keywords: Bread; Food fortification; Nigella sativa; Proximate composition; Sensory attributes

Nutritional and Organoleptic of Micronutrient Dense Food Product made from green leafy vegetables

Ambreen Qadir*, Muhammad Farhan Jahangir Chughtai, Adnan Khaliq, Samreen Ahsan, Nimra Sameed, Atif Liaqat

Institute of Food science & Technology, KFUEIT, Rahim Yar Khan, Pakistan

The basic prerequisite for a healthy life is to have nutritious food full of essential nutrients. Malnutrition is a growing issue globally and increasing day by day. Retardation, poor Growth ability and lack of social and mental maturity are the major symptoms of malnutrition. The need is to devise strategies and food formulations to tackle malnutrition. To fight malnutrition, inflammation, under nourishment and Iron deficiency anemia with green leafy vegetables is an appropriate choice. Green leafy vegetables are important part of our diet, rich in many nutrients and low in calories. These vegetables enriched with iron, folate, vitamins, calcium, bioactive and antioxidants and without any harmful effects. In order to improve their shelf life drying or dehydration as a "Natural Fortificant" can be done making them superior mineral and vitamins source with increased shelf life. These phytochemical, antioxidants, dietary fibers, minerals and vitamin present in theses vegetables has different health benefits such as anti-diabetic, anti-anemic and improve gastrointestinal function. A research project has been designed to prepare healthy snacks such as mathri by using wheat flour along green leafy dried vegetables such as mint, fenugreek, parsley and spinach. The quality parameters need to be strictly monitored such as moisture content, crude fat, crude protein, crude fiber and mineral content. It will improve nutritional value of food when combined with dried GLV. The final product will be then evaluated for organoleptic and sensory characteristics by panel of sensory panelist.

Worth of Camel Milk to Malnourished Children under the Age of Five: A Review

Tahira Batool Qaisrani, Muther Mansoor Qaisrani, Hammad Raza, Khurshied Ahmad Khan, Talat Bilal Yasoob, Muhammad Shahbaz, Muhammad Imran

Ghazi University, DG Khan, Pakistan

The 2020 factsheet of UNICEF-WHO about children under the age of five years is opening new era for food processors regarding management of foods and maintaining nutrition balance for this age group. Nearly 45% of total deaths of children of this age group is allied to unbalanced sustenance befalling typically in poverty stricken and economically middle order regions on the globe. While the graph line of over weight and obese children is growing in such earlier mentioned nations. Improving balance in growth and weight of children of this age group requires new food and nutrition patterns. The health and nutrition aspects of camel

milk are gaining attention. It provides unsaturated fatty acids and linoleic acid. Vitamins of B group, A, C and minerals like calcium, iron, and potassium are higher. Its use is benign for children after the age of 10-12 months. Its use is effective against autism, food allergies, skin diseases, proliferation of cancer cells and ulcer. It indorses natural defenses, provides stable insulin, impacts liver and kidney's function and maintains routine nourishing requirements of children. Based on this research review, it is concluded that camel milk can be a valuable addition in communities where lack of nutrition balance is knocking.

Keywords: malnutrition, Camel milk, nutrition, children under the age of five,

Effect of Dietary Calcium and Vitamin D on prognosis of breast cancer Patients Oral presentation

Aneela Qureshi*[1], Farzana Siddiqui [1], Shahid Masood [1], Hajra Ahmed [2], Syeda Mehvish Zahra*[1], [2], Mahpara Safdar[2]

[1]*Institute of Food Science and Nutrition, University of Sargodha, Sargodha*
[2]*Department of Environmental Design, Health and Nutritional Sciences, Allama Iqbal Open University, Islamabad, Pakistan*

**qaneela@ymail.com (AQ), mahvish.zahra@aiou.edu.pk(SMZ)*

Background: Breast cancer has become a major public health issue as it accounts for 40% death of all female cancers. Besides genetics or family history of cancers, age, obesity and other non- modifiable risk factors, lifestyle also plays a significant role in increasing or reducing risk of cancer. Study proved that food and food choices can increase breast cancer risk by 20%. Material & Methods: Hospital based cross-sectional study was conducted on 50 breast cancer patients and 50 healthy volunteers. Blood samples were collected and analyzed to gather biochemical data. Serum calcium and serum vitamin D, C-reactive proteins and parathyroid hormone and serum albumin were analyzed. Aim: The study was designed to check the effect of supplementation on serum calcium and vitamin D levels and anti-inflammatory biomarker on prognosis of the disease. Results: The cancer patients had poor serum calcium and vitamin D status at diagnosis stage as compared to disease free volunteers. After intervention of vitamin D and calcium supplemented cookies, serum calcium and serum vitamin D levels were observed to be increased from 8.413±0.0825B to 8.968±0.113A and 33.450±0.847B to 40.990±1.370A respectively. C–reactive proteins levels were observed to be deduced from 12.37±0.656ABC to 10.78±0.330C and Parathyroid hormone from 2.913±0.0683A to 2.785±0.0752A. Conclusion: The present research suggests that dietary intake of vitamin D and calcium does play an important role in improving breast cancer prognosis and improve quality of life.

Keywords: Breast Cancer, Vitamin D, Calcium, Lifestyle, Diet, Obesity

Effect of nutritional counselling on health status of individuals

Kiran Rabi

Dar-ul-Shifa Hospital Mardan, Pakistan

A clinical based cross-sectional study was carried out at Dar-ul-Shifa Hospital Mardan. A total of female patients was counselled regarding their weight loss. Data regarding age, height, weight, body mass index, body fats and visceral fat was collected both at baseline and after intervention. The data was analyzed with the help of SPSS (Statistical Packages for social sciences) whereas graphs were plotted with the help of Microsoft excel. The results concluded that the mean of enrolled participant was 28.6 years whereas most of the women falls in the age category of 13 to 35 years. The Mean height, weight, Body mass index, Body fat and Visceral fat at baseline were 156.0±5.2 (cm), 86.6±13.9 (kg), 35.8±5.3 (kg/m2), 50.7±4.9 (g) and 8.6±2.4 (g) which after proper nutrition counselling and weight loss diet plans, the means weight, BMI and body fat showed a significant decreased with a means of 83.9±13.5 (kg), 34.6±5.1 (kg/m2) and 49.5±4.9 (g) whereas visceral fat showed a non-significant decreased. According to the subjective global assessment majority (36%) of the women were in the stage 1 of obesity followed by stage II (32.5%). After proper nutritional counselling and 1 month follow up the Percentage of obesity II decreased from 32.5 to 28.5 whereas the percentage of obesity class III decreased from 21.5% to 16%. It shows that nutrition counselling is very effective and can help to cure many diseases and fatty liver.

Applications of State Diagram to Determine Food Stability in Relation to Safety and Quality

Mohammad Shafiur Rahman*

Department of Food Science and Nutrition, College of Agricultural and Marine Sciences, Sultan Qaboos University, P. O. Box 34-123, Al-Khod 123, Oman
**shafiur@squ.edu.om*

A state diagram shows the phases or states of foods as a function of solids or water content and temperature. The main advantage of drawing a map is to help understanding the complex changes when the solids content (or water content) and temperature of foods are varied. The recent state diagram is based on the glass transition line, freezing curve, maximal-freeze-concentration conditions, solubility line, eutectic point, solids-melting or solids-decomposition line, BET-monolayer line, and water-vapor line. Two fundamental concepts, water activity and glass transition are widely used to determine the stability of foods during processing and storage. Both concepts have their advantages and limitations when apply in different microbial, physical and chemical changes in foods. In the literature, it was emphasized that a combination of water activity and glass transition concepts could be a powerful tool in predicting food stability. Recently,

water activity and glass transition concepts are combined in the state diagram by plotting BET monolayer as a function of temperature. It is now advanced with 13 micro-regions to determine different states or phases of foods. The current applications of the macro-region and micro-region concepts based on state diagram are discussed by presenting different chemical and physical changes during processing and storage. The issues of its applications in solving food-engineering problems are discussed considering examples, such as drying, baking, and chemical reactions. In really, foods are stable using hurdle technology (i.e. combined method). Finally, empirical approach to combine water activity, glass transition and state diagram are discussed.

Discerning halal and non-halal slaughtered broiler meat based on quality parameters by employing spectroscopic methods

Hafiz Ubaid ur Rahman[1], Amna Sahar[2], Nauman Khalid[3]

[1]School of Food and Agricultural Sciences, University of Management and Technology, Lahore, Pakistan
[2]National Institute of Food Science and Technology, University of Agriculture Faisalabad, Pakistan
[3]School of Food and Agricultural Sciences, University of Management and Technology, Lahore, Pakistan

In recent times, food authenticity is the subject of great concern for researchers, processors, marketing experts, food authorities and public. In addition to adulterated or unauthentic meat, marketing of meat from dead birds/animals and non-Halal slaughtered meat, particularly of poultry sector, is another consumer concern. Islamic laws deliver comprehensive dietary rules, collectively termed "Halal", which provide the list of all permitted foods and prohibitions on eating meat which is not obtained under Islamic guidelines. In the current project, poultry birds were subjected to various slaughtering methods and compared for their microbial and quality characteristics through traditional and advanced methods (FTIR spectroscopy, Fluorescence spectroscopy). Additionally, dead poultry birds were also taken for comparative analysis. Compositional analyses revealed that slaughtering process affected meat composition in a significant manner. Likewise, results of quality assessment stated that Halal slaughtering method showed highest WHC, lower microbial load and less nitrogenous losses. Results for PCA of FTIR spectra described that classification of meat samples into four distinct groups was incomplete, but PCA differentiated some samples into distinct groups based on various slaughtering methods with minimal overlapping. Data obtained through chemometric modeling of fluorescent spectra described that variations in the peak heights and positions provided the evidence that spectral differences were due to differences in the light absorption by fluorophores present in meat. The study provides the evidence regarding the effectiveness of spectroscopic techniques to detect slaughtering authenticity of meat.

Keywords: Meat Authenticity, Halal slaughtering, Spectroscopy, Chemometrics, Meat Quality

Missing Links and Trust deficit among Academia, Government, Community and the Industry with special reference to Food safety and Food security: A critical analysis

Tayyab Rehman

Faculty of Allied Health Sciences, Iqra National University Swat Campus

The trust-based relationship between academia, government, community and industry has a significant impact on the success of any project, program or system. A strong linkage between the fourpillars provides an environment where initiatives are taken, strategies are designed and actions are planned for implementation and sustainability, otherwise the potential benefits of all concerted efforts are lost or delayed. Academianeeds to demonstrate the value of creative amalgam of theory and practice, generate viable ideas and guide and advise the government institutions with the purpose to serve community for a better life. The government functionaries exercising public power usually for private gains to achieve short-term goals need to think and understand beyond their selfish ends about the consequences of neglecting academic engagement which can undoubtedly result in a negative impact on the relationship between the two. The government conceptualizing the scholastic approach put forward by the academia must ensure the rule of law and support the external engagement by the academia to devise implementable policies. The community at risk and the advocates for Food and Nutrition in the private sector are mere spectators of this on and off relationship between academia and the government. Although the role of private sector and the community seems limited, however, they can play an important role by realizing their potential to develop trust and bridge the gap between academia and the government. This is, however, subject to the consideration of private sector by the two established domains – the academia and the government. The industry is indifferent about the research conducted in our universities and is of the opinion that the universities' emphasis is on the quantity of graduates and not on the market-oriented quality research program that provides marketable assets to industry. The industry also seems to be uninterested in investing in quality-compromised research and therefore prefer to import the products that are in demand. Inthis article, the roles and responsibilities of academia, government, industry and the roles and expectations of community including advocates of food safety and food security are briefly described. An analysis of a range of issues/barriers to cooperation among them is presented. Strategies and coordinated action plans for developing a strong linkage among all stakeholders in the context of food safety and food security have been suggested.

Altered diet and response on human health

Shumaila Ramzan[1], Malik Muhammad Hashim[1]*, Iqra Rubab[2]

Institute of food science and nutrition, Gomal university Dera Ismail khan, Pakistan
**mhmalick@gmail.com*

Food act as medicine- to maintain, prevent, and treat disease. Dietry conversion in human records were suggested to play essential roles within the human history. The purpose of public health intervention is to boost health and prevent disease. But problems is changing food habits both are positive or negative impacts on human health. A healthy diet is a diet that maintain or improves overall health. Healthy diet provides the body with essential nutrients or preserve nutrients from oxidation and natural process. High fat Ketogenic diet being used therapeutically for a number of health conditions including alzhemuer's, epilepsy, cancer and obesity. Ketogenic dietry patterns complications include weight loss, constipation & increased levels of cholesterol & triglycerides. Research founds that changing in foods intake bring certain diseases. Some foods intake in low or too much raise the risk of dying heart disease, stroke, diabetes, & other health conditions. the major disease poses substantial health & economic burdens on society. Research conducted the highest percentage of cardiometabolic disease-related death (9.5 %) was related to excess consumption of sodium. Over-weight & obese adults who drink diet beverages can raise risk of type 2 & gestational diabetes, heart disease, cancer, and other health problems. A new study adds to the evidence that eating red meat on a regular basis may shorten your lifespan. Risk of mortality from red meat intake. Highest level of both processed & unprocessed red meat, cancer mortality & cardiovascular disease mortality. Our standard American diet (SAD) is not contributing to our health relies heavily on foods that include artificial color, additives, flavourings, & chemically-altered fats & sweeteners. Our supermarket are full of convient packaged. Foods that appeal to our taste buds, but most of these foods' nutrients are removed.

Effectiveness of Seed Cycling in Polycystic Ovary Syndrome: (A Systematic Review)

Naveed Rasheed, Aftab Ahmad, Farhana Nosheen, Rabia Noreen

Department of Home Economics, GC University Faisalabad, Pakistan

Globally human health is a major concern of every individual. Women health has pivotal role to promote healthy generations. Poly Cystic Ovary Syndrome (PCOS) is the most common issue in their reproductive years. PCOS is an endocrine disorder and cause anovulatory infertility affects about 5–18% women of reproductive year. The management of PCOS is a challenging endeavor, it is a serious concern with major indicators that differ with age and treatment should be personalized to meet the precise requirements of each patient. Imbalance

hormones are known as recurrent cause of PCOS, in which androgen level is higher than normal. The formation and release of eggs during ovulation are impacted by high amounts of androgens. Seed cycling is powerful in the treatment of PCOS. Recent review studies showed positive effect of Seed cycling (Flax, sesame, pumpkin and sunflower). In 2020 a study conducted on female rats and flax seed oil given 1ml/kg /daily for 8 weeks. It showed improvements in PCOS condition related with testosterone hormone. Another study in 2020, Flax seed powder: 30g/day for 12 weeks given with life style changes to PCOS women which showed significant improvements. Pumpkin seed oil given to rabbits for 2 weeks has been significant in decreasing the serum cholesterol and body weight. Various studies also confirmed the significant effect of seed cycling supplementation on PCOS. Therefore, future investigations will make contributions to bridging the traditional understanding of using natural products combined with life style modification may reduce the signs of PCOS among women.

Sport nutrition to improve athlete performance

Javeria Rasool, Shakeel Hussain

Department of Human Nutrition and Dietetics, University Collage of Montgomery, Sahiwal, Pakistan
**Javeriarasool41@gmail.com*

Sport Nutrition is a constantly evolving field with hundreds of research paper published annually. Despite over 50 years of research the field of sport nutrition continues to grow at a rapid rate. Nutrition is an important of sport performance for young athletes in addition to allowing for optimal growth and development macro-nutrient, micro nutrient and fluids in the full amount are essential to provide energy for growth and activity to optimize performance young athletes need to learn when how to eat and drink before during and after activity. An overview of our understanding of the ergogenic value of nutrition and dietary supplementation in regards to weight loss and performance enhancement. Emerging data in the last decade has demonstrated how both macro-micro nutrients availability can play a prominent role in regulating those signaling pathway that modulate Skeletal muscle adaptation to endurance and resistance training. Nonetheless, in the context of exercise performance, it is clear that carbs (but not fat) still remains King and that carefully chosen ergogenic aids (e.g. Caffiene, creatine, sodium bicarbonate, nitrate) all promote performance in the correct exercise setting. Emerging evidence also suggest that vitamin D may play a regulatory role in muscle regeneration Sport nutrition is a young scientific field. Little is known about prevalence and motives of supplement use elite young athletes who compete national or international current survey was performed to asses information regarding the past and present use of supplement among 164 young athletes (16.6± 30 years of age). Common supplements are ergogenic aids, vitamin enriched water, branched chain amino acid and glutamine were linked to

Improving diet and immune function protein powder, sport bars, sport gels plants extract and fatty acids were primarily associated with health reason, particularly immune sport young athletes using dietary supplement safely and effectively Nutraceutical are commonly used to enhance and improve health and performance of athletes. The nutraceutical is fat burner conjugated linolenic acid (CLA) (EFAS) creatine, whey protein glutmine Tribulus terrestris, (HMB) and cordyceps. The survey showed that 82.2% of athletes were using sport supplements among which 60.6% were male athletes. Key words: Sport nutrition, Ergogenic aids, Dietary supplement, Nutraceuticals & Whey protein

Development and Evaluation of Non-dairy yogurts

Nighat Raza, Umar Farooq, Mujahid Farid, Ambreen Naz, Hina Naz

Department of Food Science and Technology, MNS University of Agriculture, Multan, Pakistan

Development of fermented vegetarian milk-based foods is important to fulfill nutritional value of both elderly and individuals that require more energy intake. Soybean, oat and coconut is an attractive functional food grains because of its high nutritional value. Due to continuous increase in human population protein supply is inadequate which causes malnutrition. Main objective of this study is to develop non-dairy vegan yogurts from soy milk, oat milk and coconut milk in conjunction with lactic acid fermentation. Purpose to make vegan yogurts is to overcome malnutrition due to protein deficiency especially in developing countries, where animal protein is insufficient and relatively expensive, increasing concerns about saturated fats and cholesterol levels in animal milk, for cardiovascular patients and lactose intolerance people and for vegetarians. For this purpose, soy, oat and coconut yogurts was prepared first and then analyzed for crude protein, crude fat, crude fiber, carbohydrates, ash, moisture contents, titratable acidity, total soluble solids and PH analysis. After this, yogurts was analyzed for sensory evaluation to check its quality and acceptability for color, aroma, taste, texture and overall acceptability. Obtained data was subjected to statistical analysis. The mean values of crude protein of yogurts showed that soy yogurt contain more protein contents than other yogurts that was 6.0±0.1%. The mean values for crude fat contents showed that maximum value 8.5±0.65% was noticed in the coconut yogurt and lowest value 3.1±0.1% was observed in soy yogurt. Mean values of crude fiber showed that fiber contents are present in more amount in soy yogurt (1.93±0.152%) than in coconut and oat yogurts. The mean maximum value for moisture contents was 84.43±4.007% that was noticed in soy yogurt and lowest value 66.69±0.164% was observed in oat yogurt. The maximum value for ash contents was 0.52±0.08% that was observed in soy yogurt. Mean values for carbohydrate in soy, oat and coconut yogurt was 9.28±0.01%, 20.76±0.659% and 16.16±1.258%. Oat yogurt has maximum soluble contents which was 34.04%. PH of soy, oat and coconut yogurt was 4.6±0.1, 4.4±0.1 and 4.73±0.493. Mean results of titratable acidity of soy, oat and

coconut yogurt were 0.68±0.1%, 0.008±0.001% and 0.48±0.01% respectively. The mean sensory score regarding taste of soy, oat and coconut yogurt samples were found to be 6.87±0.640, 7.12±0.834 and 8±1.069 respectively that showed that coconut yogurt gained maximum scores regarding its taste. Mean results of overall acceptability of soy yogurt, oat yogurt and coconut yogurt were 7±0.755, 7.25±1.035 and 8±1.069 respectively.

Keywords: Dairy alternatives; Synbiotic foods; functional foods; Fermentation; Plant-based yogurts

Effect of *Carica Papaya* Leaves Extract in Dengue Fever: A Systematic Review

Bahisht Rizwan, Hafiza Nazia, Madiha Jaffar, Sana Noreen, Umair Nazim

University Institute of Diet and Nutritional Sciences, The University of Lahore, Punjab, Pakistan

Background Carica Papaya leaves extract has become a competent herbal cure for dengue infection, which is comparatively based on observations. The systematic review aimed to critically observe and analyze the given evidence about the efficacy and safety of Carica Papaya leaves extract in the management of dengue fever comparatively from randomized clinical control trials. Methods Open DOAR, Biomed, Web of Science, JSTOR, Europe PMC, PubMed, Google Scholar, and Embase were being explored. Inclusion criteria included clinical trials like randomized and non-randomized with placebo or no treatment in the control group. Incomplete articles and researches not having proper findings related to papaya leaves extracts role in dengue fever were excluded. We assessed recovery or increase in platelet count and other favourable clinical indicators like duration of stay in hospitals, plasma leakage prevention, complications, and mortality. Results Eighteen studies were included from various countries like Pakistan, Malaysia, Indonesia, India. Ten studies showed a significant rise in platelet count in patients receiving Carica Papaya leaves extract and other remaining studies showed no significant difference. The majority of studies do not show severe adverse effects. In most studies, improvement in mean platelet counts between the first and fifth days of treatment (75% confidence interval 23.74-47.15 with 35.45 mean difference, three studies, 127 participants, and low-quality evidence). No other clinical outcomes were not available. Conclusions Comparatively, in most of the studies, papaya leaves extract has been shown a beneficial effect of significant increase $p>0.001$, while in some studies, it has been shown that hospital stay in patients treated with papaya leaves extract shows decreases. Most studies have clear evidence of an increase in blood platelet count, whereas in some cases, blood platelet does not further drop in dengue patients treated with papaya. There is a necessity for further studies comprising clinical trials examining the effect of Carica Papaya extract on plasma leakage and other severe dengue complications.

Keywords: Dengue Fever, Papaya leaf extract, Dengue Haemorrhage Fever, Thrombocytopenia, Thrombocytes

High Occurrence Rate of Multidrug-Resistant ESBL-Producing E. coli Recovered from Table Eggs in District Peshawar, Pakistan

Umer Sadique

College of Veterinary Sciences, The University of Agriculture, Peshawar

Whilst food-producing-animals could be a pool of resistance-conferring elements in the existing animal production system in Pakistan, the issue has not yet judiciously been highlighted. This study was conducted to determine incidence of extended spectrum β lactamase (ESBL) - producing Escherichia coli in table eggs and human with history of close association with table eggs. For this purpose, a total of 200 table eggs and 50 stool samples from human were analyzed. Results showed that out of 80 E. coli isolates recovered from eggs, 20 (25%) were found to be ESBL-producers, while, of the 17 human isolates, 4 (23.5%) were ESBL producers. PCR revealed that blaCTXM (blaCTXM-1=15 and blaCTXM-9=4) was carried by all 22 (91.6%) ESBL-producers with additional blaSHV2 (n=12) and blaNDM-1 (n=3), but no blaTEM was identified. A predominant combination of blaCTXM + blaSHV2 (n=12) followed by blaCTXM + blaNDM-1 (n=3) was determined. All these isolates (phylogroup D=14/24, A= 6/24 and B2=4/24) were found to be multidrug resistant displaying resistance against at least three different classes of antibiotics. Class 1 integron was carried by (21/24) followed by additional class 2 integron (15/24). A total of 8 isolates were harboring insertion sequence common region 1 (ISCR1), which was found to be linked with blaCTXM in 50% (4/8) isolates. Results of the current study indicate contamination of eggs with ESBL-producing E. coli suggesting to improve hygienic process for end consumer during- egg production.

Keywords: β lactamase, Escherichia coli, multidrug resistant, PCR, table eggs.

Generation of bioactive peptides from meat byproducts for Therapeutic applications

Munazza Saeed, Muhammad Issa Khan*

National Institute of Food Science and Technology, UAF, Faisalabad, Pakistan
**drkhan@uaf.edu.pk*

Dietary interventions have augmented the use of bioactive components with increased awareness for healthy life of individuals. Efforts have been endured to develop functional constituents that offer therapeutic responses towards physiological disorders. Meat industry produces huge amount of waste which have potential to be used as the valuable source of proteins and derived bioactive

compounds. The current study was designed to investigate the anti-hypertension and antioxidant activity of meat byproducts enzymatic hydrolysates. Physicochemical assays and hydrolysis assessment of meat byproducts were carried out to estimate the release of peptides through RP-HPLC. The hydrolysates containing bioactive peptides were evaluated for antihypertensive and antioxidative activities. Liver and kidney showed higher enzymatic hydrolysis at maximum hydrolysis time. The ACE inhibitory activity of liver hydrolysate increased significantly with increase in hydrolysis time. The kidney hydrolysates have significantly higher ABTS radicals scavenging activity than liver and heart. The results indicated that hydrolysates of liver and kidney showed significantly higher oxygen radical absorbance capacity (ORAC) activity after given hydrolysis time. In conclusion, meat byproducts can be utilized for generation of functional bioactive peptides that therapeutic applications to cure human ailments.

Keywords: Meat byproducts, enzymatic hydrolysis, therapeutic potential, antioxidant activity, anti-hypertension activity

Roasted and germinated chickpea flour as innovative fat mimetic in biscuits

Syed Muhammad Ghufran Saeed, Syed Arsalan Ali, Javeria Naz, Rashida Ali

Dept. of Food Science & Technology, University of Karachi, Karachi, Pakistan

Obesity is the major cause of non-communicable diseases (NCDs). Generally, one of the significant causes of obesity is the dietary pattern rich in saturated fat. Moreover, bakery products consumed all around the globe are high in fat content. In this research, roasted and germinated chickpea flour (RCPF and GCPF) was used as a fat mimetic in biscuits. According to weight by weight (W/W), fat content was replaced as per the following concentrations: RCPF 10%, RCPF 20%, RCPF 30%, GCPF 10%, GCPF 20%, and GCPF30%. The physicochemical properties revealed that protein, ash, and crude fiber contents were increased as the concentration of RCPF and GCPF increased in the flour blends. However, GCPF blends depicted higher percentage of protein, ash, and crude fiber contents than RCPF blends. Gluten content was decreased with the increased concentration of RCPF and GCPF, hence suggested weaker gluten network. Furthermore, antioxidant activities, total phenolic content and total flavonoid content, showed increasing trends with increased incorporation levels of RCPF and GCPF in the flour blends and biscuits samples. However, the process of germination significantly ($P \leq 0.05$) significantly enhanced the antioxidant properties of chickpeas compared to roasting. The nutritional profile of biscuits samples showed that the protein, crude fiber, and ash content of biscuits samples increased. The dimensional, textural, and sensory properties revealed that RCPF 20 % and GCPF 10% were more desirable as compared to the control biscuits. Hence it can be concluded that RCPF 20% and GCPF 10% can be used as a successful fat mimetic in bakery products.

Keywords: Antioxidants, Biscuits, Chick pea, Fat mimetic, Chick pea

Development and quality evaluation of meal replacement iron-fortified plant-based food pills

Afifa Saeed, Aysha Sameen, Tayyaba Tariq, Farwa Tariq

National Institute of Food Science and Technology; UAF, Faisalabad, Pakistan

The global prevalence of obesity is doubled in the past few decades which ultimately raises the ratio of linked diseases and puts pressure on health-related bodies to trim down it. The present study aimed development and characterization of iron-fortified plant-based food pills. Assessing the anti-obesity effect of iron-fortified pills without imparting adverse impact on health and investigating the bioavailability of food pills via efficacy trial. It's a sustainable approach with a cogent effort to control food insecurity and global warming. Fe fortification of food pills was done by a nanoencapsulation technique that improved bioavailability of fortificant as particle size reduced and surface area increased which altered surface chemistry and enhances its availability. Food pills were designed according to caloric split-up and subjected to physicochemical, sensory, microbial and storage analyses for the selection of the best treatment. Characterization of Fe nanoparticles was done by zeta potential, X-rays diffraction, transmission electron microscopy and scanning electronic microscopy. Efficacy trial of Fe fortified pills was carried out by in vivo analysis of acclimatized rats and their evaluation was done by cyanmethemoglobin method. After three months, in-vivo analyses were done and data obtained were subjected to statistical analysis. Results demonstrated that significant differences were observed in all treatment results whereas results of T0(control group) and T1 (1 meal replaced pills) i.e., Hb, RBCs and body weight were least significant as they do not show appreciable intended results whereas results of T4 (4 meal replaced pills) were highly significant, revealing that 20-22% increase in Fe bioavailability could be achieved by encapsulation technique.

Utilization of dehydrated cabbage powder a natural source of dietary fiber and antioxidants in cakes

Muhammad Usman Saleem, Tusneem Kausar*, Muhummad Nadeem

Institute of Food Science and Technology, University of Sargodha, Sargodha
**tusneem.kausar@uos.edu.pk*

Demand for health-oriented products, which have high fibre and natural antioxidant and low-calorie contents and are sugar-free, is increasing because of their beneficial effects to overcome health problems such as type of cancer, cardiovascular diseases, hypertension, diabetes, gastrointestinal disorders and weight gain. It is well known that vegetables are good source of natural antioxidants and dietary fiber. The most important reason for increasing interest

in cabbage and cabbage products in the recent years is due to their protective effects against cancer. The aim of this study was to evaluate the effects of dehydrated white cabbage powder supplement (replaced with flour at 0, 2.5, 5, 7.5 and 10%) on chemical, nutritional and sensorial characteristics as well as consumer's acceptance of cakes. Incorporation of white cabbage powder result in increase of ash (0.66-1.28%) and fibre (0.08-1.35%) while decrease the protein (7.23-8.46%) and fat (13.5-10.11%) contents. In addition, phenolic contents and antioxidant activity also improved in cakes. Concerning sensory evaluation, flavor, taste and overall acceptability also better than control.

Keywords: White cabbage, Dietary fiber, Antioxidant, Cake, Consumer acceptability

Quorum sensing under the umbrella of food microbiology

Moazma Sattar*, Haroon Munir, Shehzad Ali

Department of Food Science and Technology, Govt. College University Faisalabad, Pakistan
**moazmasattar980@gmail.com*

Food spoilage is characterized by the unsuitability of the food commodity for consumption due to the regenerative capacity of the microbiota, which ultimately took control in accordance with the dominant environmental factors. Quorum sensing (QS) has already been implicated in this behavior, despite the fact that there is little documentation available in this regard. Quorum sensing (QS), a terminology used to characterize cell-to-cell communication, is a process to comprehend environmental factors and then employ certain adaption mechanisms to cope with adverse environmental conditions in both spatial and temporal. Therefore, it is essential to analyze the significant function of synaptic signaling in food deterioration. This kind of knowledge could be used to develop mechanisms to control such communication channels, consequently, these kinds of approaches will lower or even put a stop to the processes like degradation responses or even modulate the production of pathogenic determinants in food products. Forthcoming experimentations must be used to analyze the black & grey zones of QS, which deepens our knowledge regarding the way QS influences microbiological activity in foodstuffs and will help in identifying QS's potential for preserving the food commodities.

Keywords: Food spoilage, Quorum sensing, Food preservation, cell-to-cell communication.

Mango seed oil and its promising role as food component

Muhammad Shahbaz*, Hammad Naeem, Shamas Murtaza, Nighat Raza, Umar Farooq, Ali Hamza

Department of Food Science and Technology, Muhammad Nawaz Shareef University of Agriculture Multan
** shahbaz.ft@mnsuam.edu.pk*

Mango is considered as king of fruits due to richtaste nutritional profile. Pakistan is a leading mango producing country. Most of the fruit is consumed as a fresh fruit however it is also used to produce different products using industrial processing for commercial usage. Mango seed contains appreciable amount of good quality oil which could be used in different aspects. The mango seed oil possessed good fraction of saturated and unsaturated fatty acids and partially semisolid at room temperature. Mango seed oil could be used as an alternate to shortening used in baking products because the structure of the mango seed oil is very close to shortening used in production of bakery products. Nevertheless, mango seed oil is semi-solid at ambient temperature and thatthis oil needs no partial hydrogenation. Mango seedoil also possessed a large proportion of bioactive components like antioxidants which possessed numerous health benefits and due to which it is a potent agent for food application and health benefits. The production and utilization of mango seed oil as food ingredient may responsible to reduce the environmental burden and pollution and may be a good source of earning to producer and processors as well.

Curcumin: Plants of the *Curcuma Longa* Species and the Positive Effect of Oriental Spice on Skin Health

Momina Shahid, Shahnai Basharat

University Institute of Diet and Nutritional Sciences, The University of Lahore, Pakistan

Curcumin is the main bioactive component in the rhizomes of Curcuma longa and is responsible for its bright yellowish color. Curcumin possesses potent antioxidant, anti-inflammatory, anticancer, antiviral, and antibacterial properties. Curcumin is lipophilic and requires an acidic medium for its bioavailability. Nanoparticles are produced to increase the permeability of the curcumin, such as lipospheres, liposomes, solid lipid nanoparticles, etc. Curcumin has been used for centuries in Asia to treat several diseases, such as cancer, cardiovascular disease, diabetes, COVID, etc., due to its pharmacological properties. Curcumin functions by targeting different cell signaling pathways, receptors, cofactors, enzymes, and modulating gene expression. Molecular docking reveals inhibition of melanin stimulating hormone, tyrosinase, tyrosinase-related protein1/2, PKCϴ, NFκB, IGF-R1, EGFR, PhK, COX, TNF-α, PhK, PGE2, hs-CRP and T cells activity by

curcumin. Curcumin decrease levels of IL-17A, IL-17F, IL-22, IL-2, IL-12, IL-22, IL-23 and IFN-gamma. Curcumin induces apoptosis in cancer cells by activating the tumor suppressing gene p53 and inhibiting the PI3K/AKT/mTOR pathway. Curcumin increases antioxidant enzymes like SOD, CAT, GR, etc. Curcumin improves skin disorders like hyperpigmentation, acne vulgaricus, aging, psoriasis, vitiligo, wound healing, and skin cancer.

Extraction and Utilization of Cinnamon Bioactive Compounds for Palm Oil Stability

Muhammad Zia Shahid[1], Ammar Ahmad Khan[1], Assiya Afzal[2], Ali Ikram[1], Aimen Zafar[1]

[1]*University Institute of Food science and Technology, University of Lahore, Pakistan*
[2]*The Children Hospital & the Institute of Child Health Lahore, Pakistan*

Recent scientific evidences have highlighted diet and health linkage as one of the key approaches to shield numerous metabolic dysfunctions. Spices and their bioactive components are more promising attractions for their inclusion in diet-based regimes to improve human health. The current research was aimed to investigate the antioxidant potential of cinnamon extract. For the purpose, cinnamon sticks were procured from Metro Cash and Carry while palm oil was obtained from United Ghee Industries Ltd., Faisalabad. The resultant extract was analyzed for its antioxidant activity through total phenolic content (TPC), free radical scavenging activity (DPPH assay), and total antioxidant activity was measured by ferric reducing antioxidant power (FRAP) test. The results indicated that TPC, DPPH and FRAP values were 355.01±8.34 mg GAE/g, 90.18±2.12 (%) and 132.82±3.12 (µmol/g), respectively. To check the effect of cinnamon extract on the shelf life of oil, the extract was added in the oil at different levels i.e., 0.05, 0.10, 0.15, 0.20 and 0.25%, to compare the antioxidant potential of the extract whereas to acted as control and TBHA @ 0.1% was used as synthetic antioxidant in the oil samples. Afterwards the oil samples were analysed for peroxide value (PV), free fatty acid content, (FFA) thiobarbituric acid (TBA) value and iodine value (IV) to check rancidity, after every seven days during the storage period of four weeks (28 days). The statistical analysis indicated that all these parameters were significant with respect to treatments and storage. The cinnamon extract proved effective in reducing the lipid oxidation of palm oil.

Effect of Citrus Peel Powder in Marinade for Safety, Quality and Tenderness of Chicken

Kanwal Shahzadi[1], Muhammad Rizwan Tariq[1]*, Shinawar Waseem Ali[1], Sajid Ali[2], Muhammad Shafiq[3], Moazzam Anees[3]

[1]Department of Food Sciences, University of the Punjab, Lahore, Pakistan
[2]Department of Agronomy, University of the Punjab, Lahore, Pakistan
[3]Department of Horticulture, University of the Punjab, Lahore, Pakistan
**Rizwan.foodsciences@pu.edu.pk*

Consumer awareness about the quality and safety of the food products has been increased in this century and consumer demands the use of natural ingredients to preserve the food for long duration. Citrus fruits are used to manufacture the citrus juice and other related beverages. A significant amount of peel wasted in the citrus processing industry that can be used for many other purposes due to high polyphenol contents in the citrus peel. Food processors are also investing the money in the research areas to find the possible ways to improve the quality, and safety of the chicken during storage. Therefore, the present research was conducted to understand the impact of different percentages of citrus peel extract in marinade of chicken on quality, safety and shelf life of chicken. Chicken was stored at refrigeration storage after treatment of citrus extract and storage study of 30 days was done to understand the impact on shelf life and quality. Physicochemical analysis, microbial analysis, cooking yield, lipid oxidation and sensory evaluation was done. The results of study revealed that among all treatments and storage days, lowest pH was recorded at T0 at 30th storage day with value share of 5.78±0.10. Means showed the highest moisture (%) value of 76.27±0.05 at T0 at zero day's storage. T0 showed the lowest protein (%) value of 20.33±0.31, at zero's day's storage. Means showed the lowest TPC (mg GAE/g) value of 1.21±0.02 at T0 at zero day's storage. In contrast, T3 showed the highest TPC (mg GAE/g) value of 4.32±0.23, at zero's day's storage. Means showed the lowest TFC (mg QE/g) value of 1.69±0.01 at T0 at zero day's storage. In contrast, T3 showed the highest TFC (mg QE/g) value of 8.16±0.05, at zero's day's storage. Means showed the highest TBARS (mg-MA/kg) value of 0.51±0.01 at T0 compared to other treatments at zero day's storage. Means showed the lowest TVC (log CFU/g) value of 4.37±0.01 at T3 at zero day's storage. In contrast, T0 showed the highest TVC (log CFU/g) value of 4.62±0.02, at zero's day's storage. After 30 storage days, lowest cooking loss (%) was recorded at T3 with value share of 24.6±0.42. Means showed the lowest hedonic scale score of overall acceptability 7.33±0.577 at T1 at zero day's storage. After 30 storage days, highest hedonic scale score of overall acceptability was recorded at T3 with value share of 7.33±0.577. It can be concluded that, with the addition of citrus peel extract microbial load decreased, total phenolic contents increased and overall acceptability of the product also improved.

Development of Fish Powder and Its Utilization in Making Pasta

Nida Shaikh, Asadullah Marri, Aijaz Hussain Soomro, Noor Muhammad Junejo

Institute of Food Sciences and Technology, SAU, Tando Jam, Sindh, Pakistan
**ahsoomrosau@sau.edu.pk*

Fish is an excellent nutritious aquatic food commodity which is mainly rich in good fats, proteins, vitamins, and minerals. Flesh from small, ignored fishes may be transformed to powder after an appropriate drying method and may be used in making baked, extruded and snack foods etc. Present study on the development and quality evaluation of fish powder-based pasta was conducted for determining proximate composition and sensorial attributes of pasta samples with varying levels of fish powder (T1= durum wheat flour 99 g + fish powder 1 g, T2= durum wheat flour 98 g + fish powder 2 g, and T3= durum wheat flour 97 g + fish powder 3 g T2 and T3) and control pasta sample (T0= pasta sample without fish powder). For this reason, fish powder was developed from freshly harvested freshwater small fishes (Ompok pabda) locally known as Pallu) and used for pasta making. The pasta samples were boiled and analyzed as per standard methods for proximate composition and sensorial properties. The results revealed that all attributes (proximate and sensorial) remained statistically ($P \leq 0.05$) different from one another. It was recorded that, among all treatments, T3 performed better for most of the attributes and had significantly higher ($P \leq 0.05$) average values for fat (1.77 %), protein (15.86 %), ash (1.19 %), Fiber (0.37 %), carbohydrate (19.76 %), energy value (441.93 kcal/100g), titratable acidity (0.045 %), color (8.33), flavor (8.33), texture (9), taste (8.33) and overall acceptability (8.50). Furthermore, T0 showed to have significantly higher ($P \leq 0.05$) average values merely for moisture (68.55 %) and pH value (6.7). However, T2 and T1 also showed satisfactory results for proximate composition and sensorial properties. It is therefore, concluded from the present findings that incorporation of fish powder in pasta may improve its nutritional and sensorial properties. Consequently, it is recommended to utilize fish powder in making different pasta with other different formulations.

Development and Characterization of Strawberry and Mulberry Fruit Leather

Sadaf Shakoor[1], Sehrash Fatima[1], Ahmad Din[2], Muhammad Tuseef Asghar[1]

[1]University of Agriculture Faisalabad, Sub Campus Burewala Vehari, Punjab
[2]National Institute of Food Science and Technology, UAF, Faisalabad, Pakistan

Strawberry and mulberry fruits have high nutritional content and maintain good health but both are short-season and underutilized fruits The shelf life and nutritional value of fruits can be preserved by making a different product that

contained low moisture content. Dehydration preserve the short-season fruit and reduce the quality degradation of fruits. Fruit leather is the meticulous fruit dessert and dehydrated sheet that is made by using the fruit puree, eaten as a snack food, and also used in many recipes as an ingredient. In this study fruit leather was developed by using strawberry and mulberry fruits puree with a dehydrator to maximize the shelf stability and prevent post-harvest losses. Strawberry and mulberry puree are characterized by physicochemical properties. Five appropriate treatments of different concentrations of both fruits puree was developed. The developed fruit leather is characterized by physicochemical, sensory, and antioxidant tests for the estimation of quality. TSS (44.66%- 64.33%), pH (3.79-4.29), moisture content (14.06% - 24.06%) % value increased. TA (1.33% - 0.62%) and vitamin C (68.2mg/100ml -38.71mg/100ml), antioxidants (61.81%-42.94%) crude fiber (3.31% - 1.18%) and ash content (2.31% -1.56%) and color analysis values decreased. Values of cohesiveness decreased and adhesiveness and elasticity increased from T0 to T1 treatments. Sensory evaluation showed that control is the most liked treatment. Thus, the results indicated the purpose of incorporating mulberry puree in strawberry puree was to analyze the nutritional quality of strawberry and mulberry fruits in mixed fruit leather.

Effect of ripening and in vitro digestion on free amino acids and Angiotensin I converting enzyme inhibitory (ACE-I) potential of cow and buffalo milk cheddar cheeses

Amal Shaukat* [1], [2], Muhammad Nadeem[2], Muhammad Modassar, A. N. Ranjha[2], Lala Rukh[2], Waleed Sultan[1], Kanza Aziz Awan[1]

[1]Department of Food Science and Technology, UCP, Lahore, Pakistan
[2]Institute of Food Science and Nutrition, University of Sargodha, Sargodha

Cheddar cheese is a source of a variety of biologically active peptides and free amino acids, which contributes to the cheese aroma, flavors, and textures. The free amino acid liberation and angiotensin-converting enzyme inhibition potential of cheddar cheese made from cow and buffalo milk before and after in vitro digestion by gastric and duodenal enzymes with ripening were investigated. The cheese samples were stored under refrigeration condition (4°C) for ripening for 3, 6, and 9 months. The possible differences existing in the level of free amino acids were explored before and after in vitro digestion of ripened cheddar cheese made from cow and buffalo milk. The lower level of angiotensin-converting enzyme inhibition value 62.4±1.04% was observed in gastric digested cheese samples after 9 months of ripening while the highest angiotensin converting enzyme inhibition value 93.1±1.29% was observed in duodenal digested cheese samples after 6-months of ripening. This study showed that before and after in vitro digestion, highest angiotensin-converting enzyme inhibitory potential of cheddar cheese was observed between 6 to 9 months of ripening. In 9 months ripened cheese, significant increase in contents of glutamic, glutamine, valine, leucine and lysine was observed after duodenal digestion in case of both cow and buffalo milk

Cheddar cheeses. The contents of valine, ornithine, and tryptophan were negligible before digestion and significantly increased afterward.

Agave Extract as Therapeutic Additive of Functional Foods

Muhammad Sheharyar*, Muhammad Sajid Manzoor, Shoaib Younas, Ukasha Arqam, Kanza Aziz Awan, Maha Hanif, Komal Azam

Department of Food Science and Technology, Faculty of Life Sciences, University of Central Punjab, Lahore, Pakistan

People are becoming more conscious about various food ingredients that are explored to improve health and avoid different diseases. From the ancient times, several products of the Plants have been a rich source of the therapeutic agents. Plants also utilized as medicine back to the early era. Examination for the cost-effective formulation of the natural plants as therapeutic agents considered to be excellent choice. The Agave plant are the member of the Agavaceae family and grow in humid and sub-humid tropic areas of the world. Moreover, agave is a remedial plant utilized in the formulation of the traditional medicine for the treatment of numerous diseases that have been related to the useful effects on the human health. Various species of the agave plant have natural activities like phytotoxic, immunomodulatory, anticancer, anti-hypertensive, antimicrobial and controlling gastrointestinal and urological disorders. The soaked leaves of the A. atrovirens are utilized for the treatment of the disease such as the Diabetes Mellitus. Agave is a rich source of Fructans. Researches showed that fructans are used as vigorous elements of the food due to their health advantages. Thus, Agave extract can be used as functional food additive in many food products and it makes the products beneficial for the people suffering with diabetes, obesity, hypertension problems and different immunity disorders. Moreover, fructans are used as potential food additive due to their industrial purposes such as sweetening agent, stabilizer, fat replacer, binding agent and thickening agent.

Keywords: Agave extract, Fructans, Therapeutic agent, Industrial Importance

Sport nutrition

Kiran Shehzadi, Shakeel Hussain

Department of Human Nutrition and Dietetics, UCM, Sahiwal, Pakistan
**kshahzadi202@gmail.com*

Impetus of this particular study was line up to discern the male & female athlete nutrition and nutrition knowledge. Sport nutrition is specialism within the arm of nutrition that cohort intimately with the study of human body and exercise science. To fully recognize and subsequently apply sport nutrition concept, professionals instructing athlete on proper eating scenario. The motive of that sharp end to guage nutrition knowledge. By highlighting gaps in nutrition knowledge of these athlete sport nutrition professionals may begin to address

these cracks by educating athlete with a view toward minimum injury & magnifying sport performance. The coast to coast knowledge score was 33.2% (+ 12.3%) men scored 28.2% (+ 12.7%) & women 38.7% (+ 14.2%). The coach was citied by 89.9% of athlete as the main source of nutrition in formation. The scrutinize manifested that the sport nutrition proficiency of these athlete is inadequate. But in wake of that further swap are turn out in nutrition knowledge. Male and female athlete tangled at each end of exercise, strength, weight lifting to endurance running, cycling & swimming. GONE are those days of propound the dietary practices drew on anecdotal observation or experience. Sport nutrition practices together with high carbohydrates diets and CHO chug during exercise training with glycogen stores, chug of high dose of antioxidant supplements and protein chug post exercise many influence the immune system, status in athlete. In order to popup robust immunity, athlete need to slug a well-balanced diet that is ample to bump into their requirement for energy, CHO, protein, fat and micronutrients. Habitual CHO intake is life and death for male & female athletes, to ensure pre-during and post work out. Female athlete requires 3 _ 12 g/wt-kg carbs and male athlete stationary carb 45_65%. dietary protein slightly up lifted in case of strength, speed and endurance training. female athlete needs 1, 41_ 1.71g of protein per kg of body weight. Male athlete needs 1.2_2g/wt-kg. Timing of protein is important. Fat requirement swing in male and female athlete. Female athlete need fat 20-25% daily and male requirement of fat is 20 35% mostly female athletes are iron scanty due to exercise induced mechanism & menstruation. Iron requirements for male & female athlete 10-15mg/day. Both athletes require hydration to replace fluid lost in sweat. Female athlete should consume 4 liter water per day & male athlete should consume 5.7liter per day. Both should require electrolytes like zinc, magnesium, sodium, potassium, calcium & iron for extensive activity. because during vigorous work out, these electrolytes are lost through sweat and have risk of fatigue, nerve impulsive & muscle cramp, spasm, CHO supply muscle with glucose required & protein for muscle building to prop up pinnacle gig. And some crucial vitamins should be consumed such as vitamin C, E, B- carotene and B12 for span function. Key points: Intro, Sport nutrition knowledge, Nutrition of athlete Balance diet & Nutrient requirement.

Fortification of Wheat Bread with Coconut Flour to Increase Nutritional Value

Hasham Bin Shoukat[1], Zahida Qadeer[2], Baila Ahmad[2]

[1]Department of Food Sciences, University of the Punjab, Lahore, Pakistan
[2]Department of Food Science & Technology, IUB, Bahawalpur, Pakistan

Bread is a major portion of daily breakfast, fast food and many other food products all over the world with consumption rate of 188.79 grams per person per day. It is basically prepared with wheat flour but can be fortified with different other ingredients for easy supplementation of different nutritional elements. For this

purpose, an experimental study explored the nutritional variation caused after the fortification of wheat flour bread with coconut flour. Moreover, the effect of coconut flour on sensory attributes and shelf life of the value-added bread was also analyzed. Appropriate supplementary doses of coconut flour were also determined in accordance with the sensory characteristics. Five different bread samples were prepared with ratio of coconut flour of 5%, 10%, 15%, 20% and 25%. Proximate analysis of flour samples was conducted. Water absorption capacity, sensory profile and shelf life evaluation of flour blends were also analyzed. The results revealed that the gradual addition of coconut flour from 0 to 25% into wheat flour bread caused continuous increase ($p > 0.05$) in protein, fat and dietary fiber contents along with a gradual decrease ($p > 0.05$) in carbohydrate and moisture contents. However, higher supplementary doses of coconut flour resulted in deterioration of the sensory attributes and shelf life. In conclusion, coconut flour doses up to 15% were regarded suitable for fortification in bread that sustained the sensory acceptability, shelf life and nutritional value of the bread.

Effect of Organic (Edible) Inhibitors and Biochemical Characterization of Partially Purified Oxidative Enzymes from Fruits

Aisha Siddiqua*, Fatima, Saima Mashal, Laraib Tahira, Qurbat Zahra, Rida Danish

Gomal Center of Biochemistry and Biotechnology, Gomal University, D.I.Khan
**draisha@gu.edu.pk, 03377445106*

Along with their importance, the shelf-life of fruits plays a vital role in economy of farmers and consumer. Physical appearance of fruits is destroyed by browning. Enzymatic browning is a response which requires the activity of enzymes and oxidation. Phenolic compounds are present in the cell of fruits and when these phenolic compounds are exposed to the air or oxygen through cutting the oxygen causes enzymatic browning. The PPO enzyme responsible for browning was obtained from different fruits after 30%-70% (NH4)2SO4 saturation followed by Sephadex G-300. Homogeneity of PPO enzyme was checked by SDS-PAGE. PPO from Zizipus Mauritania with 11.64 U/mg specific activities and 12.38% recovery was 264.55 fold partially purified. Whereas the same enzymes from Punica Granatum showed the specific activity up to a level of 9.74U/mg with 304.38 folds and 12.27 recoveries. Similarly, PPO from Psidium Guajava was isolated in partially purified form to the level of 282.67 folds with specific activity of 16.96U/mg and 9.87 recoveries. The molecular weight of all PPO was found to be 50kDa. The Optimum temperature of PPO was 50°C with temperature stability of 20-60 forPunicagranatum, 30-70 for Psidium guajava and 20-70 for Zizipus mauritania. The optimum pH of Punica granatum was 8.2, Psidium guajava was 7.2 and Zizipus Mauritania was 7.8. And enzyme was found to be stable at pH Punica granatum was in the range of 5.8-7.8, Psidium guajava was

5.2-8.2 and Zizipus Mauritania was 5.6-8.2The activity of enzyme was inhibited by using different organic edible inhibiters and commercial chemical inhibitors. In Zizipus Mauritania coffee was proved to be stronger inhibitor for the enzymatic activity of PPO enzyme while in Punica granatum and Psidium guajava, cinnamon powder was more potent inhibitor.

Central obesity and associated factors among working and non-working women in district Sargodha

Farzana Siddique*, Komal Waseem, Saima Noreen, Kashif Ameer

Institute of Food Science and Nutrition, University of Sargodha, Sargodha

The present project has been designed to check the prevalence of obesity between working and non-working women to find the association between nutritional health status (anthropometric and energetics measures) and other indicator biomarkers. Among anthropometry data, the results of height (WG: 150.66 ± 2.50; NG: 149.71 ± 3.08), BMI (WG: 30.309 ± 0.620; NG 30.771 ± 1.103), waist circumference (WG: 98.479 ± 3.074; NG: 100.65 ± 3.08), AMR (WG:1741.2 ± 111.6; NG: 1699.6 ± 71.0), BMR (WG:1244.7 ± 55.7; NG: 1230.8 ± 55.8), TDEE (WG: 1668.3 ± 154.3; NG: 1552.3 ± 134.0), body fat% (WG:31.12 ± 1.32; NG: 32.29 ± 1.63), body water (WG:44.97 ± 1.99; NG: 44.29 ± 1.37), cholesterol (WG: 201.63 ± 39.79; NW: 225.30 ± 43.57) were statistically highly significant (P<0.001).Food Frequency Questionnaire (FFQ) showed better dietary plan for working women. HDL, TAG and CHO showed a strong positive correlation with weight with Pearson's r value (4.17, 4.95, 3.33) and WTHR (9.22, 9.42, 14.35) for working female. Results from FFQ showed that TAG has positive correlation with fats (r=10.31 and r=2.93) respectively. Oxygen saturation with CHO has negative correlation with Pearson's value (r= 7.86 and r= 6.17). This study concluded a strong difference between BMI, major indicator biomarkers and lifestyle factors (dietary habits, physical activity) between working and non-working women that paves the way for future studies to put forward some interventions using these parameters to control central obesity.

Dietary Patterns in Pakistan and the Nation's Disease Burden

Naila Siraj[1]*, Saima Tehseen[1], Mahwash Aziz[1], Rizwana Batool[1], Adnan Amjad[2]

[1]Government College Women University, Faisalabad, Pakistan
[2]Institute of Food Science and Nutrition, BZU, Multan, Pakistan
**nailaateeq@gcwuf.edu.pk*

Having a healthy population significantly impacts the country's socio-economic development. A healthy population is more productive, earns more money, and enjoys a higher standard of living than a sick or infirm population. Overeating and under-nutrition are also significant contributors to the country's rising disease

burden, as are poor eating habits and people with a propensity for malnutrition. Diet plays a crucial role in illness development, and Pakistan's city-dwelling population is consuming an unhealthy diet. The situation in Pakistan has deteriorated as the prevalence of communicable and non-communicable diseases continues to rise. As a developing country, Pakistan is particularly vulnerable to the spread of these illnesses. As a result of the country's financial problems and poor economic standing, new health challenges have emerged that are making matters worse; there isn't a single remedy to the myriad health concerns. Even while the health care system in the United States has made significant progress over the years, it is still unable to address the issues that rural residents face adequately.

Comparative Effect of Different Weaning Foods on the Lipid Profile and Safety Assessment Biomarkers

Nida Sohail, M. Nadeem Akhtar, Shahnai Basharat, Ammar Ahmad Khan

The University of Lahore, Lahore, Pakistan

The present study explores the contemporary status of mung-beans and wheat is a significant and nutrient dense food grain vegetable that assumes an essential part in human sustenance because of its copious supplements like proteins, dietary fibers, minerals and nutrients. Other than nourishment, the presence of critical measure of different bioactive mixtures in wheat and mung-bean makes this yields a decent option for useful food. The treatments groups were evaluated for serum lipid profile and safety assessment parameters. This study designated the effect of treatment groups on the characteristics of weaning food produced from the mixture of wheat and mungbean on experimental rats. The characteristics of the weaning food mixture were determined that this mixture of wheat and mungbean were highly impact on the growth of rats. No negative changes in growth pattern were observed in experimental animals. The results were presented as means ± SD for analysis. Differences in measured values and changes in the body weight and metabolism were evaluated using parameters ANOVA testing followed by SPSS version 25. The results were considered statistically significant if the p values were less than 0.05 ($p \leq 0.05$). It has been concluded that fermented, roasted and sprouted wheat and mungbean is high in proteins that helps in growth of rats and this is also used as animal protein to enhance the growth factor in human as well as animal body. These weaning foods are highly digestible, could promote growth, improve health and meet the nutritional requirements for infants and adults.

Influence of cinnamon with superheated steam-light wave roasting on the mitigation of heterocyclic aromatic amines (HAAs) in roasted lamb meat patties

Raheel Suleman[1], Saeed Akhtar[1]*, Tariq Ismail[1], Adnan Amjad[1], Sameem Javed[1], Dur-e-Shehwar Sattar[1], Muhammad Ahsan[1]

Cinnamon spice contains many antioxidants to scavenge the free radicals and reduce all kinds of harmful compounds like HAAs etc. Modern technologies used for cooking such as use of superheated steam can be beneficial to reduce the formation of HAAs. The current study was based on the use of cinnamon spice in the roasted mutton patties to mitigate the formation of the HAAs in the roasted patties with superheated steam roasting. The results showed significant difference ($P<0.05$) in the content of both polar and non-polar HAAs in cinnamon treated patties. Cinnamon treated patties showed higher significant decline in polar HAAs (23.52-12.41 ng/g) while non-polar HAAs (16.08-9.51 ng/g) from 0.5%-1.5% respectively as compared to control 45.81 ng/g polar and 35.09 ng/g non-polar HAAs. The significant ($P<0.05$) polar HAAs reduced were PhIP, DMIP, IQx and 8-MeIQx while non-polar were Harman and Norharman. Both spices and superheated steam controlled HAAs to a significant level in mutton patties.

Keywords: Antioxidants, Heterocyclic amines, Spices, roasting.

Food Safety and One Health: Significance in Pakistan

Waleed Sultan[1], Sanabil Yaqoob*[1, 2], Kanza Aziz Awan[1], Aysha Imtiaz[3], Amal Shaukat[1]

[1]Department of Food Science and Technology, Faculty of Science and Technology, University of Central Punjab, Lahore, Pakistan
[2]National Engineering Lab for wheat and corn deep processing, Jilin Agricultural University, Changchun, China
[3]National institute of Food Science and Technology, University of Agriculture Faisalabad, Pakistan

The One Health Model is considered a holistic approach which facilitates collaboration among various disciplines. It is a broad and growing model that embraces emerging infectious diseases, antimicrobial resistance, environmental and ecosystem health, noninfectious diseases and chronic diseases, ecology, wildlife, land use, biodiversity, social sciences and much more. Out of all the food safety has taken a central place in one health model due to the foodborne illnesses as these are considered as serious public health threats around the globe and putting economic burden especially on the low & middle-income countries. Billions of people are at risk and millions of people get sick from foodborne diseases every in the world due to unsafe food. The complexity of food safety stresses field experts, researchers, scientists and professionals to move outside

from the confinements of their own mindsets, disciplines, and profession to explore new approaches of team science and concept of "One Health" contains these assertions. The food safety status of Pakistani food is highly precarious because a wide range of food products have been found highly contaminated with microorganisms and chemicals. Foodborne illnesses are greatly increasing among Pakistani children especially diarrhea, gastroenteritis. Moreover, aflatoxins are also recognized as major contaminants of Pakistani food. Food containing pesticides residues is also causing morbidity and mortality among the Pakistani population. However, no serious efforts have yet been made in terms of surveillance, monitoring, control, legislation, advocacy and awareness on food safety in Pakistan. This review will be useful for scientists, researchers and other professionals utilize this baseline data for prevention and control of food borne diseases.

Keywords: Food Safety, One Health, Foodborne illnesses, Pakistan

Nutritional Status of School Going Children (6 To 15 Years) in Urban and Rural Area of District Swat

Sumaiya, Sana Khan

The current study was conducted on the nutritional status of school going children (5 to 15 years) in rural and urban areas of district swat. The aim of research was to observe role of diet on health of school going children and to check the nutritional status of school going children in urban and rural area. Around 100 samples were selected, 50 from rural and 50 from urban area. Nutritional status was measured by anthropometric measurements, clinical examination, and dietary data. The data was collected through a preplanned questionnaire by asking face to face questions. The findings revealed that diet had a great impact on heath of school going children. As students from poor diet quality showed poor nutritional status whereas students belonged to high income families and good diet quality had better nutritional status. Outcomes illustrated that area had a wide impact on the nutritional status of children. The findings clearly shown that children belong to rural area Islampur Elum Valley Public School had moderately poor nutritional status while children from urban area Saidu sharif Almadina Model School had better nutritional status comparatively. BMI indicated that out of 100 samples 46% were underweight 39% were normal, 14% were overweight and only 1% were obese. Around 35% mothers were illiterate and 81% were housewives. Nearly 27 % were having low paid jobs. Approximately half of the rural children showed poor signs of nutrition such as pale complexions, dark circles, dry skin, ridged and brittle nails, dry and easily pull-out hair, and dental cavities. Consequences evaluated poverty, lack of mother education, lack of nutritional awareness, unhygienic practices, unhealthy breakfast, junk food intake, poor diet quality, poor appetite, and unhealthy food choices as the main factors of malnutrition.

Nutritional and sensory properties of cookies fortified with de-bittered Moringa leaves powder

Laraib Syed, Aijaz Hussain Soomro*, Shahzor Gul Khaskheli, Asadullah, Marri, Nida Asad

Institute of Food Sciences and Technology, Sindh Agriculture University, Tandojam, Sindh, Pakistan
**ahsoomrosau@sau.edu.pk*

Moringa oleifera is highly useful tree with multiple nutritional and therapeutic properties for human health. The experiment for present study was conducted to investigate the physical, nutritional and sensorial properties of the cookies fortified with de-bittered Moringa leaves powder (DMLP). Fresh baby Moringa leaves were plucked, botanically identified, washed, de-bittered and shade dried at ambient temperature. The dried leaves were grinded to obtain DMLP which was used for preparing cookies. Five different treatments were developed for this study including T0 (100% wheat flour/control), T1 (99.5% WF and 0.5% DMLP), T2 (99.0% WF and 1.0% DMLP), T3 (98.5% WF and 1.5% DMLP) and T4 (98.0% WF and 2.0% DMLP). The results revealed that physical attributes such as diameter (38.31mm to 35.37mm) and the spread ratio (3.73mm to 3.22mm) of fortified cookies were decreased while thickness (10.24mm to 11.44mm) of fortified cookies were increased. It was observed that T4 showed significantly higher average values for protein (15.03%), fat (15.70%), carbohydrate (40.56%), crude fiber (2.48%) and pH (4.87). Whereas ash (3.63%) and moisture (4.39%) content were higher in T3 and T2, respectively. The organoleptic evaluation of T1 cookies perceived significantly higher scores for color (7.5), taste (7.7), flavor (7.7), aroma (7.5), appearance (8.0) and overall acceptability (7.8). It was concluded from the study that the addition of DMLP improved the nutritional composition of cookies due to its rich source of nutrients therefore it could be used as supplementary ingredient for enhancing the nutritional value of fortified cookies. The sensorial properties of cookies fortified with DMLP may exhibit higher acceptability among consumers.

Development of Solar Thermal Dryer for On-Farm Drying of Moringa Leaves

Assam Bin Tahir

University Institute of Food Science and Technology, The University of Lahore

Moringa Oleifera is recognized as a miracle plant with many therapeutic properties such as anti-inflammatory and antioxidant activities. Furthermore, it comprises a variety of nutrients such as amino acids, vitamins, and antioxidant compounds. Due electricity and gas crisis in Pakistan the drying of moringa leaves needs to economize. The main objective of the current research was to design and

fabricate a solar drying unit to minimize the transportation and other miscellaneous costs during the processing of moringa leaves on the farm. During the operation, the machine was entirely operated on solar energy, and no gas and electricity was consumed. Several trials were conducted on moringa leaves to optimize the drying process to reduce the energy requirements and increase the yield. The Moringa leaves were dried at 50°C, 55°C, and 60 °C. A maximum decrease in moisture was observed at 60°C, and a minimum decrease was observed at 50°C. The difference in weight of leaves as a function of time was monitored. The total time taken by Moringa leaves to reach the achieved moisture content at 50°C, 55°C, and 60 °C was 8 hours respectively, despite the time factor being kept constant.

Blockchain Technology in Food Supply Chain

Saima Tehseen[1], Sidra-tul-Muntaha[2]

[1] Department of Food Science and Technology, GC Women University Faisalabad, Pakistan
[2]Department of Food Science and Technology, GC Women University Faisalabad, Pakistan

**dr.saimatehseen@gcwuf.edu.pk(ST), sidragillani@gcwuf.edu.pk(STM)*

With more globalization, the food supply chain has become very advanced. It has become a very common practice to buy the off-season vegetables and fruits by the consumers. The food ingredients are travelling a very long distance to reach the destination from different parts of the world. As more globalizations has been seen in the food industry so it results in more travel of the products. Moreover, it results in variations in the information. It results in more complex food systems and increasing issues in food supply chain. Food Frauds has been seen due to the reason of lack of transparency and immoral practices. It also results in food recalls. There is an increasing demand by the consumers to validate their purchases by the tracking of the products and also by understanding the effect of environment throughout the food supply chain. For resolving these issues and for the enhancement of the business a new information technology is used known as Blockchain Technology. It is a chain of blocks. All these blocks are in a database that is called as the shared ledger, and this is further well distributed in the network of the given business. If a single tempering is noticed in one block it will not be able to link to the next block and results in breakage of the chain. Blockchain is secure, up to dated, reliable and difficult to hack. The food supply chains efficiency as well as the transparency can be increased by the blockchain, and it has a positive impact from the warehouse to the payment.

Keywords: Food Supply Chain, Information Technology, Food Fraud, Food Recall

Effect of yeast types on ethanol production from sugarcane molasses

Imtiaz Ali Unar[1], Dileep Kumar[1]*, Aijaz Hussain Soomro[1], Asadullah Marri[1], Nizamuddin Depar [2]

[1]Institute of Food Sciences and Technology, Sindh Agriculture University, Tando Jam, Sindh, Pakistan
[2]Nuclear Institute of Agriculture Tandojam Sindh, Pakistan
**dkumar@sau.edu.pk*

The present study was conducted to study the effect of yeast types on ethanol production from sugarcane molasses at laboratory of Institute of Food Sciences and Technology, Sindh Agriculture University, Tandojam. Treatments included: T1: Baker's yeast, T2: Instant yeast, T3: Red ethanol yeast. The results of present study showed that the sugarcane molasses with baker's yeast showed significantly higher pH 5.4, 3.73% titratable acidity, 13.46% total soluble solids, 2.29% ash, 13.36% reducing sugar, 18.02% total sugar inversion, 9.60% total sugar, 1.89% fermentable sugar, 3.50% non-fermentable sugar, 9.22% ethanol yield, 8.82% ethanol purity, 8.69% ethanol density, 0.83(ppm) calcium, 1.46(ppm) magnesium, 2.76(ppm) potassium and 0.70(ppm) sodium as compared to two other treatments.

Effect of thermal and non-thermal processing on nutritional composition and toxicants load in white cabbage powder

Muhammad Waseem, Saeed Akhtar*, Tariq Ismail*

Department of Food Science & Technology, Faculty of Food Science & Nutrition, Bahauddin Zakariya University, Multan, Pakistan

**saeedbzu@yahoo.com(SA), tariqismail@bzu.edu.pk(TI)*

This study was aimed at improving nutritional, functional and consumer's safety aspects of dehydrated cabbage powder. White cabbage was processed to cabbage powder after following microwave heating, blanching, alkali and acid washing treatments. The results for nutritional composition of raw and processed cabbage powder (CP) elucidated raw CP to exhibit significantly ($p<0.05$) higher amounts of protein (12.2%), dietary fiber (25.2%), Na (52 mg/100g), Ca (355 mg/100g), K (286 mg/100g), Fe (14 mg/100g) and Zn (32 mg/100g) as compared to the processed CP. Among different processing techniques deployed to reduce intrinsic and extrinsic toxicants of raw cabbage, microwave treatment resulted in significantly ($p<0.05$) higher rate of reductions for alkaloids, oxalates, tannins and phytates contents i.e., 77%, 85%, 85%, and 86%, respectively. Likewise, the residual levels of pesticide including imidacloprid, cypermethrin, bifenthrin, chlorpyrifos and deltamethrin were also found to decline at higher rate in

microwave processing i.e., 0.98 – 0.12 ppm (87%), 1.22 – 0.23 ppm (80%), 1.03 – 0.15 ppm (84%), 1.97 – 0.43 ppm (77%), and 2.12 – 0.36 ppm (83%), respectively when compared with blanching, alkali and acid washing techniques. Supplementation of CP in unleavened flat bread at a level beyond 5% was observed to significantly ($p \leq 0.05$) reduce textural and sensory attributes of the baked good. The results suggest microwave heat treatment as a cost-effective technique to reduce natural and environmental load of toxicants in raw cabbage while microwave treated dehydrated cabbage powder supplementation @ 5% in whole wheat flour might serve as a natural mean to ameliorate various nutritional and health disorders.

Keywords: Brassica oleraceae, microwave, oxalates, phytates, Zn, dietary fiber, pesticides, leafy vegetables

The Effect of Lactic Acid Bacteria and Co-culture on Structural, Rheological, and Textural Profile of Corn Dough

Sanabil Yaqoob*[1, 2], Aysha Imtiaz[3], Huimin Liu[2], Meihong Liu[2], Mingzhu Zheng[2], Kanza Aziz Awan[1], Dan Cai[2], Jingsheng Liu[2]

[1]Department of Food Science and Technology, Faculty of Science and Technology, University of Central Punjab, Lahore, Pakistan
[2] National Engineering Lab for wheat and corn deep processing, Jilin Agricultural University, Changchun, China
[3] National institute of food science and technology, university of agriculture Faisalabad, Pakistan

This study is aimed at assessing the effect of lactic acid bacteria (LAB) on corn flour using dynamic characterization methods including RVA, TPA, Rheometer, SEM, and DSC along with co-culture technique in order to enhance its applicability by evaluating the variations in rheological, textural, morphological, thermal, and structural properties. Our findings suggested that bacterial incorporation both individually and in combination (co-culture) revealed an improved corn dough profile with better properties. SEM showed irregular shape of particles having more grooves, indentations, and cracks. RVA demonstrated different pasting behavior on the dough. Bacterial inoculation in flour attributed to increase the TO (68.61–71.18), TP (73.74– 78.42), TC (78.78–85.36), melting temperature (10.17–15.19), and ΔH (2.72–5.40). The hardness of corn was found approximately 75% of native dough. In treated corn, an increase was noted in both loss and storage modulus in correspondence with changes in the starch configuration and leaching of constituents. The results from DSC presented an increased melting temperature range and gelatinization enthalpy owing to bacterial treatment accredited to diversified morphological characteristics. The outcomes concluded in demonstration of a novel influence on structural, thermal, morphological, and rheological capabilities and capacities of corn dough. Lactic acid bacteria hydrolyzed part of the corn and flour had smaller, irregularly shaped particles with more holes in them, resulting in a reduced water retaining capacity.

Textural, thermal, and pasting profile has also been improved due to degradation of macromolecules. Furthermore, the insight alterations induce various changes leading to improved corn flour. It may also develop the associations about the upright insurgence in the corn dough profile and its potential usage in industry and homes.

Keywords: corn, lactic acid bacteria, co-culture, rheology, fermentation.

Mango Kernel: An Innovative Non-Conventional Starch

Sanabil Yaqoob*[1], [2], Omaima Maryam, Kanza Aziz Awan, Waleed Sultan, Aysha Imtiaz[3], Amal Shaukat, Ayesha Saleem

[1]Department of Food Science and Technology, Faculty of Science and Technology, University of Central Punjab, Lahore, Pakistan
[2] National Engineering Lab for wheat and corn deep processing, Jilin Agricultural University, Changchun, China
[3] National institute of food science and technology, university of agriculture Faisalabad, Pakistan

Mostly mango produced in tropical and subtropical climates in Asia, Africa and Central America. From April to July is common marketing time for mangoes in Pakistan and 8 to 10 months of year is the harvesting time in Kenya, Brazil and Columbia. Mango is fifth in production and globally second most traded tropical fruit. Mango is largely consumed by the human population and considered the king of fruits due to its sweet taste and unique flavor. Mangoes mostly are involved in the production of juice, puree, jam, squash and pickles. Majorly mango kernel is source of flour, butter, starch, oil. Worldwide mango produces a huge amount of waste as a topranked tropical fruit. Peels contributes 7% to 24% while seed contain 20% to 60% and kernel contain 45% to 75% of the total fruit mass. Microorganisms can easily dissolve mango peel, but its seed cannot be easily decomposed. Bioactive compounds and antioxidants from mango kernel extract is providing protection against cardio and hepatic effects, antiaging, and ant carcinogenic effects. Application of ultra-sonication on mango kernel increase the number of bioactive compounds present in it. When mango seed kernel fermented, crude protein value increase from 4.61 to 7.06% and ash, lipid and fiber content decrease. Fermentation also result in increased bioavailability of phosphorous (2.67mg/kg), potassium (2433mg/kg) and calcium (0.4mg/kg).

Keywords: bioactive compounds, food waste, phenolic compounds, antioxidant.

Socioeconomic inequalities affecting child malnutrition in rural areas of district Faisalabad, Pakistan

Eesha Yaqoob*[1], Saad Javed[2], Anwaar Ahmad[3]

[1]Department of Sociology, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan
[2]Rawalpindi Medical University, Holy Family Hospital, Rawalpindi, Pakistan
[3]Institute of Food and Nutritional Sciences, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan

The study was designed to investigate the socioeconomic inequalities affecting child malnutrition in rural areas of District Faisalabad. The area of investigation was Faisalabad, incorporating Tehsil Faisalabad and Tehsil Tandlianwala. The objectives were confined to find the areas of socioeconomic inequalities in child malnutrition, to know the relationship between financial imbalance and the normal level of malnutrition, to draw consideration to various factors of socioeconomic inequalities affecting child malnutrition. The conceptual framework constitutes the dependent variable Child Malnutrition and the independent variable Mother Education. The sample size of 200 mothers having child of the age between 5 to 11 years old were selected. Chi square test was used for determining the association between dependent and independent variables. The chi- square value (52.584) shows a significant (P=.003) association between schooling years of mother and weight percentile of child. The major findings were that 16% of children were 97th weight for age percentile.

Keywords: Mother's Education, Weight for age, Child malnutrition, Financial imbalance.

CRISPR/Cas9-mediated Genome Editing in Potatoes

Aneela Yasmeen*, Abdul Qayyum Rao*, Saira Azam, Ayesha Latif, Naila Shahid, Allah Bakhsh, Sana Shakoor, Sara Ajmal, Sahar Sadaqat, Momna Muhammad, Muhammad Awais, Abdul Raouf, Mehwish Imtiaz, Tayyab Husnain, Kausar Malik

Centre of Excellence in Molecular Biology, University of the Punjab, Lahore
**anila.malik5@gmail.com, 923347609019*

CRISPR-Cas9 is a state of art technology that has enabled researchers to edit genomes. The present study was conducted to investigate the efficiency of genome editing in locally grown potato variety (AGB purple) in comparison to a diploid variety (M6). The stem internodes of 5-6 weeks old potato plants of both varieties were infected with Agrobacterium strain LBA4400 harboring CRISPR-Cas9 vectors expressing a particular guide RNA against vacuolar invertase; and Cas9 endonuclease. Both potato varieties showed encouraging regenerative response on selection media. The overall transformation efficiency of potatoes

was found to be 11.7% whereas the indel% was found to be 6 for diploid and 5 for tetraploid variety via Sangers' sequencing data. The regenerated plantlets were shifted to culture tubes and then to pots after development of proper roots and shoots. The molecular analysis confirmed the integration of cassette and expression of Cas9 in primary transformants. Realtime and Sanger's Sequencing results concluded that the CRISPR/cas9 can be efficient tool for editing of plants that can be further used in an efficient potato breeding program.

Impact of non-thermal processing application of food safety

Shoaib Younas*, Muhammad Sajid Manzoora, Ukasha Arquma, Muhammad Sheharyara, Kanza Aziz Awan

Department of Food Science and Technology, Faculty of Life Sciences, University of Central Punjab, Lahore, Pakistan

There are numerous postharvest challenges in terms of food safety such as shelf-life extension, retention of nutritional values and sensory parameters. Thus, non-thermal techniques are capable to destroy both spoilage and pathogenic organisms with negligible impact on nutritional composition and sensory properties of treated foodstuff and created a niche in food industry. Plasma is applied in the food sector in context of quality retention, insect control, shelf-life extension, biochemical changes, allergen control, bioactive components enhancement, and enzymatic study. Dielectric cold plasma is non-thermal novel approach for microbial inactivation and considered fourth form of matter plasma composed of charged particles, photons, and reactive species. Reactive oxygen species (ROS), reactive nitrogen species (RNS) play bactericidal role for the safe and healthy produceby damaging shell or DNA. Plasma could apply in different ways in form of Jet application, plasma activated water (PAW) or directly on food.

Keywords: Non-thermal, Cold plasma, Food Safety, Shelf life

Evaluating the effect of barley to reduce diet induced obesity biomarkers

Umrah Zafar, Umar Farooq, Afshan Shafi

Department of Food Science & Technology, MNS University of agriculture Multan, Pakistan
**umrah.zafar@mnsuam.edu.pk*

Dietary factors are influential in the most important public health solutions. Together, diseases such as coronary heart disease, stroke, cancers, diabetes and osteoporosis constitute the most common causes of disability and death. All these diseases are associated directly or indirectly with dietary factors. Along with drug therapy, some nutritional factors also help in reducing serum cholesterol e.g. dietary fiber. The study was conducted on rats to determine the effects of barley on obesity biomarkers. Thirty rats were reared in three groups namely normal

(G1), control (G2) and barley fed (G3). Diet based obesity biomarkers were induced to G2 and G3 group by feeding them on high fat and high sucrose diet. Afterwards, G1 and G2 were fed on regular diet while G3 was fed on barley-based diet for one month. The results showed that anthropometrical parameters were reduced 7, 3.35, 1.32, 6.0 and 1.29% for weight, AC, TC, BMI and AC/TC respectively. Biochemical parameters were also reduced 27.6, 24.13, and 13.38% for LDL, cholesterol and TG. Level of HDL was increased 31%. Liver enzymes Aspartate transaminase (AST), alkaline phosphatase (ALP), Alanine transaminase (ALT) and were reduced 5.8, 2.8 and 3.6%. There was no effect of barley on creatinine, serum total protein and body length of rats. Results of this trail demonstrated that barley positively affect anthropometrical and biochemical parameters.

Keywords: Nutrition, Barley, Obesity biomarkers

Utilization of spinach powder as a source of minerals for development of cookies

Junaid Zafar, Tusneem Kausar*, Mian Anjum Murtaza

Institute of Food Science and Technology, University of Sargodha, Sargodha 40100, Punjab, Pakistan
**tusneem.kausar@uos.edu.pk*

Spinach (Spinacia Oleracea L.) belonging to the family Chenopodiaceae is widely regarded as a functional food due to its diverse nutritional composition which includes minerals (especially Fe, Ca, Mg and K), fiber and protein. Due to its nutritional importance, this study was planned to add spinach powder in cookies at various replacement levels (0, 2.5, 5, 7.5 and 10%) with white flour. The prepared cookies were then analyzed for physical, chemical, mineral content and sensory properties. Addition of spinach powder effect the physical analysis of cookies by lowering its spread ratio. In chemical analysis, increase in ash (0.40-2.10%), fibre (2.29-11.04 and protein (6.62-8.50%) was observed while fat content decrease (31.16-25.93%) by addition of spinach powder. Regarding minerals, addition of spinach powder increased Ca (186.3-1393.7 ppm), K (634-1454 ppm), Mg (146-626 ppm), Mn (2.99-10.03 ppm), Fe (10.63-64.5 ppm) and zinc (6.99-21.03 ppm) contents in cookies. Concerning sensory evaluation, spinach powder added cookies resulted in reduced score in terms of color, flavor, taste, texture and overall acceptability, however, cookies with 5% replacement of spinach powder fall in acceptable level.

Keywords: Cookies, Spinach powder, Proximate composition, Mineral analysis, Sensory properties

Cricket meal (*Gryllus bimaculatus*) as protein supplement: A Comprehensive Review

Aimen Zafar, Assam Bin Tahir

University Institute of Food Science and Technology, The University of Lahore, Pakistan

The worldwide population is gradually rising making food security a critical concern. The requirements for animal commodities such as egg, milk, and meat have increased intensely in current years because of the fast-growing population. All major supplements are important; however, protein is one of the primary supplements essential for individuals, and protein deficiency prompts severe sickness. Protein from animal sources might be particularly significant, as it comprises essential amino acids that are not present in many plant proteins. Insects are considered promising reserves of protein. Globally insects are the basic food source in many regions such as Asia, Africa, and South America. Cricket (Gryllus bimaculatus) has potential as a feed insect and food species. Crickets also consist of crude fiber (6.90%), fat (26.90%), crude protein (54.10%), and total digestible nutrients (78.90%). Moreover, these insects contain a variety of essential amino acids such as histidine, leucine, lysine, methionine, and valine. Furthermore, it has been observed that insects can be a vital source of protein in the diets of fish and poultry. Nutritional values are of great significance, but for balanced intake, a portion of food must be admissible from sensory perception. Crickets can be eaten in the form of whole insects, dried and milled, and then added to different products besides nutrients can be extracted and added to food. The main purpose of this study is to comprehensively review the Cricket meal (Gryllus bimaculatus) as a protein supplement.

Biosynthesis of Sulphur nanoparticles and its in-vitro activity against food-borne pathogens

Qurbat Zahra, Aisha Siddiqua*, Hadia Baloch, Rida Danish, Jaweria Bakhta

Gomal Center of biochemistry and Biotechnology, Gomal University, D.I.Khan, Pakistan
**draisha@gu.edu.pk*

Millions of people around the world get food-borne illnesses, and food deterioration is a serious problem. Therefore, it is necessary to look for new and potent antibacterial drugs. Food-borne infections can be controlled by using nanoparticles as antibacterial agents. Here presents a new study to synthesize Sulphur nanoparticle using green method by the using of Allium fistulosum. The characterization of Sulphur Nanoparticle by UV spectrophotometer, Fourier Transform Infrared Spectroscopy, Scanning Electron Microscope, Nanoparticles Tracking and Analysis. Absorbed spectra of Sulphur Nanoparticle from Allium

fistulosum were 291 nm. The Sulphur nanoparticles had a spherical shape and were almost100nm. SNPs' in vitro antibacterial efficacy was assessed against a number of food-borne pathogens, including Aspergillus flavus and Salmonella typhi. SNPs were shown to have the strongest antibacterial effect against Salmonella typhi (24 mm). Antibiotics like ampicillin and amphotericin b were shown to have increased action when combined with nanoparticles.

Keywords: Biosynthesis; Sulphur nanoparticles; in-vitro activity; food-borne pathogens

Eating trends in adults due to stress

Saadia Zainab[1], [2]*, Saira Tanweer[3], Tariq Mehmood[1]

[1]Institute of Food Science and Technology, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan, Pakistan
[2]College of Food Science and Technology, Henan University of Technology, Zhengzhou, China
[3]Department of Food Science and Technology, Faculty of Agriculture and Environment, Islamia University Bahawalpur, Bahawalpur, Pakistan
**zainab3810@gmail.com*

Adverse consequences of health via straight biological and devious social alterations can be seen because of stress. Commotion to normal eating traits can be seen due to stress while the intensity of these to linked is not uncovered yet. Several studies have been conducted to reveal the power of stress relatable in adults and to investigate the causes of possible moderators. Clearly stress has been discussed in cases that it's the quantity which is associated to the non-chaotic eating. Several studies have been conducted to linked the stress to eating habit of individuals. Most of the people in stress tend to consume high caloric foods like chocolates, fried items and fast foods. Stress can be results in eating more unhealthy food items and reducing usage of healthy food items. That gives the indirect measure of stress on the outcomes of eating behavior. Unhealthy food consumed at randomized time adversely effect the health and can be causes dangerous disease like obesity and cardiovascular diseases. If the stress level exceeds that could also lead to the psychiatric issues.

Keywords: Stress eating; Eaing disorder; Eating behaviour; obesity; cardiovascular disorder

Detection and monitoring of food by nanomaterial-based sensors

Saadia Zainab[1], [2]*, Muhammad Farhan Jahangir Chughtai[1], Tariq Mehmood[1], Saira Tanweer[3], Ayesha Ali[1], Samreen Ahsan[1], Adnan Khaliq[1]

[1]Institute of Food Science and Technology, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan, Pakistan
[2]College of Food Science and Technology, Henan University of Technology, Zhengzhou, China
[3]Department of Food Science and Technology, Faculty of Agriculture and Environment, Islamia University Bahawalpur, Bahawalpur, Pakistan
**zainab3810@gmail.com*

The food sector is always keen the search for novel and precise approaches to observe the food safety and quality control of the end products. Existing exposure methods for the analysis are expensive and time taking, also required skilled personnel to operate the specific apparatus. Nanotechnology is an emerging field with various applications in the industrial area containing the food subdivision. The practice of nano-matters in sensual arrangements not only eradicates drawbacks but has also merits like advanced compassion and choosiness. The material used due to sensory properties includes metal & magnetic nanoparticles, carbon nano-arrangements (nanotubes, graphene, and its imitative, and nano-threads), nano-cable, and electrospun nanofibers. Such materials are used for the exposure of spoilage (due to pathogens, toxins, gases, and alteration in pH) and adulteration (because of additives, urea, glucose, and melamine). Currently, these sensors can be employed in smart packaging for food items to satisfy the customer's demands. Extensive functions of nanotechnologies in the packaging of food products have been suggested to express antimicrobial obstacle characteristics that avoid food decomposition, increasing mechanical attributes like apoplectic, emulsification, and water building competence, augmenting substantial interactions of biopolymers that are employed as food packaging matter that can increase thermal steadiness and crystallinity.

Propylactic and Antioxidant Potential of Rosemary

Saba Zartaj[1]*, Saira Tanweer[1], Muhammad Asif Khan[1], Tariq Mehmood[2], Saadia Zainab[2], Areej Fatima[1]

[1]Department of Food Science and Technology, IUB, Bahawalpur, Pakistan
[2]Department of Food Science and Technology, KFUEIT, Rahim Yar Khan

Rosmarinus officinalis L. leaves plays a vital role in the production of healthy foods. Currently, there is high demand of food free from synthetic additives. Due of its bioactive qualities, rosemary, an aromatic evergreen plant in the Lamiaceae family has been extensively researched.By using phenolic plant extracts, a source of naturally occurring bioactive substances, one can slow down the rate at which

food spoils.High quantities of phenolic chemicals found in rosemary have been identified and employed in a variety of food applications, such as frying oils, snacks, fish oils, roasted nuts, and meat productsin food application testing, rosemary extracts were discovered to considerably lower lipid oxidation, photo-oxidation, and oxidation product levels, in addition to possibly extending the shelf life of these goods.These goods will be moved into the functional food sector under a new category as healthy products after the addition of natural antioxidants. The content and chemical make-up of the phenolic components in the extracts determined the antibacterial and antioxidant activity. The reducing power, free radical scavenging effectiveness, and b-carotene bleaching test were utilized to describe the antioxidant capabilities of the extracts.R. officinalis extracts could be employed as natural antioxidants in the pharmaceutical, nutraceutical, and food industries. Natural preservatives and bioactive agents with health-promoting features may be prepared from R. officinalis extracts.

Keywords: Antioxidant, Natural preservative, Antimicrobial, Rosmarinus officinalis

Human Nutrition: A Health Perspective

Zia ud Din

Department of Human Nutrition, the University of Agriculture, Peshawar

Nutrition is a science as well as an art that links foods to health & disease, and involves promotion of skills and capabilities for the intake of a healthy diet at population level. It includes in-depth studies of the processes by which the human being utilizes food regarding their short- and long-term impacts on the physical, physiological and psychological components of health. Nutrition has a specific contribution in the promotion of health at each life stage. Malnutrition is the common term that refers to either *under-nutrition or over-nutrition*. Both states of malnutrition exist in most part of the world in different proportions, *including* Pakistan. Malnutrition results in specific health consequences for different age groups. Growth and development processes at prenatal and postnatal stages are deterred promptly from the standards when under-nutrition exists at these critical periods. Ultimately, the long-term consequences for children include poor cognitive capabilities and scholastic performance, unhealthy behavior and social attitude and, irreversible errors in personalities. Over-nutrition mostly refers to the excess intake of energy and macronutrients that usually leads to metabolic errors and non-communicable diseases among adults. More common metabolic consequences include diabetes, several cardiovascular diseases, certain cancers and relevant physiological disorders. Based on scientific evidences and research outcomes, nutrition has been declared as an unavoidable factor that has a major contribution in the promotion of all aspects of health and therefore, has a significant role in a country's economical growth. All nations, specifically the developing countries, are therefore required to develop and adopt solid and stable

strategies and policies that could improve the nutrition status at community level for the better interest of national economy and steady development.

Immune Regulatory impact of Dairy Products

Esha Muhammad Zubair, Fasiha Ilyas, Rabia Naz

Kinnaird Collage for Women, Lahore, Pakistan

The immune system is a tightly controlled system in which any deviation can cause pathogenic symptoms. Specific immune responses are produced by immune regulatory mechanisms in response to the consumption of certain foods. Dairy products are a vital component of our diet. Proteins, lipids and other components make a vital percentage of dairy products that regulate different immune processes in humans and mice. Immune system protects the body against invading pathogens. Dairy products, particularly milk, contain bioactive molecules that can boost or suppress aspects of humoral and cellular immunity. The combination of dairy products in addition provides additional protection against certain auto-immune, inflammatory and other diseases. NK cell activity and reduction in allergies have been improved by dairy products. Bioactive peptides, sphingomyelin (a lipid) and high and low-fat dairy products have different outcomes. Lactobacillus, a bacterium found in yogurt has also a fundamental role in enhancing immunity. Dairy products are also useful vehicles for the delivery of probiotics to the body that acts as a protection shield against certain infections. Lower risk of metabolic diseases i.e. CVD & Diabetes has been linked to the use of Dairy Products.

Phytochemical and bio-safety evaluation *Stevia rebaudiana* leaves based functional tea

Muhammad Naeem Zubairi, Muhammad Khurram Afzal*, Saeed Akhtar, Majid Hussain, Tauseef Sultan

**khurram.afzal@bzu.edu.pk*

Stevia rebaudiana is Asteraceae, medium size herbal crops. It is a native to tropical Asia but commonly found in the areas of South Africa, China, Brazil, the West India, East Africa and Mexico. Stevia is one of the important crops which must be grown in Pakistani areas like Swat, Hunza, Chilas, Malakand, Rawalpindi and Islamabad, where temperature ranges between 20C°-30C°. Stevia rebaudiana leaves contain phytochemical compounds including flavonoids, phenols and glycosides therefore it exhibits antidiabetic, anti-inflammatory, antioxidant, hepatoprotective, anticancer and antifungal properties. The current project will be designed to explore the pharmacological properties of Stevia rebaudiana leaves. The leaves extract will be fractionated and purified through thin layer chromatography (TLC) to study different component and then subjected to high performance liquid chromatography (HPLC) for quantification. The extract will

also be analyzed for its antioxidative, anti-microbial, anti-inflammatory, immunomodulatory, anticancer, antidiabetic potential and determination anti-nutritional components in extract. Then functional tea will be prepared from leave's extract and its qualitative features and toxic impact will be assessed by using albino rat's model. Thus, results obtained will be subjected to statistical analysis to compare the mean values of various treatments at $P< 0.05$.

Keywords: Stevia rebaudiana, Phytochemicals, Antidiabetic, Anti-inflammatory, Antioxidant, Anticancer, Bio-safety study of functional tea

Assessment of Aflatoxins Degradation Potential of Selected Indigenous Medicinal Plants

Muhammad Naeem Zubairi*, Saeed Akhtar, M. Khurram Afzal, Amir Ismail

**naeem.zubairi123@gmail.com*

Aflatoxins are the most lethal mycotoxins, produced by Aspergillus flavus, Aspergillus nomius and Aspergillus parasiticus. Aflatoxin biotransformation products have been reported mainly in milk and milk products. Major categories of aflatoxins include aflatoxin B1 (AFB1), aflatoxin B2 (AFB2), aflatoxin G1 (AFG1), aflatoxin G2 (AFG2). Aflatoxins may be decontaminated in the food commodities by physical, biological and chemical methods. The extracts of medicinal plants also have chemically active properties for the degradation of aflatoxins. Medicinal plant extracts are obtained from natural sources and are considered as safe for human and animal health. The extracts of plants show antifugus and antimicrobial activities. Antifugus and antimicrobial activities of medicinal plants are thought to have significant impact on their aflatoxin's degradation potential. The current project was designed to explore the potential degradation of aflatoxin using the extract of medicinal plants e.g. Portulaca oleracea (Kulfa), Chenopodium album (Batho), Eucalyptus camaldulensis (sufaida), Echinops spinosus Linn (onth ktara), Morus alba (white mulberry), Toona ciliate (Mahanim), Cassia fistula (Amaltas), Lantana camara Linn (Ghaner), Allium sativum and Ziziphus Jujuba (fruit-bearing tree). The extract of medicinal plants was prepared with solvents (n-hexane, methyl, acetyl acetate and water) using the rotary evaporator. The extract was subjected to thin layer chromatography (TLC) for identification of afflation and then subjected to high performance liquid chromatography (HPLC) for quantification. The extract was also be analyzed for its antioxidative, anti-microbial properties. The extract of Eucalyptus camaldulensis (sufaida) was showed highest degradation of aflatoxin than other medicinal plants. The percentage degradation of aflatoxin using extract of Eucalyptus camaldulensis (sufaida), Chenopodium album (Batho) and Portulaca oleracea (Kulfa) were 90, 75 and 60 % respectively.

Keywords: Degradation of Aflatoxin, Medicinal plants, Antioxidant, HPLC, TLC

In Collaboration with

Evolution
Your Desire . . . Our Way

University of Swat

University of Malakand

Printing Sponsored by

PASTIC Reprographic Unit,
PASTIC National Centre, Islamabad.
Tel: 9248103-04, Fax: 9248113
ISO 9001:2000 Certified
www.pastic.gov.pk