EuroSciCon

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Theme: Exploring the recent advancements & its applications in Agriculture & Food Chemistry

Abstract

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Ion-Chromatography-High Resolution Mass Spectrometry (IC-HRMS) for the detection of glyphosate and its metabolites in food of animal origin

Sara Panseri

Department of Health, Animal Science and Food Safety, University of Milan, Via Celoria 10, 20133 Milan. Italv

Glyphosate and glufosinate are broad spectrum herbicides, widely used in agriculture and in inhabited or industrialised areas, whereas aminomethylphosphonic acid is a degradation product of glyphosate. In 2015, the International Agency for Research on Cancer reported that glyphosate is a probable carcinogenic. In 2017, however, a scientific opinion of the European Chemicals Agency concluded that glyphosate is not proven to be carcinogenic, mutagenic or to have negative effects on reproduction. Nevertheless, aminomethylphosphonic acid was not considered. Due to their chemical-physical characteristics these molecules present difficulties that have not yet allowed routine monitoring to be carried out. For these reasons, we developed and validated a simple and versatile liquid extraction before the IC-HRMS analysis of three different complex matrices: honey, bass fish and bovine muscle. Among the satisfactory validation parameters, the LOQs in the range of 4.30-9.26 ng g^{-1} demonstrated high method sensitivity, compared to the few works present in literature.

Antiproliferative and antioxidant effect of polar hemp (Cannabis sativa L.) extracts

Volpe M.G

stituto di Scienze dell'Alimentazione, Consiglio Nazionale delle Ricerche (CNR), Via Roma 64, 83100 Avellino,

The health benefits and nutritional values of hemp products are attributed to its unique fatty acid composition and bioactive minor components, including polyphenols. Polyphenolic compounds from a large variety of plant foods, spices and beverages have been shown to inhibit or attenuate the initiation, progression and spread of cancers both in cells *in vitro* and in animals *in vivo*.

In the present investigation, we aimed at extracting and characterizing the phenolic compounds from seed, flour and oil obtained from a single hemp *cultivar*, Fedora, which is a monoicous EU registered hemp genotype. Furthermore, we assessed their potential effects on modulating cell death and cell growth in Caco-2 cell line, deriving from a human adenocarcinoma and largely used as a model resembling the intestinal epithelium.

Gelation of UHT milk: an applicative study

Paolo D'Incecco

Department of Food Environmental and Nutritional Sciences, University of Milan, Italy

Stability of UHT milk during storage is a crucial aspect for both consumers and manufacturers, and gelation represents the main cause of product recall from the market. Factors causing milk gelation are not fully understood yet but a primary responsibility is attributed to bacterial peptidases remaining active in milk after thermal treatment. These peptidases are encoded by *aprX* gene that is mostly harboured by psychrotrophic bacteria. Thus, storage of raw milk at low temperature causes an increase in this population and, ultimately, in the enzyme density. In gelled UHT milk, these peptidases showed a specific proteolytic activity on k-casein, with the release of soluble peptides here proposed as early indicators of milk gelation onset. An applicative study was carried out to validate this approach and a Capillary Zone Electrophoretic method was developed to evaluate the presence of these markers in milk. Three bacterial strains (*Pseudomonas poae*, *Pseudomonas fluorescens* and *Chryseobacterium joostei*), isolated from raw bulk milk collected at an industrial plant, were inoculated (10^3-10^4 CFU/mL) in microfiltered milk and incubated at 4 °C for up to 6 days. Every day, the cultured milk samples were batch-sterilized (98 °C for 8 min) and stored up to 90 days at 25 or 40 °C to study the ability of peptidases previously produced by the three strains to release the target peptides and cause milk gelation. Specific proteolysis evaluated in these milk samples led us to formulate a mechanism for milk gelation onset.

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Abstract

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Design Thermal Comfort in Greenhouses Environment

Abdeen Omer

Energy Research Institute, UK

The move towards a de-carbonised world, driven partly by climate science and partly by the business opportunities it offers, will need the promotion of environmentally friendly alternatives, if an acceptable stabilisation level of atmospheric carbon dioxide is to be achieved. This requires the harnessing and use of natural resources that produce no air pollution or greenhouse gases and provides comfortable coexistence of human, livestock, and plants. This study reviews the energy-using technologies based on natural resources, which are available to and applicable in the farming industry. Among these are greenhouses, which are necessary for the growth of some plants (i.e., vegetables, flowers, etc.) in severe climates. However, greenhouses require some air conditioning process to control their temperature and relative humidity to suit specific plants. This device helped to reduce the energy consumption of the greenhouse whilst providing a pleasant environment for the plants inside the greenhouse. The system was designed taking into account the meteorological conditions, which affect the environment inside the greenhouse. The performance of the system was monitored over a period of time by measuring the temperature and relative humidity of the greenhouse. Results of the monitoring have shown that the system was able to provide comfortable conditions (temperatures of 16-26^{o}C and relative humidity of 65%) suitable for the plants grown in the experimental greenhouse. It also enabled the minimisation of temperature variation and, hence, avoided the hazard of any sudden climatic change inside the greenhouse.

Stirred yoghurts fortified with colostrum – influence of colostrum addition on its acidification process and rheological properties

Adriana Bomba

University of Warmia and Mazury in Olsztyn, Poland

Colostrum, appriciated for its antymicrobial and immunostymulatory properties, was investigated as an additive for production of functional yoghurts. Firstly, acidification process and microbial quality were tested in order to check if the colostrum interferes with acidification process during yoghurt manufacturing or if it inhibits growth of *St. thermophilus* and *L. bulgaricus* after production and during yoghurts storage. Technological variants of the produced yoghurts accounted for 0,5% and 1,0% of the colostrum addition before (A, B) and after (C, D) incubation, respectively. Secondly, chemical composition (dry mass, protein content, fat content, profile of fatty acids), rheological properties (texture analysis, oscillatory and rotational measurements), structure (microscopic evaluation of fat globules, measurement of particles' size distribution), technological features (syneresis and water biding capacity) of the produced yoghurts were tested.Neither acidification rate, nor the final pH were affected by the colostrum addition. What is more, it did not inhibit growth of investigated strains. Fortification of the yoghurts with the colostrum caused increase in dry mass, protein and fat content and apparent viscosity was the same for all of the examined technological variants.

Therapeutic ketosis and the broad field of applications for the, ketogenic diet: Ketone ester applications & clinical updates

Raffaele Pilla

St. John of God Hospital – Fatebenefratelli, Benevento, Italy

It has been recently shown that nutritional ketosis is effective against seizure disorders and various acute/chronic neurological disorders. Physiologically, glucose is the primary metabolic fuel for cells. However, many neurodegenerative disorders have been associated with impaired glucose transport/metabolism and with mitochondrial dysfunction, such as Alzheimer's/Parkinson's disease, general seizure disorders, and traumatic brain injury. Ketone bodies and tricarboxylic acid cycle intermediates represent alternative fuels for the brain and can bypass the ratelimiting steps associated with impaired neuronal glucose metabolism. Therefore, therapeutic ketosis can be considered as a metabolic therapy by providing alternative energy substrates. This represents a state of normal physiological ketosis and can be therapeutic. Ketone bodies are transported across the blood-brain barrier by monocarboxylic acid transporters to fuel brain function. Starvation or nutritional ketosis is an essential survival mechanism that ensures metabolic flexibility during prolonged fasting or lack of carbohydrate ingestion. Therapeutic ketosis leads to metabolic adaptations that may improve brain metabolism, restore mitochondrial ATP production, decrease reactive oxygen species production, reduce inflammation, and increase neurotrophic factors' function. It has been shown that KD mimics the effects of fasting and the lack of glucose/insulin signaling, promoting a metabolic shift towards fatty acid utilization. In this work, the author reports a number of successful case reports treated through metabolic ketosis.

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Abstract

Production of Biochars from Cashew Nut Shell to Adsorb Mycotoxins, (Aflatoxins and Ochratoxin A) under Different Conditions for Use in Agriculture.

Abderahim AHMADOU
Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), UMR QualiSud, 73 rue Jean-Francois

The objective of this research was to study the adsorption of two main families of toxic mycotoxins (Aflatoxins and Ochratoxin A) by various biochars obtained from cashew nut shell produced in three pyrolysis conditions. The results indicate the correlations between the biochar properties and its adsorption capacity of mycotoxins.Three different biochars were produced from cashew nut shell at 400, 600 and 800°C and analyzed and characterized. They were tested at different pH (4.15, 6.54 and 9.05) and under different adsorption conditions (filtration, stirring) for their ability to capture aflatoxins and ochratoxin A. Results of this research demonstrated that the laboratory-made biochars prepared from cashew nut shell could adsorb ochratoxin A and aflatoxins. Sorption studies showed that biochars adsorbed aflatoxins more efficiently (near 100%) than ochratoxin A. Pyrolysis temperature, biochar mass used, pH and adsorption conditions (filtration/stirring) were the most important parameters for ochratoxin A sorption.For ochratoxine A, an increase in the pyrolysis temperature caused a great increase in the adsorption rate while pH has a weak effect on sorption (2-5%). Biochar produced at 800°C adsorbed almost 98% of the ochratoxine A by stirring at pH 4.15 while its rate was 52.7% by filtration.

The Seasonal, Rainfall and temperature varitions changing the flavor, growth as well as potentional medicinal values in teas as they produce

Albert Robbat
Tufts University, Chemistry Department Sensory and Science Center and Center for Field Analytical Studies & Technology Boston

Many tea farmers are already adapting their practices to the changing climate. One approach that Ahmed has found to be promising is agroforestry, in which tea is grown in a forest-like ecosystem with trees and shrubs instead of as a monoculture in a terraced garden. Agroforestry provides tea plants with more shade, which helps to protect them from the heat of the Sun, and also reduces the amount of moisture that tea plants lose by transpiration, protects them from frost, and helps to prevent soil erosion. If legumes are incorporated into the forest, soil can be enriched through the actions of nitrogen-fixing microorganisms that live in the roots of such plants. Ahmed has shown that agroforestry seems to improve the quality of the resulting tea, by affecting the level of phenolic compounds it contains. “For tea agroforest, there’s less of a drop in the level of epigallocatechin gallate and other catechins, compared to the terraced gardens,” she says. Farmers can also grow tea plants from seed, rather than cuttings. Such plants have a deeper, more resilient root system, which helps them to survive drought and prevent soil erosion.

Watery Saliva Secreted by the Grain Aphid Sitobion avenae Stimulates Aphid Resistance in Wheat

Yong Zhang
Julian Chen
Institute of Plant Protection, Chinese Academy of Agricultural Sciences

Wheat is very important cereal grains in world food supply. The grain aphid, Sitobion avenae, is one of the most dominant and destructive pests of wheat. Aphid causes damage by sucking phloem sap and also as vector of barley yellow dwarf virus, causing huge negative impact on quality and quantity of wheat production. Application of herbivory induced plant defense is a sustainable and promising approach to control pests. In our study, the role of *S. avenae* watery saliva in resistance induction was examined by infiltrating aphid saliva into wheat leaves. Gene expression studies showed that watery saliva infiltration in wheat leaves induced a strong salicylic acid-responsive defense but moderate jasmonic acid-dependent defense. Feeding on treated wheat leaves, compared with untreated leaves, aphid was decreased significantly by the number of nymphs daily reproduced and the intrinsic rate of increase of the population of *S. avenae* (r_m). In a choice test, saliva-infiltrated leave had a repelling effect on aphid. Additionally, electrical penetration graph results showed that saliva-treated wheat leaves had negatively affected aphid’s feeding behavior. These data provided direct evidences that salivary components of *S. avenae* are involved in the induction of wheat resistance against aphids.

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Sequencing and analysis of transcriptome in Gleditsia sinensis

Zhen Feng
Shandong Agricultural University, College of Forestry, China

Gleditsia sinensis Lam. is one of the alleged "50 fundamental herbs" used in traditional Chinese medicine. *G. sinensis* has been used as a medicinal herb in China and Korea and have antitumor properties. The thorns of *G. sinensis* (Leguminosae) have been used in traditional medicine for the treatment of inflammatory diseases including swelling, suppuration, carbuncle and skin diseases. However, the basic biology on *Gleditsia sinensis* Lam. is relatively weak, especially the molecular mechanism of the formation of the thorns has not been reported, which seriously restricts the exploration of key gene resources, the metabolic mechanism of secondary metabolites and the genetic improvement of *G.sinensis*. With the increasing perfection and maturity of high-throughput sequencing technology and the cross-application of bioinformatics and molecular biology, high-throughput sequencing technology has become the mainstream means of transcriptome sequencing and gene expression research. In this study, the shoots of a specific plant without thorns and the shoots &tender thorns of a normal tree were used as the experimental materials. The transcriptome sequencing of *G.sinensis* was done by high-throughput sequencing technology, and the results were systematically analyzed for the biological information, laying a genetic foundation for digging out the genes related to the thorn formation of *G.sinensis*. Comparing all-unigene with KOG database, 25 different functional annotations were obtained.

Food-grade Pickering emulsion stabilized by protein-based particles obtained from a lupin variety (AluProt-CGNA®) as a system for encapsulating astaxanthin

César Burgos-Díaz
Monserrat Soto-Añua, Mauricio Opazo-Navarrete
aAgriaquaculture Nutritional Genomic Center, CGNA, Temuco, Chile

Numerous studies have shown that astaxanthin has a number of benefits for human health. Unfortunately, the use of astaxanthin oleoresin as food ingredient is limited owing to its poor water solubility in aqueous matrices and susceptibility to degradation through the development of oxidation reactions, which may be promoted during thermal treatment or storage. Encapsulation technology may be a way of solving these problems. Among encapsulation methods Pickering emulsion (O/W) could be an alternative for protecting this appreciate molecule. Therefore, the aim of this study was to investigate the encapsulation of astaxanthin using a food-grade Pickering emulsion system to enhance its stability during spray-drying. Astaxanthin was microencapsulated in a Pickering emulsion and then subjected to a spray-drying process. The emulsions were stabilized by protein-based particles obtained from the protein-rich lupin variety Alu*Prot*-CGNA® (**LPIA**). The Pickering emulsion stability, microstructure, physicochemical properties and astaxanthin concentration after spray-drying process were investigated. First of all, the results showed that lupin protein aggregate particles (**LP-APs**), obtained from LPIA, exhibit great potential to perform as stabilizers for Pickering emulsions. The formed emulsions were highly stable against creaming upon storage over 14 days, especially at high concentrations (>3%, w/v). On the other hand, the stability of the astaxanthin in the microcapsules was evaluated. The results indicated that spray-drying can be applied to prepare stable astaxanthin emulsions into powders with good oxidative stability. The success of this study could help to expand the use of astaxanthin as a functional ingredient, overcoming problems related to dosage and manipulation, low solubility and oxidative stability.

Changes in Quality and Microbial Succession of Lightly Salted and Sugar-Salted Blunt Snout, Bream (Megalobrama amblycephala) Fillets Stored at 4 ℃

Yan Li
Agricultural University, Beijing, China

The effect of a low concentration of salt and sugar on the quality and microbial succession in blunt snout bream (*Megalobrama amblycephala*) fillets was assessed by sensory analysis, total volatile basic nitrogen, biogenic amines, K value, total viable counts (TVC), 16S rRNA gene analysis, and Illumina MiSeq PE300 high-throughput sequencing. Fish samples were left untreated (control), treated with 1.8% salt (T1), or treated with 1.8% salt plus 0.9% sugar (T2). Consequently, salted and sugar salted treatments extended the shelf life of bream fillets by 2 days, which retarded the increase of total volatile basic nitrogen, putrescine, cadaverine, and total viable counts. The putrescine and cadaverine concentrations of T2 were significantly ($P < 0.05$) higher than T1 after day 10. *Brachybacterium* spp. was the major initial microbiota of bream fillets. As storage time progressed, shifts in the microbial community and lower diversity of microbiota were observed. *Pseudomonas* spp. and *Shewanella* spp. were major genera in the spoiled control group. *Pseudomonas* spp., *Shewanella* spp., and *Pseudoalteromonas* spp. became the main spoilers in the T1 and T2 groups. The top three dominant species *Pseudomonas versuta* (16/84), *Shewanella putrefaciens* (12/84) and *Aeromonas sobria* (11/84) were used and inocluated in sterile flesh blocks. The initial TVC value of inoculated groups were within 4.5-5 log CFU/g and showed a significant increase during storage, especially for the group inoculated with *Pseudomonas versuta* (from 4.49 to 9.59 log CFU/g), while the control group was below 2.0 log CFU/g all the time. *Pseudomonas versuta* was observed a strong corruption capacity of sarcoplasmic degradation and cadaverine accumulation; *Shewanella putrefaciens* exhibited a strong corruption capacity of myofibrillar degradation and putrescine accumulation; *Aeromonas sobria* could produce cadaverine and putrescine.

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Effective Detection and Removal of Tetracycline Residues from Contaminated Food Samples by CNS/Zr-absorbents

Qingfeng Yang
China Agricultural University, Beijing, 100083, China

CNS/Zr, a novel adsorbent, is applied to determination and removal of Tetracycline residues (TC) from the contaminated food samples. The CNS/Zr adsorbent was successfully fabricated via solvothermal synthesis and characterized by Scanning electron microscope (SEM), Transmission electron microscope (TEM), Powder X-ray diffraction patterns (PXRD), Fourier-transform infrared spectra (FTIR), and the X-ray photoelectron spectroscopy analysis (XPS). The obtained adsorbent of CNS/Zr was used to adsorption and removal of TC, and the influence of pH, adsorption time, and temperature was also investigated, and the results indicate that the adsorption capacity of CNS/Zr for TC at pH 2-3 under room temperature is higher than that at the other pH. What's more, adsorption behavior of CNS/Zr exhibits a good fitting to Freundlich isotherm model and Temkin isotherm model, indicating the adsorption process of TC on CNS/Zr is a multi-step process. The maximum adsorption capacities of TC are higher than that of the most reported adsorbents. Moreover, due to it's chemiluminescence characteristics, the CNS/Zr adsorbent is used as a novel sensor for detection of TC in the food samples including fish muscle and . The CNS/Zr sensor provided a wide linear range for TC of 0.1 to 20.0 mg g−1 under the conditions of pH 2, λex (excitation wavelength) = 315 nm, λem (emission wavelength) = 404 nm and room temperature, and the relative standard deviation (RSD) for the different concentration of TC (0.5 to 20 mg g-1) was at the range of 1.7 - 6.3%, suggesting the CNS/Zr can effectively detect the TC in food samples. These results prefigure the promising potentials of CNS/Zr in food safety risk management.

Phosphorylated Peptides from Antarctic Krill (Euphausia superba) Ameliorated Osteoporosis by Activation of Osteogenesis-related MAPK and PI3K/AKT/GSK-3β Pathways in Dexamethasone-treated Mice

Lihua Han
College of Food Science and Nutritional Engineering, China Agricultural University, Beijing, China

Glucocorticoid is widely used as an effective therapy for alleviating chronic inflammatory and autoimmune diseases. However, long-term use of glucocorticoids is accompanied by severe side effects, including increased incidence of osteoporosis. In the current study, the effects of phosphorylated peptides from Antarctic krill (PP-AKP) on osteoporosis induced by dexamethasone were investigated in vivo. Results showed that PP-AKP significantly improved bone turnover status, reduced bone loss and degeneration of microarchitecture, in addition to accelerated bone formation. Further mechanism investigation revealed that PP-AKP suppressed the mRNA expression of MKP-1 and CB1, which activated the downstream osteogenesis-related MAPK and PI3K/AKT/GSK-3β signaling pathways through elevation of the expression of the key factors p38, ERK, PI3K, AKT and β-catenin, in addition to osteogenic nuclear transcription factors Runx2 and OSX. Additionally, reduction in number of adipocytes and an increase in trabeculae in the bone marrow cavity, in addition to a decrease in abdominal adipose further verified that PP-AKP augmented bone formation with a comparable reduction in the accumulation of fat. Our results suggested that PP-AKP might serve as a potential functional ingredient against osteoporosis.

Antarctic Krill Oil improves articular cartilage degeneration via activating chondrocyte autophagy and inhibiting apoptosis in osteoarthritis mice

Kai Wang
College of Food Science and Nutritional Engineering, China Agricultural University, Beijing, China

Osteoarthritis (OA) is a major debilitating disease characterized by cartilage degeneration. In the current study, the in vivo effects of Antarctic krill oil (AKO) on cartilage degeneration in destabilization of the medial meniscus (DMM) model mouse were investigated. Results showed that AKO clearly improved the cartilage structure as evidenced by increased cartilage thickness and cartilage area and decreased histological OARSI scores. Safranin O/Fast Green staining showed that AKO remarkably inhibited the loss of cartilage matrix in mice with OA. Chondrocytes play important roles in regulation of cartilage homeostasis. AKO maintained the normal chondrocyte phenotype by downregulating hypertrophy markers such as *Ihh, Col10α1, Runx2, and MMP-13* and restoring the expression of chondrocyte-specific genes, including *Acan, Col2α1, and Sox9*. In addition, expression of key genes related to autophagy, including *LC-3B, Beclin-1, ATG-5*, and *BNIP-3* were significantly enhanced after treatment with AKO. The p53-dependent mitochondrial apoptotic pathway plays an important role in regulating chondrocyte apoptosis. We observed that AKO suppressed the expression of key genes expression in this pathway, such as *p53, Bax, Bid, cytochrome c, caspase-9*, and *caspase-3*. Furthermore, AKO enhanced the expression of anti-apoptotic genes, including *Bcl-2* and *Bcl-xl*. These findings might provide a theoretical basis for the application of AKO as a potential chondroprotective bioactive compound or functional food.

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Abstract

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LOSS OF FOOD NUTRIENTS ASSOCIATED WITH COOKING POTS

ONYEKA E.U
Department of Food Science and Technology, Federal University of Technology, Owerri, Nigeria

There is abundant evidence that cooking reduces the level of micronutrients in foods, but the reductions are influenced by among other factors the type of cooking pot used in cooking the food. We conducted a research to determine the influence of various cooking pots on micronutrients of cooked foods. Seven pots and five types of food stuffs were used for the experiments. Cooking pot forged from titanium offered best retention (protection) of micronutrients while aluminum pot offered the least retention irrespective of the food cooked. In the course of our investigations we also noticed that titanium and enamel cooking pots require less quantity of water in cooking. The use of less water to cook might have impacted better taste of food since the food will be nutrient-dense; having considerable lower moisture content. High food nutrient protection by titanium pot was also evidenced in high ash content of food cooked in it. Our research has evidenced that cooking pot can have a strong impact on people's morbidity since some can aggravate hidden hunger, that is, micronutrient malnutrition. Hidden hunger is a subtle enemy that drains away health and vitality unnoticed until it is too late to reverse. This is a piece of information that is quite vital and beneficial to food consumers, manufacturers of cook wares, operators and key players in the food processing industry.

Chemical Investigation of Algerian Propolis and Evaluation of Its Biological Activities

Salah AKKAL
University Of Constantine Route Ain el bey 25000, Constantine, Algeria

Propolis is a resinous material that bees collect from the buds and barks of some trees, especially coniferous trees. This natural mastic is rich in active principles, especially phenolic compounds that have major therapeutic properties the objective of this study is the isolation and identification of chemical constituents of Algerian propolis and the evaluation of its antioxidant and anticholinesterase activities. Propolis was collected from the north-east of Algeria (Constantine). Extraction was performed using maceration in solvents of varying polarities. Antioxidant activity was evaluated using four methods namely CUPRAC, β-carotene-linoleic acid, DPPH and ABTS radical scavenging assays. Anticholinesterase activity was determined against acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) enzymes. Chemical investigation of ethyl acetate extract allowed the isolation of six compounds including caffeic acid derivatives, flavonoids and diterpenes. Structure elucidation was done using 1H-NMR, 13C-NMR and MS techniques and by comparison of obtained data with those reported by the literature. Among all tested extracts ethyl acetate extract exhibited the highest lipid peroxidation inhibitory activity. The DPPH, ABTS, and CUPRAC assays supported this finding. While, petroleum ether and chloroform extracts indicated good anticholinesterase activity. These results showed that the tested extracts can be considered as sources of food additives, as well as moderate anticholinesterase agents.

FUNCTIONAL PROPERTIES OF NOODLES WITH MANGO KERNEL FLOUR

Remina S Sabado
University of Santo Tomas, Manila, Philippines

The utilization of mango kernels has become an interest for food scientists as they are commonly discarded as wastes. However, studies showed that mango kernelscontain beneficial bioactive components. Hence, theymay be used as a functional ingredient with common food products. In this study, mango kernels were utilized into flour that was used in the formulation of noodles as a source of dietary fiber and phytonutrients. The study attempted to investigate the functional properties of noodles with different amounts of mango kernel flour (MKF). Seeds from ripe carabao mangoes (*Mangifera indica L.)* were processed by drying, decortication, pulverization, and sieving to produced MKF that was incorporated in noodles with different amounts (0%, 5%, 10%, 15%). Proximate composition and total dietary fiber content of the MKF and noodle samples were analyzed following the AOAC methods. Physicochemical properties in terms of cooking quality, color, texture, and microstructure analysis were also determined. Phytonutrient content and antioxidant activity of the MKF and the noodles with the most acceptable formulation were also analyzed. Results showed that MKF is a good source of dietary fiber (5.0 g/100g), polyphenols (6888.69± 0.14 mg/100g), anthocyanidin (77.09 ± 1.61 mg/100g), and flavonoids (55.44±0.37 mg/100g). The total dietary fiber content significantly increased as the amount of MKF in the noodles increased, 1.72 to 3.13 g/100g. In terms of the cooking quality, cooking time and water absorption decreased while cooking loss increased as the substitution of MKF in noodles increased. High amounts of polyphenols (892.49 ± 5.04 mg/100 g).

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Biography

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Developing of Trilobatin Dihydrochalcone as a New-Style of Phytochemical Agent

Mwafaq Ibdah
NeweYaar Research Center, Agriculture Research Organization, Israel

The increasing prevalence of several diseases, like Alzheimer's disease, obesity, cancer, and diabetes, in humans in recent decades worldwide, accompanied by rising concern regarding the safety of many synthetic chemistry-based pharmaceuticals, has raised public demand for phytochemical-based medicines. This in turn has led to increasing interest in metabolic engineering as an approach to produce such natural products on an industrial scale, which has the potential to decrease production costs of, e.g. desired dihydrochalcones. We note that fruits accumulating high level of phytochemicals including flavonoids and dihydrochalcones that may play a key role in reducing chronic disease risk. We have applied a set of molecular and biochemical tools to identified reactions and enzymes leading to the biosynthesis of dihydrochalcones. We recently cloned and biochemically characterized three key enzymes in the dihydrochalcone biosynthesis pathway; a p-coumaroyl-CoA double bond reductase that converts p-coumaroyl-CoA into p-dihydrocoumaroyl-CoA, chalcone synthase that accepted p-dihydrocoumaroyl-CoA, in the presence of malonyl-CoA, leading to production of phloretin, and a specialized phloretin-4'-O-glycosyltransferse which glycosylated phloretin in the presence of UDP-glucose into trilobatin The proof of our concept have open the possibility for developing new-style of natural phytochemical for a growing market of population suffering from "modern" diseases

Agar-calcium pectinate beads as a covalent immobilization support

Marwa Wahba
Department of Chemistry of Natural and Microbial Products, National Research Center, El-Behooth St., Dokki, Giza, Egypt

Enzymes play important roles in food industries. Enzymes suffer from their low stability. The separation of soluble enzymes from the reaction mixture is also tedious and expensive. Thus, industrial enzymes should be immobilized onto solid supports as being attached to such solid supports will facilitate the removal of these enzymes from the reaction mixture. Furthermore, the immobilization process is known to enhance the stability of the enzymes. Calcium pectinate (CP) was recently employed as a solid support to covalently immobilize enzymes. Nevertheless, CP suffers from instability in the presence of cations. Agar was added to pectin during the preparation of the calcium pectinate (CP) beads in order to overcome the CP's instability in the presence of cations. The significant positive effect imparted by the addition of agar was also confirmed from the ANOVA of the Box-Behnken Design (BBD). The BBD was employed to investigate the optimum agar concentration and also the optimum PEI concentration and pH that would allow for the attainment of the highest observed activity of the immobilized β-gal. The optimized agar-CP beads immobilized a whole of 7.96±0.18U β-gal/g beads. Moreover, these beads retained 86.84±0.37% of their initial activity after 13 reusability cycles which proved their operational stability.

Cadmium Contamination in Consuming Foods and Biological Samples in Iran

Mohammad Hadi Dehghani
Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

Cadmium is an important environmental contaminant. High consumption of chemical fertilizers and industrial activities in recent decades has caused people to be worried about exposure to cadmium. There is no policy for environmental and biological monitoring of exposure to cadmium in the general population in Iran. This study was aimed to review cadmium content in consuming foods and biological samples in Iran, systematically. We developed a comprehensive search strategy and used it to search on Web of Science, Scopus, Science Direct, and Scientific Information Database until 28 December 2016. The totals of 285 articles were identified and finally 31 original papers were selected. Cadmium contamination was found in Iranian food groups such as rice, cereal and legumes, canned tuna fish, vegetables, fruit juice, and egg. This study showed that cadmium amount in 75% of the consumed rice samples (domestic and imported) was higher than the maximum limits approved by institute of standards and industrial research of Iran. Lettuce samples in Yazd were recorded the highest concentration of cadmium compared to other studies. In addition, high amount of cadmium was observed in the blood of the general population. Regarding the cadmium contamination in food and blood samples in Iran, policies must be adopted to reduce exposure to cadmium through different matrices as much as possible.

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Abstract

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The self-assemble Nanoparticles of Ophiopogon japonicus extracts to reduce ROS and NO induced by LPS from the Molecular Level Analysis

Yi-Cheng Ho
Department of BioAgricultural Sciences, Chiayi University, Taiwan, R.O.C

Ophiopogon japonicas(OJP) is a kind of food ingredients for generally considered to improve immunity in Taiwan. The extract of OJP also has the effect of improving immunity and is used in the treatment of Chinese medicine. The nanoparticles (NPs) produced by chitosan (CS) and OJP water extracts after self-assembly have good cell affinity and have the ability to scavenge the oxidative nitrogen scavenging activity generated by LPS. And these NPs can promote cell proliferation. We used the reaction surface method (RSM) to analyze the optimum parameters of the most chitosan and OJP extracts, and found the optimal composition parameters through cell experiments. We performed cytotoxicity test, ROS assay, intracellular NO assay, and quantitative PCR to reduce the expression of MCP1, MIP2a, iNOS, COX2, TNF-α and other genes induced by LPS, further flow cytometry and antibody confirmation of expression at the protein level.

Electrification in Georgian Agriculture Sector as a Factor of State Regional Competitiveness

Demur Chomakhidze
Georgian National Energy Regulatory Commission 19, A. Mitskevichi Str., Tbilisi. 0194. Georgia

The article provides a brief retrospective analysis of the level and dynamics of Georgia's electrification from the beginning of the process up to today. It is said that the production and consumption of electricity per inhabitant throughout the country reached its maximum in 1989. As for these indicators in agriculture, it is far worse. However, it is noteworthy that in the last years of the country's independence the situation has been improved. The research has been provided throughout the country as well as in agriculture. The article provides suggestions for improvement of the situation. Namely to increase the level of electric power.

Development of Low Arsenic Accumulating Rice variety for safer human consumption

Debasis Chakrabarty
Biotechnology and Molecular Biology Division, CSIR-National Botanical Research Institute, Rana Pratap Marg, Lucknow-226001, India

Arsenic (As) contamination of the environment has emerged as a serious problem. One of the findings was that partitioning of arsenic in rice grains showed major variation in diverse germplasm of rice. The molecular basis for phenotypic divergence in the different or contrasting genotypes is still unclear. Several QTLs for variations in the As accumulation in different rice tissues have been already mapped in rice genome. However, they are failed to elucidate the mechanism related to the variability in As accumulation among different rice genotypes and limiting molecular breeding program. Transgenic technology is being widely enforced for improving heavy metal tolerance in plants. We have also identified several candidate genes that are involved in arsenic metabolism in rice and generated several transgenic rice plants that accumulate less arsenic in their grains. Our study described the principal understanding on the molecular basis of arsenic toxicity and accumulation in plant parts. And also covered the transgenic and bioremediation approaches to minimize As accumulation in rice which further reduces food chain contamination. The data suffice to mitigate the effects of As toxicity as much as possible by reducing the As accumulation in rice grain. We described the measures to decrease As accumulation in rice, and to understand the mechanism and transport of As uptake, its transport from root to shoot to rice grain, its metabolism, detoxification as well as the mechanisms lying behind its accumulation in rice grain. We proposed various checkpoints which can be targeted to reduce As accumulation in rice grain. Genes/protein involved in As detoxification like glutathione biosynthesis, Phytochelatin synthesis, and arsenic methytransferase are also provided a great pool of pathways that can also be castellated for the same purposes.

SPEAKER SLOTS AVAILABLE

Abstract

Implications of thermal processing on bitterness development in custard apple (Annona squamosa L) fruit pulp: Biochemical and Sensory characteristics

Revathy Baskaran
Central Food Technological Research Institute, Mysore, Karnataka, INDIA

Custard apple has a sweet, granular pulp with pleasant flavour. Several constraints exist in industrial processing of custard apple, including enzymatic browning and development of bitterness on heating beyond 55˚C. Preserving the pulp using conventional method i.e., heat, is practically impossible. This presentation will define reasons for development of bitterness in the pulp on thermal processing and effect of enzymic clarification of fruit pulp on bitterness. Extraction and characterization of free, bound and esterified phenolics of both fresh and heated pulp were analyzed by UPLC-ESI-MSMS. There was an increase in both free and bound phenolics on heating. Particularly, the precursor ion at m/z 277, was found to increase ~ 6 folds and tentatively identified as p-decycloxybenzoic acid (PDBA). The contribution of this compound to sensory parameters is still unclear. Further, partially purified fresh and heated tannin fractions were subjected to High Resolution Mass Spectrometry (HRMS). In heated sample, a new precursor ion m/z 139 (M+H) was found at a very high intensity, with fragment ion at m/z 121, which was probably formed by the loss of a water molecule M+H-H_2O [M+1-18]. Based on the mass to charge ratio and the fragmentation pattern, m/z 139 was tentatively identified as p-hydroxybenzoic acid (PHB), which is well known to have an acidic and bitter taste. Hence, the perceived bitterness in custard apple pulp on thermal processing is probably due to the synergistic effect of phenolic acids, flavanols and certain low molecular weight compounds formed by heat-induced chemical reactions. Enzymic clarification of the fruit pulp prevented development of bitterness considerably. This was substantiated with data, as revealed and discussed through HRMS, HPLC, FTIR and sensory analysis in detail.

Agriculture and Food Chemistry is the most powerful industry for the development of health, basic need and daily use of life, reduce financial crises, global poverty and hunger in the developing countries of the world like South Asia particularly in Pakistan

Muhammad Usman
Agricultural Research System, Government of Pakistan

The aim of presentation consist of Agriculture, Food Chemistry, health, life, financial crises, global poverty and hunger were studied and reported that Agriculture and Food Chemistry is the most powerful industry for the development of health, basic need and daily use of life, reduce financial crises, global poverty and hunger in the developing countries of the world like South Asia particularly in Pakistan. The study reported that agriculture is the science, art and occupation of cultivating the soil, producing crops, raising livestock etc. It is the food we eat, the clothing we wear, the materials of our homes, the garden around us etc. It is not only the basic need of food but also fulfills all the basic requirements of human beings in the form of the following integrated agricultural products/industries including Livestock and Dairy Development, Poultry, Aquaculture, Apiculture, Crop production. The major food nutrients are carbohydrate, lipids and protein which are found in plants and animals cells. It is also called as the food science. In other worlds, food science is the study of the physical, biological and chemical makeup of food, the causes of food deterioration and the concepts underlying food processing. Food scientists and technologists apply scientific disciplines including chemistry, engineering, microbiology and nutrition to the study of food to improve the safety, nutrition, wholesomeness and availability of food. Latest food technology is the application of food science to the selection, preservation, processing, packing, distribution and use of safe food. Food carbohydrates include sugar, starches and fibers, lipids include fats, oil, waxes. Similarly protein is very important component of food and necessary for the life of human being. Similarly food chemistry deals with the three biological components of food , carbohydrate, lipid-fats and protein which are the basic need and daily use of life. The food obtained animal and plants are consider is a complete food if all these components are available in food. The study further reported that all these three nutrients are essential for the health but in the absence or lake of these nutrients proper life is almost impossible. The total number of countries are available in the world are 224, consist of 49 developed countries, 149 developing countries, 4 observers states, 8 state with partial recognition and 14 unrecognized states but the South Asia comprises the countries of Pakistan, Bangladesh, India, Bhutan, Maldives, Nepal and Sri-Lanka South Aisa is about one fifth of the world's population, which is considered as the most densely populated region in the world. In the light of the above study, the industry of Agricultural and Food Chemistry should be commercialized for the development of health, basic need and daily use of life, absorbing millions of technical and non-technical people, like engineers, doctors, agriculturist etc, generate income, create employment, increase the job, stronger economy, reduce financial crises, global poverty and hunger in the developing countries of the world like South Asia particularly in Pakistan.