International Conference of Food Science and Technology 2010

Programme
Abstracts
List of delegates and Exhibitors

22nd – 24th March 2010
University of Chester, Chester

Society for Food and Agricultural Immunology

The University of Chester

SCICOMM
The Centre for Science Communication

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Welcome!

Dear Friends and Colleagues, welcome to the 2nd International Chester Food Science and Technology Conference and welcome to the University of Chester. This is the second Food Science and technology Conference in Chester and occurs within the Chester Food Science Week. We have prepared a programme that will hopefully provide you all with something that promotes interest and discussion.

Conferences have always proven successful in allowing the development of collaborations and friendships. I hope that that this conference will be equally successful and more new friendships and collaborations will be formed as a result of it.

As part of the Chester Food Science week this is the first of 3 events taking place this week. On Wednesday we will be hosting the 5th Environmental Mass Spectrometry conference. You are welcome to visit the lectures taking place as part of that conference should you wish. On Thursday and Friday we are holding the 1st Food Nanotechnology Conference which I hope those of you staying for the full week will find interesting and thought provoking.

As part of this welcome note I would like to acknowledge the colleagues who have assisted with the preparations for this event. First, I would like to thank Louisa Scarre who has taken on the burden of the Conference Secretariat single-handed. I would also like to thank my colleagues, Graham Bonwick and John Banks for their help in organising this week of events.

Finally I wish you all an enjoyable conference and trust that you will take the opportunity to enjoy your visit to Chester, and make new friends and contacts.

Best Wishes
Chris Smith

ICFST PROGRAMME

- All oral presentations will be held in Beswick 017.
- Lunch and coffee will be served in Small Hall, where the poster and exhibition stands sessions are taking place.
- Dinner is served in the Dining Hall. These are all marked on your campus map.

Monday 22nd March

09:00 – 10:00		Registration and coffee – Beswick Foyer (17 on map)
10:00		Opening remark by Prof Chris Smith and Prof Graham Bonwick
10:10	**L-01**	**Towards Structuring Reduced Saturated / Trans Fat- Based Systems from a Multidisciplinary Approach** Niall W G Young, Paul Wassell, Graham Bonwick, Christopher Smith, Eva Almiron-Roig,
10:30	**L-02**	**Chemical Compositions and Biological Activities of the Essential Oils of Three *Ocimum* Species Collected From Different Geographical Regions of Pakistan** Abdullah Ijaz Hussain, Shahzad Ali Shahid Chatha, Jenny Worthington[b] and Abdul Jabbar
10:50	**L-03**	**Application of Sodium carboxymethyl cellulose as a fat replacer** A.Z. Shojaei D Ghanbarian
11:10	**L-04**	**Is Spirulina microalgae the answer to the question of malnutrition?** Yacoub Halawlaw
11:30	**L-05**	**Development an On-Line Solid Phase Extraction Coupled with High Performance Liquid Chromatography for Determination of Trace Sudan Dyes in Foods** Xu Zhixiang, Wang Shuo, Fang Gongzhen, Song Jiajia, Zhang Yan
11:50	**L-06**	**Functional and nutraceutical potential of defatted wheat germ flour for value added baked products** Muhammad Umair Arshad
12:10	**L-07**	**Comparison of RAPD and ISSR markers for the study of genetic diversity in barley** Ferdaous Guasmi, Leila Touil, Khadija Fères, Walid Elfalleh, Tebra Triki, Ali Ferchichi

12:30 – 13:30		Lunch – buffet served in Small Hall (62 on map)
12:30 – 14:00		1st Poster and Exhibition session – Small Hall
14:00	**L-08**	**Intervarietial variation in nutritional and antioxidant potentials of mungbean (Vigna radiataL.)** Abdullah Hussain, Shahzad Ali Shahid Chathaa, Jenny Worthingtonb and Abdul Jabbar
14:20	**L-09**	**Antioxidant activity of peel fraction of 7 pomegranate (ripe and unripe) varieties grown in Iran** Mehrosadate Mirmohammadi, Majideh Jamshidi
14:40	**L-10**	**HUFA and Vitamin C Enrichment of *Artemia urmiana* for Persian Sturgeon (*Acipenser persicus*) Larviculture** Mahmoud Hafezieh
15:00	**L-11**	**Extraction and purification of Omega-3 fatty acids concentrate from *Hypophthalmichthys molitrix* oil** Hedieh Alavi, M. Ardjmand, A, Motallebi, R. Pourgholam.
15:20 – 15:45		Refreshment break – Small Hall (62 on map)
15:45	**L-12**	**A novel enrichment broth to improve detection and isolation of *Cronobacter* spp. (*Enterobacter sakazakii*) from infant formula** Murad Al-Holy
16:05	**L-13**	**Use of high homogenization pressure to control the growth of the spoiling microflora of juices** Antonio Bevilacqua, Maria Rosaria Corbo, Milena Sinigaglia
16:25	**L-14**	**Preliminary nutritional survey of ensiled wild sunflower (*Tithonia diversifolia*) leaves with sugar cane molasses silage additive as a prelude to incorporating into monogastric livestock diets** Ayodeji Oludare Fasuyi
16:45	**L-15**	**Microbiological Analysis and Lactic Acid Fermentation Studies on Edible Irish Brown Seaweeds** Shilip Gutpa, Nissreen Abu-Ghannam, Gaurav Rajauria
		Session Ends
18:30		Dinner – Dining Hall (30 on map)

Tuesday 23rd March

09:00	**L-16**	**Effect of processing treatments on certain nutritional and anti-nutritional characteristics of grains of mung bean [vigna radiata (l.)] Varieties** Alka Singh
09:20	**L-17**	**Calcium Chelating Effect on Fibersol-2** Oumar Bangoura
09:40	**L-18**	**Nutritional Mapping of Chevon Carcass** Sushasish Biswas, G. Patra, D. Bhattacharya & P. Bandopadhya.
10:00	**L-19**	**Textural properties of white yam (dioscorea esculenta) flour, and physical and sensory characteristics of bread substituted by the flour** Umi Purwandari, Galih Supriyanto.
10:20 – 10:50		Refreshment break – Small Hall (62 on map)
10:50	**L-20**	**A CFD study of convection currents in a high pressure processing unit during Non-thermal Sterilization of Liquid Food** Ghani Albaali
11:10	**L-21**	**Effect of Salt Whey as an Ingredient in Iranian processed cheese** M Dezyani, Roghayeh Ezzati1,Habib Allah Mirzae
11:30	**L-22**	**Evaluation of the antioxidant and antibacterial activity of rosemary and garlic extract in rainbow trout stored at 2 ± 1°C** Halime Eternadi, Masoud Rezaei
11:50	**L-23**	**Study of oil uptake and some of quality attribute of potato chips affected by hydrocolloids.** R Ezzati, M.Dezyani, H.A.Mirzaei
12:10	**L-24**	**Enzymatic liquefaction of texture-modified fillings in triple-shot confectionery products** Harald Rohm, Birgit Böhme, Yvonne Schneider
12:30 – 13:30		Lunch – buffet served in Small Hall
12:30 – 14:00		2nd Poster and Exhibition session – Small Hall
14:00	**L-25**	**Extrusion processing of deoiled rice bran in the development of biodegradable molded sheets** D. C. Saxena, M. Jadhav

14:20	**L-26**	**Standardisation of thermal processing of cuttlefish nidamental gland** P.M. Sherief, Bikash Kumar Pati
14:40	**L-27**	**Gel core nanoemulsions as new vehicles for food nutraceuticals** Reza Soltani, Rassoul Kadkhodaee, Bi Bi Marzieh Razavi Zadeh, Mohammad Taghi Hamed Mousavian
15:00	**L-28**	**Measuring moisture and fat contents of breaded-fried chicken nuggets using vis/nir hyper-spectroscopy** Alireza Yavari
15:20 – 15:45		Refreshment break – Small Hall
15:45	**L-29**	**Frankfurters produced with tomato powder and reduced nitrite level** Esen Eylier Yilmaz, Aydin Oztan
16:05	**L-30**	**Optimization of morphology and geometric parameters of encapsulated Hypophthalmichthys molitrix oil** Hedieh Alavi, Ardjmand,M. Motallebi ,A. Pourgholam,R.
16:25	**L-31**	**Chemical characteristics and Biological activity of Ulva lactuca L sulphated polysaccharides** Gamal El Baroty
16:45	**L-32**	**Analysis of cream formation in green tea concentrate with different solid concentrations** Yong-Quan Xu, Su-Qin Chen, Hai-Bo Yuan, Ping Tang, Jun-Feng Yin
		Session Ends
18:30		Dinner – Dining Hall (30 on map)

Wednesday 24th March

09:00	**L-33**	**Rheological properties of reduced-fat model processed cheese spreads** M Dezyani, R.Ezzati1,H.A.Mirzaei
09:20	**L-34**	**Formulation Optimization of Process Cheese using Enzyme Modified Cheese** Mohammad Habibi, S. Sabouri, and M. Nasiri Mahallati
09:40	**L-35**	**Cheese making experiments in pilot and production scale revealed distinct differences in cheese yield and sensory quality as affected by the coagulant** Doris Jaros, Mandy Jacob, Harald Rohm
10:00	**L-36**	**Factors affecting Penicillium roquefortii (Penicillium glaucum) in internally mould ripened cheeses: Implications for pre-packed blue cheeses** Andrew Fairclough
10:20 – 10:50		Refreshment break –Small Hall
10:50	**L-37**	**Intervarietial variations in proximate composition and antioxidant potential of dry peas (Pisum sativum L)** Shahzad Ali Shahid Chatha
11:10	**L-38**	**Efficiency and ripeness of traditional white and ultrafilteration cheese as affected by psycrotrophic bacteria** M Dezyani, Roghie Ezzati, Ali Mortazavii
11:30	**L-39**	**Quick and automated approach to screening of Beta-Agonists in urine** Michal Godula, Peter Fürst, Thorsten bernsmann
11:50	**L-40**	**The health hazard risk associated with the consumption of raw meat in Ethiopian society** Sanjay Goyal
12:10	**L-41**	**Application of Generic Algorithm in Optimization of Low Fat Ice-Cream Formulation** Majideh Jamshidi
12:30 – 13:30		Lunch – buffet served in Small Hall
12:30 – 14:00		3rd Poster and Exhibition session – Small Hall

14:00	**L-42**	**The Effect of Cultivar Variety on Bioactive Compounds of Flax Seed (Linum usitatissimum)** Evrim Ozkaynak, Gülden Ova
14:20	**L-43**	**Quantitative trait locus analysis for textural properties traits of Chinese Northern-Style steamed bread** Peng Wu, Jichun Tian
14:40	**L-44**	**Microstructure of Iranian process cheese** M Dezyani, R.Ezzati, H.A.Mirzaei
15:00	**L-45**	**Studies on sensory evaluation of chemically preserved mushrooms through response surface method** Sarfraz Hussain
15:20	**L-46**	**Assessment of the nutritional value of wild root tubers vegetable consumed in the Behbahan of Iran: a preliminary study** Ali Aberoumand
15:45		Refreshment break –Small Hall
18:30		Dinner – Dining Hall *** Please note that this is only for those delegates that are staying in accommodation on the night of Wednesday 24th.**
19:30		Conference Dinner – Dining Hall. *** Please note that this is only for those delegates that chose to attend this special dinner. The catering staff will have a list of names for those that have registered to attend and only those will be served.**

L -01

Towards Structuring Reduced Saturated / *Trans* Fat- Based Systems from a Multidisciplinary Approach

Niall W.G. Young, Paul Wassell, Graham Bonwick, Christopher Smith, Eva Almiron-Roig

Reduction of saturates and *trans* fatty acids through hydrogenation, interesterification and fractionation will be discussed together along with the influence on fat crystallisation and solid fat content. Caution is urged focus on a multidisciplinary approach to reducing saturated and *trans* fatty acids as opposed to concentrating on the purely physio-chemical aspects.

Progressing from traditional fat structuring towards novel structuring, whilst still maintaining fat blend functionality is likely to initially involve a mixture of traditional and novel raw materials. Advent of structure accelerants, e.g. surfactants such as mono-diglycerides will likely be crucial to the next commercially viable incremental step. Coupling these accelerators with already accepted novel structurants such as phytosterols and oryzanols could provide insight into new mechanisms of structuring fat blends. Food examples will be given as well as insights into possible future trends.

L-02

Chemical Compositions and Biological Activities of the Essential Oils of Three *Ocimum* Species Collected From Different Geographical Regions of Pakistan

Abdullah Ijaz Hussain[a,b*], Shahzad Ali Shahid Chatha[a], Jenny Worthington[b] and Abdul Jabbar[a]

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[b] School of Biomedical Sciences, University of Ulster, Colerain, BT52 1SA, Northern Ireland, UK
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Different species of *Ocimum* are frequently used as a food in different Asian dishes. The aim of the present study was to examine the variation in the yield, chemical composition and biological activities of essential oils of three *Ocimum* species, grown at hilly and plane regions of Pakistan. The essential oils contents of *Ocimum sanctum, O. gratissimum* and *O. basilicum,* collected from hilly regions were 0.90, 1.32 and 1.00 % were slightly higher than from plane regions 0.52, 0.90 and 0.70 %, respectively. The GC-MS analysis revealed fluctuation in the contents of most of the chemical components of the essential oils investigated, with respect to species and regions. The major chemical constituent of *O. sanctum, O. gratissimum* and *O. basilicum* essential oil from hilly and plane regions were eugenol (18.9 and 27.3 g/100g), β-caryophyllene (18.7 and 20.5 g/100g), β-elemene (15.6 and 12.0 g/100g); eugenol (46.1 and 55.1 g/100g), germacrene D (9.70 and 5.61 g/100g); linalool (47.8 and 29.4 g/100g), eugenol (8.33 and 15.5 g/100g), 1,8-cineol (6.00 and 10.1 g/100g), respectively. The tested *Ocimum* essential oils and main components exhibited excellent antioxidant activity as measured by DPPH free radical-scavenging ability, bleaching β-carotene in linoleic acid system and inhibition of linoleic acid oxidation. The antiproliferative activity has been tested on breast cancer MCF-7 and prostate cancer LNCaP cell lines by the MTT assay. Essential oils of *O. basilicum* showed best antioxidant while *O. sanctum* exhibited best anti-proliferative activities. A significant variation in the biological activities was observed with respect to regions and species.

L-03

Application of Sodium carboxymethyl cellulose as a fat replacer

Shojaei A. Z. & Ghanbarian D.

It is well known that cellulose gum is physiologically inert and can be used in low-calorie products to meet consumers' desire. Both fat and hydrocolloid are very important to formulate any full-fat or reduced–fat food product as lipids influence all aspects of food perception and hydrocolloids are a good substitute for the viscosity of lipids. Sodium carboxymethylcellulose (CMC) was characterized and its effects on flavour release established. Experiments were then carried out to determine the effect of hydrocolloid concentration and different oil contents on strawberry flavour release from low and regular fat milk samples, thickened with CMC under static equilibrium headspace. Under equilibrium condition, the oil content and lipophilicity of volatile compounds significantly affected the air/product partition coefficients of ethyl hexanoate and ethyl butyrate, resulting in alteration of the aroma profile. However, the thickener concentration had no significant effect on the release of these esters under equilibrium conditions.

Keywords:

Sodium Carboxymethylcelluse, flavour release, lipid, APCI_MS

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L-04

Is Spirulina microalgae the answer to the question of malnutrition?

Yacoub Idriss Halawlaw

Spirulina is a microscopic alguae from the family of cyanophycae. It is the first inhabitant of Earth [R.D. FOX, 1986; 1996, 1999].

In this paper we are interested in its nutritional value and the spreading of its use where it is necessary.

Spirulina (In our study we used *Arthrospira platensis*, a specie which is encountered in Lake Chad and Kanem regions of western Chad) is the richest product in proteins ever known (more than 60% of the dry mass) [YACOUB I. H., 2009; 2006; 2005].

It can be easily used to fight malnutrition in the world. It is very easy to cultivate and harvest. The problem at the local level is linked to the process of drying and conservation. We propose a new approach to the question of technology transfer and apply it to the case of the valorisation of Spirulina in Chad and in the region of central Africa.

We think that technology transfers from North to South were designed in northern laboratories and nobody was bothered with the environments of use. We try in this paper to propose a methodology of technology transfer which is more appropriate because it involves the target population as an actor.

L-05

Development an On-Line Solid Phase Extraction Coupled with High Performance Liquid Chromatography for Determination of Trace Sudan Dyes in Foods

Xu Zhixiang, Wang Shuo, Fang Gongzhen, Song Jiajia, & Zhang Yan

Sudan dye is a synthetic dye which was forbidden as an additive for any food at any levels because of its demonstrated cancerogenity. So the development of simple, rapid and sensitive analytical method for determination of Sudan dyes in foods is crucial and necessary. In this paper, we presented a sensitive and simple method for the preconcentration and determination of trace Sudan dyes in foods through on-line solid phase extraction coupled with high performance liquid chromatography using activated silica gel as sorbent. With a loading flow rate of 1.7 mL min^{-1} for sampling 50 mL at pH of 6.7, the enrichment factors ranged from 196-991 were achieved. The detection limit (S/N = 3) of Sudan I-IV were in the range of 1.4-7.0 ng L^{-1}, and the relative standard deviation for repeatability of the peak areas for five replicate detections of 0.01 μg L^{-1} Sudan I-IV were 2.2 to 4.5%. The blank food samples of chilli powder, chilli sauce and duck eggs spiked with Sudan III at two levels (0.25, 0.50 μg L^{-1}) were determined by this method with recoveries ranging from 70.3 to 95.2 %.

L-06

Functional and nutraceutical potential of defatted wheat germ flour for value added baked products
Muhammad Umair Arshad
Blending of wheat flour (WF) and defatted wheat germ (DFWGF) at levels of 0–25% was investigated for the effect of DFWG on nutritional and functional properties of flat bread (chapattis). The DFWGF had higher protein, fiber, ash and NFE content but lower fat content. The crude protein content of DFWGF was as high as 27.80% with highly valuable amino acid profile, rich in essential amino acids especially lysine (2.324 g/100g). The water and oil absorption capacities, foaming and emulsifying properties of the DFWGF/WF blends improved with increased amount of DFWGF in the blends. The bulk density did not differ significantly ($p > 0.05$) among the blends. The physico-chemical and sensory evaluation of chapattis, revealed that up to 15% substitution of wheat flour with DFWGF produced acceptable chapattis. The protein quality of the chapattis was assessed through weanling albino rats by feeding a diet of cookies for 10 days, which was formulated to supply 10% protein, with a casein diet as a control. The chapattis containing 15% DFWGF were best regarding protein bioavailability in rats. The protein efficiency ratio (PER), net protein utilization (NPU), biological value (BV) and true digestibility (TD) differed significantly among diets containing chapattis with 0–10% DFWG, and casein diet when fed to rats. Concluding, the diets containing 15% DFWG have values, of these parameters, similar to the casein diet.

L-07

Comparison of RAPD and ISSR markers for the study of genetic diversity in barley

Ferdaous Guasmi, Leila Touil, Khadija Fères, Walid Elfalleh, Tebra Triki, Ali Ferchichi

Barley *(Hordeum vulgare L.)* is one of the most important crop species in the word and has been subject to considerable genetic study. A total of 80 accessions from South Tunisia were collected and evaluated ex situ at IRA experimental fields of Médenine. Two types of molecular markers, random amplified polymorphic DNA (RAPD) and inter-simple sequence repeat (ISSR), were assayed to determine the genetic diversity of 80 barley accessions. The ISSR primers amplified a total of 9 bands out of which 6 bands were polymorphic. These primers showed variation in the percentage of polymorphism, band informativeness (Ib) and resolving power (Rp). Average band informativeness (AvIb), is a measure of closeness of a band to be present in 50 % of the genotypes under study and resolving power (Rp) is the sum of Ib values of all the bands amplified by a primer. The percentage of polymorphism is 66.66 %, average Ib ranged from 0.24 to 0.0386 while Rp ranged from 0.74 to 1.16. The primer UBC 890 showed the highest averaged Ib (0.386) and Rp (1.16). In RAPD analysis, 3 primers yielded a total of 17 scorable bands, which are all polymorphic. The 3 polymorphic primers exhibited variation with regard to average band informativeness (AvIb) and resolving power (Rp). The primer OPA-11 showed the lowest AvIb (0.37) and Rp (1.85) while the highest AvIb of 0.65 and Rp (5.2) values were exhibited by the primers BY-15. RAPD and ISSR marker systems were found to be useful for the genetic diversity among the barley accessions. The dendrogram based on RAPD markers was in accord with the dendrogram based on ISSR markers for the majority cases. A poor correlation (r= 0.124) was found between both sets of genetic similarity data, suggesting that both sets of markers revealed unrelated estimates of genetic relationships.

Key words: Genetic diversity, *Hordeum vulgar* L., ISSR markers, RAPD markers, South-Tunisia.

L-08

Intervarietial variation in nutritional and antioxidant potentials of mungbean (*Vigna radiata*L.)

Abdullah Ijaz Hussain*, Shahzad Ali Shahid Chatha, Muhammad Sajid Iqbal and Abdul Jabbar

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This research work was carried out to investigate the intervaratial variations in nutritional and antioxidant potential of mungbean (*Vigna radiata* L.). The mungbean samples after grinding were extracted using soaking and shaking methods with 100 and 80 % methanol. The proximate compositions in terms of moisture, ash, fibre and protein contents varied non-significantly with respect to various cultivars. The antioxidant potential of extracts was assessed using some antioxidant assays like estimation of total phenolic contents (TPC), total flavonoids contents (TFC), percentage inhibition of peroxidation of linoleic acid system, reducing power and DPPH free radical scavenging capacity. TPC, TFC, reducing power, %inhibition of peroxidation in Linoleic acid system and DPPH radical scavenging activity of different mungbean extracts were found in range of 0.681 - 1.04 g/100g of GAE, 1.47 – 2.22 g/100g of CE, 0.872 - 0.981, 56.20 - 78.73%, 16.66 – 31.47mg/mL respectively. The amount of TPC and DPPH radical scavenging activity of different mungbean extracts varied significantly but no significant variations were found in the amount of TFC, percentage inhibition of peroxidation in linoleic acid system and reducing power among various cultivars and extraction methods. From the results of present investigations it is reasonable to say that methanolic extracts of mungbeans have exhibited varying degree of antioxidant activity.

L-09

Antioxidant activity of peel fraction of 7 pomegranate (ripe and unripe) varieties grown in Iran

Mehrosadate Mirmohammadi and Majideh Jamshidi

Antioxidant capacity and total phenolic of peel fraction of 7 pomegranate varieties grown in Iran were determined. The effect of maturation on antioxidant activity was also determined. The results showed that Pust Ghermeze Shirin(sweet taste with red peel) had the highest antioxidant value among all varieties and followed by Pust Sefeede Shirin(sweet taste with white peel), Yazdi(sub acid taste with pink peel), Pust Ghermeze Torsh(sour taste with red peel), Pust Sefeede Torsh(sour taste with white peel), Malas(sub acid taste) and Makhmali(sub acid taste with velvet peel). Maturation of pomegranate increased the antioxidant capacity.

L-10

HUFA and Vitamin C Enrichment of Artemia urmiana for Persian Sturgeon (Acipenser persicus) Larviculture

Mahmoud Hafezieh

High mortality frequently occurs in larval mass production of Persian sturgeon fish, *Acipenser persicus*. Nutritional deficiencies in live food, *Artemia urmiana* nauplii, fed to larvae could be a reason. A series of experiments was carried out to evaluate the effects of nutritional enrichment of *Artemia* by oils in different concentrations with or without different levels of vitamin C during two enrichment periods (12 and 24h) on survival, growth rate and salinity tolerance in Persian sturgeon larvae reared in tanks. Four types of oils (ICES30/4, sturgeon ovary, cod liver, and linseed oils) were evaluated.

Artemia nauplii eicosapentaenoic (EPA), docosahexaenoic acids (DHA) contents and DHA/EPA and ω3/ω6 ratios significantly increased ($P<0.05$) as highly unsaturated fatty acid (HUFA) concentration and enrichment period increased. *Artemia* arachidonic acid (ARA) content, however, increased significantly ($P<0.05$) as HUFA concentration decreased and enrichment period increased. 300 ppm ICES30/4 plus 20% vitamin C with 24h enrichment period resulted in significantly higher ($P<0.05$) vitamin C content (1063.8± 48.00 µg/g DW) in Ar*temia* nauplii than other combinations.

HUFA oil source with or without vitamin C did not affect the growth rate of Persian sturgeon larvae. Nevertheless, survival rates and chemical compositions were significantly improved ($P<0.05$) only in fish larvae fed *Artemia* enriched HUFA oil supplemented with vitamin C. ICES30/4 was the best oil source for improving the chemical composition including fatty acids in Persian sturgeon larvae only when it was supplemented with vitamin C. Lower levels of vitamin C (less than 30%) and longer enrichment period (24h) were more effective ($P<0.05$) in improving on chemical composition of sturgeon fish larvae. When the sturgeon larvae were exposed to salinity test, those fed with HUFA enriched *Artemia* showed tolerance only up to 6 ppt while those fed HUFA+vitamin C enriched *Artemia* demonstrated high tolerance (≥ 90% survival) up to 12 ppt for 120h. Although the enrichment of *Artemia urmiana* with 300 ppm ICES30/4 and 30% vitamin C gave the best salinity tolerance at 12ppt (100% survival), the enrichment with 300 ppm sturgeon ovary oil and 10% vitamin C was economically affective in increasing the salinity tolerance of Persian sturgeon larvae (98 % survival).

Keywords: *Artemia urmiana*, enrichment, Persian sturgeon (*Acipenser persicus)*, chemical composition, salinity tolerance

L-11

Extraction and purification of Omega-3 fatty acids concentrate from *Hypophthalmichthys molitrix* oil

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Extraction and purification of *Hypophthalmichthys molitrix* fish oil by urea complex formation were made at -5 , +1 and +5 ºC , respectively . Fish oil was extracted by Bligh and Dyer method from the muscle tissue and after concentrating PUFAs , the oil samples were stored at -70 ºC . The observed results show that the rate of omega-3 extraction have been increased while saturated and long chain monosaturated fatty acids decreased during this process . EPA has a higher tendency to form urea adducts than the other two major n-3 PUFAs , especially at low temperatures . The optimum temperature for maximum recovery of EPA is about 1 ºC . The amount of extracted omega-3 in *H.molitrix* oil were 20.58% wt of total extracted oil and by subsequent purification increased to 68% wt at 1 ºC , 36.82% wt at +5 ºC and 22.53% wt at -5 ºC of total extracted oil .

Key words : omega-3 , urea complexation, *Hypophthalmichthys molitrix* oil , PUFA extraction , concentrates , purification , fatty acids .

L-12

A novel enrichment broth to improve detection and isolation of *Cronobacter* spp. (*Enterobacter sakazakii*) from infant formula

Murad A Al-Holy

The current study investigated the potential of using Al-Holy-Rasco (AR) medium, a novel broth for detection and isolation of *Cronobacter spp.* in infant formula milk (IFM). The new medium is based in its composition on the general medium Brain Heart Infusion broth (BHI) with the addition of 1% NaCl, 15% sucrose and 0.80 g/l sodium deoxycholate as selective ingredients. AR broth outperformed Enterobacteriaceae enrichment broth (EE), *E. sakazakii* enrichment broth (ESE), modified lauryl sulfate broth (m-LSB), and milk as enrichment media to stimulate the growth of a cocktail of 10 strains of *Cronobacter*. Additionally, AR broth significantly suppressed the growth of competing non-*Cronobacter* Enterobacteriaceae compared to EE, ESE, m-LSB and milk. The recovery of desiccated *Cronobacter* (1 to 5000 CFU/100g) from powdered IFM in the presence of competing non-*Cronobacter* Enterobacteriaceae was determined by EE, ESE and AR broth with 10% and 15% sucrose. AR broth with 15% sucrose outperformed all other examined broths and recovered *Cronobacter* from all samples tested at all *Cronobacter* concentrations. EE broth, an enrichment broth used in the FDA method for detection and isolation of *Cronobacter spp.* failed to recover the organism from samples containing 10 CFU/100g or lower. Therefore, AR broth offers a reliable alternative for the current recommended broth for rapid detection and isolation of *Cronobacter spp.* from powdered IFM and baby foods.

L-13

Use of high homogenization pressure to control the growth of the spoiling microflora of juices

Antonio Bevilacqua, Maria Rosaria Corbo and Milena Sinigaglia
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and
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Since 1990s high homogenization pressure (HPH) has been regarded as an alternative way to the thermal processing for the inactivation of the pathogens and/or spoiling microorganisms of liquid foods. In this report, we propose the use of HPH for the inactivation of the spoiling microflora of fruit juices.

The research was divided in three steps:

1. Effectiveness of HPH against *Bacillus coagulans*, *Lactobacillus plantarum*, *L. brevis*, *Saccharomyces bayanus*, *Rhodotorula bacarum* and *Pichia membranifaciens*.
2. Use of the centroid approach to model the individual and interactive effects of HPH, citrus extract and sodium benzoate against *P. membranifaciens*.
3. Use of the centroid to model the effects of HPH, citrus extract and limonene against *S. bayanus* in a laboratory medium. Then, the data were validated in a commercial apple juice, focusing on the microbiological results and the sensorial acceptability of the samples.

Bacteria appeared more resistant than yeasts; moreover, amongst the bacteria lactic acid bacteria were very resistant to homogenization, as they required a 3-step processing at 1500 bar to be reduced by 1 log cfu/ml. On the other hand, lower pressures (500-900 bar) were required to inactivate yeasts and achieve the complete inactivation.

Finally, the use of a multi-hurdles approach (antimicrobials+HPH) seemed to indicate that the effect was; HPH, in fact, reduced the initial cell numbers (hurdle at the beginning) and the antimicrobials controlled microbial growth throughout the storage (additional hurdle).

L-14

Preliminary nutritional survey of ensiled wild sunflower (Tithonia diversifolia) leaves with sugar cane molasses silage additive as a prelude to incorporating into monogastric livestock diets

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Harvested wild sunflower (*Tithonia diversifolia*) leaves were chopped into small pieces of about 2-3cm before ensiling in 2kg plastic bags with 4 different levels of molasses (0, 2, 4 and 6% dry matter basis). The ensiling durations of 0, 7, 14, 21 and 28 days were chosen. The dates (0, 7, 14, 21 and 28) had the 4 molasses levels in 3 replicates. Samples were taken from all the bags for physical examination and phytochemical determinations (pH, NH_3-N, water extractable DM, N and total N).

Except samples at 0% molasses, all others turned yellow-brown on the 7^{th} day and the colour deepened with increased molasses addition. All silages had attractive smell. pH dropped from an average of 6 at the start of ensiling and continued to decrease with increasing length of duration and increasing levels of molasses. The NH_3-N and total N appreciated considerably with increasing length of ensiling duration molasses levels. The dry matter (DM) increased but reduced and became stable after 7 days. The NH_3-N on dry matter basis appreciated considerably and peaked at a value of 1101.2mg/kg on day 28. Major antinutrients in *Tithonia diversifolia* leaves (phytin, tannin, oxalate, alkaloid and flavonoid) gradually decreased with lengthening duration of ensiling and increase in molasses addition.

A level of 4% molasses and 14 to 21 days ensiling periods appeared optimum and most suitable for effective ensiling of *Tithonia diversifolia* leaves as determined by most investigated physicochemical properties.

L-15

Microbiological Analysis and Lactic Acid Fermentation Studies on Edible Irish Brown Seaweeds
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Seaweeds, being rich in bioactives and polysaccharides, are an attractive option for fermentation. Lactic acid fermentation was conducted on three species of edible Irish brown seaweeds, *Himanthalia elongata*, *Laminaria saccharina* and *Laminaria digitata*. To ensure seaweeds are free from contamination before fermentation, surface microflora studies were performed. Raw seaweeds showed complete absence of cultrable microflora. Heating at 85°C for 15 min resulted in spore germination and bacterial counts as high as 10^7; which were completely inactivated by heating at 95°C for 15 min. Bacteria belonging to Bacillaceae, Paenibacillaceae, Moraxellaceae and Enterobacteriaceae family were identified by 16S rRNA sequencing. Thereafter, fermentation of raw and heated seaweeds (95°C for 15 min) was carried out with *Lactobacillus plantarum*. However, none of the raw seaweed could support the growth of *L. plantarum*. Heat treatment resulted in 4 times increase in the total sugar content, for *L. digitata* and *L. saccharina*, which maintained the growth of *L. plantarum* for 24 h; after which the cell growth started to decline. The high content of laminaran polysaccharide in these species might be responsible for the growth of LAB. In case of *H. elongata*, neither raw nor heat treated forms could sustain the growth of *L. plantarum*. Effect of aeration on fermentation kinetics in heat treated seaweeds was assessed by varying the rate of agitation. Cell growth increased as the rotation speed was increased from 0 to 100 rpm reaching a maximum of 1.3×10^9 CFU/ml within 16 to 24 h for *L. saccharina* and *L. digitata*. Maximum lactic acid production of 2.5 g/l was achieved at 0 rpm. Experimental data was mathematically modelled for optimizing cell growth and lactic acid production. Results from the present study are encouraging and provide an initial indication of the potential of fermentation of seaweeds for the development of new functional foods.

L-16

Effect of processing treatments on certain nutritional and anti-nutritional characteristics of grains of mung bean [vigna radiata (l.)] Varieties

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Among various legume crops, *Vigna radiata* also called green gram is prized for its seeds. The present study was undertaken which involve screening of whole grains, dhals and sprouted grains of fifteen promising varieties of mung bean for certain nutritional (Protein content, Methionine content, Tryptophan content, ascorbic acid content), antinutritional (Polyphenol content) and physical characteristics (grain production, seed index) to identify relatively nutritionally superior varieties of *Vigna radiata*. Efforts have also been made to examine the effects of dhal processing (dhal recovery (%), husk recovery (%) and percentage loss in processing) and germination on the nutritional status of fifteen promising *Vigna radiata* varieties. Among all the varieties studied, varieties KM-92-220 and KM-2192 were identified to have significantly superior status of protein in their grains, dhals and germinated grains. While variety PDM-54 was relatively richer in methionine in its grains, dhals and germinated grains. A maximum level of tryptophan content was present in grains and dhals of variety KM-2138. Best performance for tryptophan content after germination was detected in KM-2054 followed by T-44. Varieties KM-2138 and T-44 were also found suitable for maximum dhal recovery. Cultivars K-92-140 and PDM-54 produced maximum vitamin C and had minimum and desired levels of polyphenols in their germinated grains as compared to ungerminated ones. Finally, it may be concluded that germinated *Vigna radiata* grains are excellent sources of edible protein, limiting amino acids and vitamin C and possessed very low levels of antinutritional polyphenols, therefore, have superior nutritional status as compared to ungerminated grains.

L-17

Calcium Chelating Effect on Fibersol-2

Aboubacar Oumar bangoura

Fibersol-2 is a soluble dietary fibre with specific physiological effects that are protective against degenerative diseases such as diabetes, obesity, coronary heart disease and large bowel disease. It is a white powder fibre extracted from cornstarch, containing about 90% of indigestible component (Ohkuma et al. 1990). Ohkuma & Wakabayashi 2001 estimated that fibersol-2 reaches the large intestine undigested where it is partly fermented by bacteria, producing short-chain fatty acids (SCFA) with the remainder being excreted in the faeces.

Fibersol-2 is considered safe for human consumption at all levels in humans up to 60g in a single administration and 60g per day over three months (Te Mana & Ahitereiria 2004). The average molecular weight of fibersol-2 is 2000Da, composed of only α (1→4) and α (1→6) glucosidic bonds, as present in the native starch, but also containing 1→2 and 1→3 linkages and levoglucosan (Ohkuma & Wakabayashi 2001).

Fibersol-2 is a soluble white powder fibre extracted from cornstarch by enzymatic hydrolysis, using α-amylase. The usual method to remove the undesirable color of fibersol-2 is by use of activated charcoal, which purifies the product to a white color. In this study, a calcium binding process replaced the decolourization using activated charcoal. Fibersol-2 does not inhibit calcium absorption in-vitro or in-vivo studies and this is attributed to its low viscosity (Okada et al. 1990). Thus, the purpose for chelating calcium to fibersol-2 was developed, in order to enable self-monitoring of calcium consumption, since any calcium chelated to fibersol-2 will be released after the partly fermentation of fibersol-2 in the large intestine. The percentage of calcium chelated to fibersol-2 was 46.76%. Total and free calcium content was 9274.19μg/g and 4336.88μg/g respectively. The data revealed that, the chelation of calcium to fibersol-2 is possible, and there is no gel formation at all. The application of calcium chelating process to the preparation of fibersol-2 gave an acceptable white bright color and the taste to the product as demonstrated by the sensory evaluation. In addition to the above it also increases nutritional and medicinal value of fibersol-2.

L-18

Nutritional Mapping of Chevon Carcass**

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The food animal carcasses comprised of different wholesale cuts. In this trial the goat carcass having eight different wholesale cuts namely neck, shoulder, rack, breast, fore shank, lion, leg and frank (ICAR, 1992) were considered as the study material. These cuts owing to their anatomical location and physiological function subject to exposed differently in body functioning etc. In this study, on the basis of this perspective, a programme has been set up to find out the nutritional profile namely the proximate composition of these cuts and to find out the differences of these cuts in respective to nutritional aspects to predict the most desirable cuts for the consumers in respect to provide nutrient . Besides, the meat quality studies of these cuts were also conducted. The results showed that lion and breast muscles were found to be the best in respect to protein content. The results also extended to analyse to estimate the residual concentration of chlorinated pesticides namely, DDT, DDE, TDE, lindane, dieldrin and endrin by using AAS in parts per billion. Results were analysed and found significantly different ($P<0.05$) in cuts wise. The concentration of DDT did not exceed the World Health Organisation (WHO) maximum limit in meat and fat.

** part of D.Sc work of first author

L-19

Textural properties of white yam (*dioscorea esculenta*) flour, and physical and sensory characteristics of bread substituted by the flour

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Different types of yam tubers are staple food for people in some Asian and African countries. Some types have been extensively studied for their health-promoting effects including hypocholesterolemic and immune-enhancing activities. Flour of three commercial *Dioscorea* species available in Madura and Java markets, Indonesia, were examined for their textural properties. Flour of *Dioscorea esculenta* was the most heat-resistant, with strongest gel, and least retrogradation compared to flour of two other commercial *Dioscorea* species. Flour of *D. esculenta* showed highest water absorption index (0.875 to 0.786), and comparable water solubility index (9.234 to 9.485) to those of the other species. Therefore, flour of *D. esculenta* was used to substitute wheat in bread at the level of 5, 10, 15, and 20%. Non-substituted bread was used as control. Substitution of wheat with *D. esculenta* flour up to 15% did not significantly ($p>0.05$) reduced volume of loaf. The texture of substituted bread was reduced significantly ($p<0.05$) by 12% and 21% in bread substituted by 15 and 20% flour, respectively. However, the difference in texture was not noticed ($p>0.05$) by 20 untrained panellists. Although the substitution considerably ($p>0.05$) reduced the likeness to colour and aroma, the overall preference was not altered significantly ($p>0.05$). Substituted bread contained higher ($p<0.05$) amount of amlyose. Therefore, *D. esculenta* flour can be added into bread as wheat substitution, and thus potentially increased functional properties of bread.

L-20

A CFD study of convection currents in a high pressure processing unit during Non-thermal Sterilization of Liquid Food

Dr. Ghani Albaali

High Hydrostatic Pressure treatment offers the food industry a new technology of food preservation. In this work, temperature, velocity and pressure profiles during the early stages of high pressure compression of liquid food (water), within a three dimensional cylinder basket are simulated in this work. The computations domain was performed for a cylinder with a diameter of 38 mm and height of 290 mm, which are the same dimensions as those of the high pressure unit “FOOD-LAB model S-FL-850-9-W” used for measurements. Direct processing of water at pressure level of 500 MPa and a pressure holding time of 970 s is simulated. Pressure is assumed to rise from atmospheric pressure to the treatment pressure linearly by enforced mass flow. The governing equations for continuity, momentum and energy conservation are solved using a commercial Computational Fluid Dynamics (CFD) package (PHOENICS), version 3.5, which is based on a finite volume method of solution. The simulation for the liquid food shows for the first time, the effect of forced and free convection flow, on the temperature distribution in the liquid at the early stages of compression. This is due to the difference between the velocity of the pumping fluid as it leaves the inlet hole and the velocity in the treatment chamber. Validation of the computed temperature at the different height at the axis of the cylinder are in a good agreement with those measured experimentally.

Keywords: High pressure processing, CFD, Temperature distribution, Velocity profile.

L-21

Effect of Salt Whey as an Ingredient in Iranian processed cheese

Masoud Dezyani[1], Roghayeh Ezzati[1], Habib Allah Mirzae

The objective of this research was to determine whether salt whey, obtained from a traditional Cheddar cheese manufacturing process, could be used as an ingredient in Iraninian processed cheese. Due to its high salinity level, salt whey is underutilized and leads to disposal costs. Consequently, alternative uses need to be pursued. The major components of salt whey (salt and water) are used as ingredients in Iraninian processed cheese. Three replicates of pasteurized Iraninian processed cheese (PC), pasteurized Iraninian processed cheese food (PCF), and pasteurized Iraninian processed cheese spread (PCS) were manufactured. Additionally, within each type of Iraninian processed cheese, a control formula (CF) and a salt whey formula (SW) were produced. For SW, the salt and water in the CF were replaced with salt whey. The composition, functionality, and sensory properties of the CF and SW treatments were compared within each type of Iraninian processed cheese. Mean melt diameter obtained for the CF and SW Iraninian processed cheeses were 48.5 and 49.4 mm, respectively, for PC, and they were 61.6 and 63 mm, respectively, for PCF. Tube-melt results for PCS was 75.1 and 79.8 mm for CF and SW treatments, respectively. The mean texture profile analysis (TPA) hardness values obtained, respectively, for the CF and SW treatments were 126 N and 115 N for PC, 62 N and 60 N for PCF, and 12 N and 12 N for PCS. There were no significant differences in composition or functionality between the CF and SW within each variety of Iraninian processed cheese. Consequently, salt whey can be used as an ingredient in PC without adversely affecting Iraninian processed cheese quality. Key Words: salt whey • Iraninian processed cheese Abbreviation key: CF = control formula cheese, PC = pasteurized Iraninian processed cheese, PCF = pasteurized Iraninian processed cheese food, PCS = pasteurized Iraninian processed cheese spread, SW = salt whey formula, TPA = texture profile.

L-22

Evaluation of the antioxidant and antibacterial activity of rosemary and garlic extract in rainbow trout stored at 2 ± 1°C

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The antioxidant and antibacterial effect of rosemary (*Rosmarinus officinalis*), garlic extract (*Allium sativum*) and BHT at concentrations of 1000, 5000 and 300 ppm in air and vacuum packaging of rainbow trout were investigated. Microbial, chemical and sensory characteristics were determined at 2 ± 1°C for 18 days. Rosemary and BHT significantly delayed lipid oxidation.TBA, PV and FFA value of GR-VP samples increased rapidly that is due to preoxidant activity of used concentration garlic extract. Bacterial count of RS-VP and GR-VP samples were significantly lower than the rest samples. Psychrotrophic and Total count bacteria of CAP, VP and BHT-VP samples exceed from initial value 2.83, 2.71 to 7 log cfu/g after 9, 14, 18 days of storage. Based on Sensory, chemical and microbiological analyses, the shelf- lives of CAP and GR-VP samples were 9 days, VP samples 14 days and RS-VP and BHT-VP samples 18 days.

Keyword: Antibacterial and antioxidant activity, BHT, chilling, Rosemary and garlic extract, shelf life

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L-23

Study of oil uptake and some of quality attribute of potato chips affected by hydrocolloids.

R.Ezzati[1] , M.Dezyani[1],H.A.Mirzaei[2]

Use of coating agent is one of the effective ways to reduce oil absorption in fried products. Reducing fat content of fried foods by application of coatings is an alternative solution to comply with both health concerns and consumer preferences. The aim of this study was to analyses the effect of hydrocolloids as coating agent on the quantity of oil-uptake and sensory attributes of potato chips. The effect of coating composition showed that minimum fat content related to 1% Carboxymethyl cellulose (CMC), 0.5% xanthan, 0.3% guar and 1% xanthan with 21.220, 21.757, 22.383 and 24.840 percent respectively and the highest of fat content related to blank sample (non- coated), 2% Tragacanth, 0.5 guar gum with 49.383, 41.730 and 33.160 percent of oil content respectively The most effective coating agent reduced oil uptake by 57.03, 55.94, 54.67 and 49.71 percent respectively ($P<0.05$). Sensory evaluation showed that best color related to 1% CMC, 0.3% guar and 2% Tragacanth and by respect to flavor evaluation best flavor observed in Tragacanth 2%, CMC 0.5% and CMC 0.1 respectively and best texture refer to Tragacanth 2%, CMC 0.5% and CMC 1%. In sensory evaluation all coated chips get high score in compared with blank (non coated chips) samples ($P<0.05$ Key words: potato chips, coating, hydrocolloids and oil absorption.

L-24

Enzymatic liquefaction of texture-modified fillings in triple-shot confectionery products

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The one-shot or single-shot method is an advanced depositing technique for filled confectionery products which allows the time-controlled, simultaneous release of two viscous fluids through a 2-piston pumping unit and a release system consisting of a central, circular nozzle and a concentric cylindrical feed. As the mass flow at any time t is controlled, it is possible to deposit the masses in molds of a specific geometry. Main requirement is, however, that both filling and chocolate mass are comparable as regards density and viscosity at processing temperature. Therefore, it is to date not possible to produce pralines with liquid alcoholic fillings with this technique.

A novel strategy to overcome this limitation is to use a thickening agent which gives a filling viscosity at molding temperature (32 °C) of approximately 5 Pa.s, and an enzyme which is able to degrade the thickener once the praline is formed. A careful selection of thickener and enzyme is necessary because, for fulfilling industrial purpose, the high viscosity must be maintained for at least 3 hours, and enzymatic degradation should be completed within 2 weeks at 15 °C.

In our experiments, we used different starches as thickening agents and either added pure amylase or malt extract. The necessary dosage of the thickener significantly depended on the ethanol and moisture content of the filling which, in turn, determined the amount of enzyme or malt extract. Results of laboratory experiments where we deposited the fillings in pre-fabricated chocolate shells were confirmed by experiments in semi-industrial scale. Sensory analyses revealed that neither of the additives produces an off-flavour. Using this technique it was possible to achieve an ethanol content in the filling of 15 %.

L-25

Extrusion processing of deoiled rice bran in the development of biodegradable molded sheets
D.C. Saxena, Jadhav M. V.
In an attempt to move away from environmentally unfriendly plastics and other polymers, there is need to develop biodegradable, eco-friendly, medium water resistant composite from protein based by-products of cereal processing for agriculture planting purposes. Deoiled rice bran (DRB) obtained after extraction of oil from rice bran using solvent extraction method is a good source of protein (17-22%). Present research work is a step towards developing an eco-friendly and medium water resistant biodegradable material from deoiled rice bran. Molded sheets were developed by using twin-screw extruder and hydraulic press molding machine having combinations of deoiled rice bran (as a polymer), sawdust and varying percentage of glycerol (as a plasticizer). Protein solubility of deoiled rice bran increased with increased pH. Water binding capacity, solubility as well as the texture of molded sheets was found to be more superior in 0.4 G/P ratio as compared to other ratios. Molded sheets prepared using 0.4 G/P ratio degraded in 45 days, control sample which was prepared at 170°C molding temperature 30 min. time and sample having G/P ratio 0.6 degraded in 60 days and other samples got degraded in 75 days. The most significant conditions for preparation of molded sheets can be used as planting container, were barrel temperature 130°C, Flow rate 4g/s, Molding temperature 170°C, Molding time 30min. and G/P ratio 0.4. This biodegradable material can be used to form molded sheets to be used as planting container for agriculture in future.

L-26

Standardisation Of Thermal Processing Of Cuttlefish Nidamental Gland

P. M . Sherief , Bikash Kumar Pati

Cuttlefish nidamental gland in brine was packed in tin plate cans in 65 : 35 ratio (gland : brine) and thermal processed in an overpressure retort. The optimum blanching condition was found to be 5 % brine for 5 min. The retorting temperature and process time were selected as 121.1^{0}C and 25 min, respectively. The F_0 value attained by the process was found to be 11.25 min with total process time of 30.54 min. The processed product was found to be commercially sterile. The study showed that the cuttlefish nidamental gland can be used for ready to eat product, which can be stored at room temperature for long periods.

Keywords: cuttlefish, cuttlefish nidamental gland, heat penetration, sensory panel evaluation.

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L-27

Gel core nanoemulsions as new vehicles for food nutraceuticals

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Properties of water-in-sunflower oil (W/O) nano-emulsion with a gel core prepared by a low energy emulsification method are described in this paper. Mixed non-ionic surfactants were used to incorporate aqueous phase containing anthocyanin pigments into oil. The influence of the pH of continuous and dispersed phases, total surfactant concentration and the ratio of individual surfactants on the release of anthocyanin, its diffusion through the gel membrane as well as the stability of nano-emulsion was investigated.

The results showed that the system may be suitable for delivery of functional components and precise control over the release of encapsulated components during mastication and digestion to maximize adsorption.

Keywords: Nano-emulsion; Anthocyanin; Ostwald ripening; Coalescence; Release rate

L-28

Measuring moisture and fat contents of breaded-fried chicken nuggets using vis/nir hyper-spectroscopy

Alireza Yavari

Moisture and fat contents are two important parameters in quality evaluation of fried chicken nuggets. This study was undertaken to evaluate moisture and fat contents of fried breaded chicken nuggets using VIS/NIR hyper-spectroscopic technique. Breaded nugget samples were fried for different times in hydrogenated soybean oil in order to obtain various levels of moisture and fat contents.

Reflectance spectra of samples were collected within the range of 400-1750 nm using a spectro-radiometer. Partial Least Squares (PLS) calibration models were developed for quantitative evaluation of the two parameters. The R^2 and Root Mean Square Error (RMSE) for each prediction were calculated to assess the prediction capability of the model. R^2 values of 0.92 were obtained from cross validation of calibration for total moisture and fat contents. Validation of the calibration resulted in RMSE of 0.105 for moisture content and 0.017 for fat content predictions.

L-29

Frankfurters produced with tomato powder and reduced nitrite level

Esen Eyiler Yılmaz, Aydin Öztan

The aim of this study was to investigate the properties of frankfurters which were produced by both reducing the nitrite level and adding tomato powder. All samples were vacuum packed after production and stored at +4°C for 60days. Lycopene content of frankfurters and tomato powder, nitrosomyloglobin (NOMb) content, sensorial properties and the oxidation level of the frankfurters were investigated.

According to the results obtained addition of tomato powder reduced the pH of the frankfurters which was due to the acidic characteristic of tomato. Oxidation level was increased when the nitrite level was decreased which was expected because one of the main reason of adding nitrite to frankfurters is to reduce oxidation. Besides this addition of tomato powder decreased the level of oxidation in the samples. The acceptance of frankfurters were increased when tomato powder was added, mainly due to the increased redness in the samples which was also shown by the color measurements. While addition of tomoto powder increased the redness in samples, reducing the nitrite level resulted in decresed level of reddness because of the decresed level of NOMb.

L-30

Optimization of morphology and geometric parameters of encapsulated *Hypophthalmichthys molitrix* oil

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To improve the storage and operational stability fish oil containing eicosapantaenoic acid (EPA) and docosahexaenoic acid (DHA) were encapsulated. The gelatin/gum Arabic was used for encapsulating *Hypophthalmichthys molitrix* oil and the capsules were prepared by complex coacervation . The effect of stirring speed and kind of cross-linking agent were investigated. When glutaraldehyde was used as the cross-linking agent instead of formaldehyde and homogenization stirring speed was changed, results clearly showed significant differences in size and shape. Microcapsules showed spherical shape, smooth surface with no obvious dents and particle size distribution became narrower . The average particle size were 537.2±0.8 µm , 84.4±0.5 µm , 12.98±0.4 µm , 8.24±0.5 µm and 4 ± 0.7 µm at the homogenization stirring speed of 100 , 300 , 500, 750 and 1000 rpm , respectively . Microcapsules were analysed by optical microscopy technique and particle size analyzer. The best conditions were with 25% glutaraldehyde at 1000 rpm of stirring speed.

Key word : gelatin , gum Arabic , glutaraldehyde , cross linking agent , microcapsules , stirring speed , complex coacervation

L-31

Chemical characteristics and Biological activity of *Ulva lactuca* L sulphated polysaccharides

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Sulphated polysaccharides (SPS) of *Ulva lactuca* L (*Ul*-SPS) grown in both artificial and natural seawater media were extracted by hot water and 85% ethanol, followed precipitated with ethanol absolute and their chemical characteristic and biological property were investigated. All *Ul*-SPS extracts were characterized by HPLC and IR spectroscopy and show to be contains the similar type of polysaccharides family as ulvan. Six monosaccharides: rhamnose, xylose, glucouronic acid, mannose and fucose, and sulphates sugars were present in all *Ul*-SPS similar that of ulvan.

All *Ul*-SPS showed pronounce effect on the inhibition cell proliferation of two culture human cancer cell lines (breast adenocarcinoma cells, MCF-7 and hepatocellular carcinoma cells, HepG2), with an IC_{50} values ranged from 0.54 to 9.22 µg/ml, as compared to commercial antiviral novantron (IC_{50} 1.4 and 4.0 µg/ml, respectively). The various *Ul*-SPS extracts showed meaningful scavenging effects that of BHA and BHT in DPPH and ABTS radicals' assays. In addition, *Ul*-SPS extracts exhibited prominent antiviral and anticoagulant property.

Keywords: *Ulva lactuca*; Sulphated Polysaccharides characterization; Ulvan; Antiproliferation; HPLC; Anticoagulant and antiviral

Analysis of cream formation in green tea concentrate with different solid concentrations

Yong-Quan Xu, Su-Qin Chen, Hai-Bo Yuan, Ping Tang, Jun-Feng Yin

The formation of tea cream in the green tea concentrates of different solid concentrations (5, 10, 20, 30, 40, 50 and 60°Brix), and the chemical components of irreversible tea cream were investigated. The results showed a good positive correlation ($\gamma = 0.98$, $p \leq 0.05$) between the amount of tea cream and the solid concentrations from 5 to 40°Brix, while the amount of tea cream in the tea concentrates of 50 and 60°Brix decreased acutely, compared to the concentrates of 30 and 40°Brix. However, good positive correlations were also found between the amount of tea cream and the contents of total sugar ($\gamma = 0.97$, $p \leq 0.05$), caffeine ($\gamma = 0.98$, $p \leq 0.05$), flavones ($\gamma = 0.95$, $p \leq 0.05$), total catechins ($\gamma = 0.98$, $p \leq 0.05$) and gallated catechins ($\gamma = 0.95$, $p \leq 0.05$) which participated in tea cream formation in the green tea concentrates from 5 to 60°Brix. The large decrease of the amount of tea cream in the tea concentrates of 50 and 60°Brix may be induced by a sharp increase of the viscosity of the tea concentrates.

L-33

Rheological properties of reduced-fat model processed cheese spreads

M.Dezyani [1], R.Ezzati[1],H.A.Mirzaei

The objective of this research was to determine whether salt whey, obtained from a traditional Cheddar **cheese** manufacturing process, could be used as an ingredient in **Iraninian processed cheese**. Due to its high salinity level, salt whey is underutilized and leads to disposal costs. Consequently, alternative uses need to be pursued. The major components of salt whey (salt and water) are used as ingredients in **Iraninian processed cheese**. Three replicates of pasteurized **Iraninian processed cheese** (PC), pasteurized **Iraninian processed cheese** food (PCF), and pasteurized **Iraninian processed cheese** spread (PCS) were manufactured. Additionally, within each type of **Iraninian processed cheese**, a control formula (CF) and a salt whey formula (SW) were produced. For SW, the salt and water in the CF were replaced with salt whey. The composition, functionality, and sensory properties of the CF and SW treatments were compared within each type of **Iraninian processed cheese**. Mean melt diameter obtained for the CF and SW **Iraninian processed cheese**s were 48.5 and 49.4 mm, respectively, for PC, and they were 61.6 and 63 mm, respectively, for PCF. Tube-melt results for PCS was 75.1 and 79.8 mm for CF and SW treatments, respectively. The mean texture profile analysis (TPA) hardness values obtained, respectively, for the CF and SW treatments were 126 N and 115 N for PC, 62 N and 60 N for PCF, and 12 N and 12 N for PCS. There were no significant differences in composition or functionality between the CF and SW within each variety of **Iraninian processed cheese**. Consequently, salt whey can be used as an ingredient in PC without adversely affecting **Iraninian processed cheese** quality.

L-34

Formulation Optimization of Process Cheese using Enzyme Modified Cheese

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The effect of different levels of Ricotta cheese and Enzyme Modified Cheese on chemical, physical and sensory properties of processed cheese has been investigated.

Ricotta cheese was added at 0 % (control), 10 %, 20 % and 30 % and the added levels of Enzyme Modified Cheese were 0 % (control), 0.5%, 1% and 1.5%. Emulsifying salt and sodium chloride were added to all formulas at 1.5 % and 0.5 % respectively. Factorial experiment in a completely randomized design with 3 or 4 replicates for chemical and physical measurements and 14 replicates for sensory evaluation was used.

The results of chemical analysis showed that increasing the content of Ricotta cheese in processed cheese formulas leads to an increase in moisture and protein content, a decrease in fat content and no significant change in pH of end products.

The results of back extrusion test illustrated that when Ricotta level rises in processed cheese formula the resultant end product get harder, but the different levels of Enzyme Modified Cheese had no significant effect on hardness of processed cheese.

The results of sensory evaluation indicated that as the amount of Ricotta cheese increases in processed cheese formula, the spreadability, aroma, taste intensity and mouth feeling of processed cheese decline but overall acceptance increases up to 20% and then decreases at 30 % Ricotta cheese. Furthermore, the influence of increasing EMC level on spreadability was not significant, although it results in an increasing the aroma and taste intensity, mouth feeling and overall acceptance of the processed cheese.

L-35

Cheese making experiments in pilot and production scale revealed distinct differences in cheese yield and sensory quality as affected by the coagulant

Doris Jaros, Mandy Jacob, Harald Rohm

The limited supply of calf stomachs combined with an increasing cheese production necessitates the use of rennet substitutes. Since the 1960's aspartic proteases from mainly *Rhizomucor miehei*, *R. pusillus* and *Cryphonectria parasitica* have been important coagulants for the cheese industry. FPCs (fermentation produced chymosins) from GMO are now widely spread on the market, but there exist some legal restrictions within European countries. Aim of the study was to evaluate the effect of the clotting enzyme on cheese yield and on sensory characteristics of Gouda.

Cheese making experiments were performed in pilot scale (450 L, Gouda cheese) and in commercial scale using a calf rennet (80 % chymosin, 20 % pepsin) and a microbial rennet substitute from the last generation (derived from *R. miehei*). Two dairies were involved: dairy 1 (140,000 L milk to semi-hard cheese) and dairy 2 (5,000 L milk to Camembert). The amount of clotting enzyme was adjusted to result in the same stiffness of coagulated milk at the predefined cutting times. Vat milk, curd and whey were subjected to analysis of dry matter and protein content.

At all levels of scale the estimated solids transfer from milk to curd was significantly higher (0.50 - 1.19 %) when using calf rennet. This differences can be attributed to an enhanced loss of small protein fractions into the whey, which results from higher casein degradation because of a more pronounced proteolytic activity of the microbial clotting enzyme. Enhanced casein breakdown during long-term Gouda maturation is responsible for a significantly increased bitterness in cheeses made with microbial rennet substitute as perceived in forced-choice paired-comparison test.

L-36

Factors affecting Penicillium roquefortii (Penicillium glaucum) in internally mould ripened cheeses: Implications for pre-packed blue cheeses.

Andrew C. Fairclough

To our knowledge the cheese industry both Nationally and Internationally, is aware of the loss in colour of pre-packaged internally mould ripened blue cheeses; after reviewing data published to date it would appear that no work has been undertaken to explain why this phenomenon is occurring which makes this work novel. The amount and vivid colour of blue veins of internally mould ripened cheeses are desirable quality characteristics. It is therefore important that there is a sufficient amount of veining and that it maintains its blue appearance to be appealing to consumers therefore leading to maximised sales potential and profit for the manufacturing company.

The work undertaken in this study determined that the factors for optimum *in vitro* growth of *Penicillium roquefortii* (strain PRB6) were: a temperature of 20 °C ± 2 °C, pH of 6.0 ± 0.1, and a relative humidity of 70%. Optimum *in vitro* growth mimicking the conditions typically found in pre-packed blue cheeses, and using lactose as the sole carbon source, was facilitated by a gas mixture of 5% Oxygen/0% carbon dioxide/balance nitrogen).

Further *in vitro* studies have also shown that the increasing 'in pack' carbon dioxide concentration not only depresses the growth of *P roquefortii* but also affects immature conidiospore pigmentation (no effect has been seen on mature conidiospore pigmentation).

The implications of this study suggest that the majority of pre-packed internally mould ripened blue cheeses on sale in supermarkets are packaged in inappropriate materials.

L-37

Intervarietial variations in proximate composition and antioxidant potential of dry peas (*Pisum sativum* L)

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This research work was carried out to investigate the intervarietial variations in proximate composition and antioxidant potential of dry pea (*Pisum sativum* L.). The dry pea's samples after grinding were extracted using stirring method with 100 and 80 % methanol. The proximate composition in terms of moisture (7.00 - 8.50%), ash (3.85 – 4.97%), fibre (3.8 - 12.3%) and protein (17.3- 18.8%) contents varied significantly with respect to various cultivars. The antioxidant potential of extracts was assessed using some antioxidant assays like estimation of total phenolic contents (TPC), total flavonoids contents (TFC), percentage inhibition of peroxidation of linoleic acid system, reducing power and DPPH free radical scavenging capacity. TPC, TFC, reducing power, %inhibition of peroxidation in linoleic acid system and DPPH radical scavenging capacity of different dry peas extracts were found in range of 0.651-0.684 g/100g of GAE, 0.021-0.041 g/100g of CE, 0.713-0.895, 40.051-84.608%, 18.097-24.591 mg/mL, respectively. The amount of TFC, and %inhibition of peroxidation in linoleic system of different dry peas extracts varied significantly but non significant variations were found in the amount of TPC, DPPH radical scavenging capacity and reducing power among various cultivars and solvents. From the results of present investigations it is reasonable to say that methanolic extracts of dry pea's have exhibited varying degree of antioxidant activity.

L-38

Efficiency and ripeness of traditional white and ultrafilteration cheese as affected by psycrotrophic bacteria

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During cheese ripening, some of water insoluble casein change to water soluble nitrogen which are include intermediate hydrohysate protein and free amino acids. In this work, ripening and efficiency of traditional white and UF cheese as affected by psycrotroph bacteria was investigated. The result of this research showed that amount of psycrotroph bacteria on the white and UF cheese was significant. Also, there was a good correlation between psycrotroph bacteria and ratio of soluble nitrogen to total nitrogen during ripening period. In fact, as the psycrotroph bacteria increase, the ratio of soluble nitrogen to total nitrogen will be increased during ripening period. The percent of N recovery (efficiency index) for UF and traditional white cheese was 88.01-90.45 and 77.23-80.52, respectively. The effect of changing above parameter on UF cheese is more than white cheese.

L-39

Quick and automated approach to screening of beta-agonists in urine

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β-agonists are synthetically produced compounds that, in addition to their bronchodilatory and tocolytic effects, can promote live weight gain in the food producing animals. There have been documented cases when consumption of liver and meat from animals illegally treated with clenbuterol has resulted in serious human intoxication[1]. Due to their adverse effects, the use of clenbuterol and its analogues from the beta-agonists group has been banned by the European Union[2] and other regulatory agencies worldwide.

Current methodology used for screening of beta-agonists in urine typically employs laborious extraction and clean-up steps followed by LC/MS/MS or LC/accurate mass MS determination. There is however a need for quick and simple methods allowing rapid screening of urine samples without a manual sample processing steps. The presentation will show a newly developed method applicable for screening of priority beta-agonists in urine based on the fully automated online sample preparation procedure using the Turboflow™ chromatography clean-up step and a detection with the new Exactive MS system based on the proven Orbitrap™ technology. Method performance parameters and the applicability for fast and simple screening of veterinary drug residues will be thoroughly discussed.

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L-40

The health hazard risk associated with the consumption of raw meat in Ethiopian society

Sanjay Goyal

Ethiopian society prefers to consume raw uncooked meat which is a reservoir of micro flora. It also intends to cause of short span of life of populations. The basic fundamentals of hygiene and sanitation are almost poor in most of the butcheries in Ethiopia. This can cause serious outbreak and surveillance to the nations. The knowledge and awareness of diseased animals are not well recognized in Ethiopian society, where civilization is not premature enough. Animal foods undergo deteriorations of varying degree in their organoleptic properties, nutritional value ,safety and aesthetic appeal. in this sense most meats from the time they are slaughtered undergo progressive deterioration ,which depending upon the condition of animals it render the meat virtually useless in a matter of hours.

The consumption of large quantities of animal products generally is well correlated with the affluence of a society. Nevertheless the human appetite always has had a strong preference for animal foods.

No society and no generation can groom and grow by unmannered and uncivilized way of eating pattern of resources which is found in any country. Ethiopia has a very plentiful basket of animal cattles in the African continent and having top ranking.
By leaving culture bias and belief of raw meat consumption .The unhealthy way of consumptions will leads to the generations in to sick and vulnerable mass.

This Research develop capacity building to judge and grading by proper inspection of animal and their meats and dissemination of the safe practice of hygiene, slaughtering at all level, the safe meat consumption practices and the disadvantages of raw meat consumption by road show.

L-41

Application of Genetic Algorithm in optimization of low fat ice-cream formulation

Majideh Jamshidi

The fat reduction influences the characteristics of the resultant ice-creams by affecting their rheological properties and affects the consumer acceptance of low-fat product. Simplesse and Maltodextrin as fat replacers in low-fat ice-creams can improve the properties of these products. Type and amount of fat and fat replacer affect by different considered objectives such as functional properties (high viscosity and overrun, low hardness and melting rate), the nutritional properties (low-calorie) and the price of product. Single and multi objective optimization method based on the GA were applied to select the suitable fat-free and low-fat ice-cream formulations. The results of Single-Objective optimization showed that the ice-cream contain 3.5% Simplesse and 1.72% fat and 2.95% Maltodextrin and 1.87% fat will have the best fitting of considered objectives. Multi-Objective optimization produced a range of solutions (fat and fat replacer contents) which the users can select a solution most suitable to their own need, depending on the importance they attach to each objective.

L-42

The Effect of Cultivar Variety on Bioactive Compounds of Flax Seed *(Linum usitatissimum)*

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The fat reduction influences the characteristics of the resultant ice-creams by affecting their rheological properties and affects the consumer acceptance of low-fat product. Simplesse and Maltodextrin as fat replacers in low-fat ice-creams can improve the properties of these products. Type and amount of fat and fat replacer affect by different considered objectives such as functional properties (high viscosity and overrun, low hardness and melting rate), the nutritional properties (low-calorie) and the price of product. Single and multi objective optimization method based on the GA were applied to select the suitable fat-free and low-fat ice-cream formulations. The results of Single-Objective optimization showed that the ice-cream contain 3.5% Simplesse and 1.72% fat and 2.95% Maltodextrin and 1.87% fat will have the best fitting of considered objectives. Multi-Objective optimization produced a range of solutions (fat and fat replacer contents) which the users can select a solution most suitable to their own need, depending on the importance they attach to each objective.

L-43

Quantitative trait locus analysis for textural properties traits of Chinese Northern-Style steamed bread

Peng Wu, Jichun Tian

The textural parameters of quality traits of Chinese Northern-Style steamed bread were derived from Texture Profile Analysis(TPA). Quantitative trait locus (QTLs) for textural properties of Chinese Northern-Style steamed bread of wheat were studied using a doubled haploid (DH) population containing 168 progeny lines derived from a cross between two elite Chinese wheat cultivars Huapei 3 and Yumai 57 (Triticum aestivum L.). The DH population and the parents were planted in 2007 and 2008 in Tai'an and 2008 in Suzhou. QTL analyses were performed using the software of QTL Network version 2.0 based on the mixed linear model. Seven putative QTLs for steamed bread's textural properties traits were detected on six chromosomes,3B,2A,1B, 3A, 3D and 6B. The total QTLs explained 66.07% of the phenotypic variation, with additive effects 2.48%, epistatic effects 11.78%, and QEs 51.81%. The results showed that both additive effects and epistatic effects were important genetic bases of Chinese steamed bread's textural property which were subjected to environmental modifications, and caused dramatic changes in phenotypic effects. The information obtained in this study will be useful for manipulating the QTLs for Chinese steamed bread's textural property by molecular marker-assisted selection (MAS).

L-44

Microstructure of Iranian Process Cheese

M.Dezyani [1], R.Ezzati[1], H.A.Mirzaei

The effects of the concentration of trisodium citrate (TSC) emulsifying salt (0.25 to 2.75%) and holding time (0 to 20 min) on the textural, rheological, and microstructural properties of Iranian Processed CheeseCheddar cheese were studied using a central composite rotatable design. The loss tangent parameter (from small amplitude oscillatory rheology), extent of flow (derived from the University of Wisconsin Meltprofiler), and melt area (from the Schreiber test) all indicated that the meltability of process cheese decreased with increased oncentration of TSC and that holding time led to a slight reduction in meltability. Hardness increased as the concentration of TSC increased. Fluorescence micrographs indicated that the size of fat droplets decreased with an increase in the concentration of TSC and with longer holding times. Acid-base titration curves indicated that the buffering peak at pH 4.8, which is due to residual colloidal calcium phosphate, decreased as the concentration of TSC increased. The soluble phosphate content increased as concentration of TSC increased. However, the insoluble Ca decreased with increasing concentration of TSC. The results of this study suggest that TSC chelated Ca from colloidal calcium phosphate and dispersed casein; the citrate-Ca complex remained trapped within the process cheese matrix. Increasing the concentration of TSC helped to improve fat emulsification and casein dispersion during cooking, both of which probably helped to reinforce the structure of process cheese.

L-45

Studies on sensory evaluation of chemically preserved mushrooms through response surface method

Dr Sarfraz Hussain

In developing countries, lack of functional storage facilities, inadequacy of transportation and communication increase the necessity of using certain food additives for the purpose of food preservation. In tropical regions, high temperature and humidity favour microbial attack, and increase the rate of development of oxidative rancidity. Use of antimicrobial agents is more justified in these countries than in those having temperate climates. It should be recognized that the greater risk associated with the augmented use of food additives must be weighed against the benefits gained from preventing food losses and making more food available for areas in which it is needed. In such circumstances, food additives can be used to supplement the effectiveness of traditional methods of food preservation rather than to replace them. Three varieties of commercially cultivated Mushrooms grown on cotton waste (A. *bisporus*, A. *bitorquis* and P. *ostreatus*) were preserved in steeping solution for 90 days by the use of chemical additives (Potassium metabisulfite, sodium benzoate, Citric acid, Acetic acid, sodium chloride, Ascorbic acid, and Potassium sorbate), the culture of *A. bitorquis* (AGS-W20) was originally obtained from HRI wellsbourne, U.K. which showed maximum enzyme activity and flavour characteristics. At the end of study period preserved mushrooms were evaluated for their sensory characteristics as colour, flavour, taste and texture by hedonic scale ranking method and the results were interpreted through generating contours using Response surface statistical technique.

L-46

Assessment of the nutritional value of wild root tubers vegetable consumed in the behbahan of iran: a preliminary study

Prof. Ali Aberoumand

Most of nutrient requirements can be met by increasing the consumption of fruits and vegetables to 5–13 servings/day. In addition to meeting nutrient intake levels, greater consumption of fruits and vegetables is associated with reduced risk of cardiovascular disease, stroke, and cancers of the mouth, pharynx, esophagus, lungs, stomach, and colon. The proximate composition and mineral constituents of *Chlorophytum comocum* root tubers were evaluated. The root tubers contained a ashes: 10.38%,crude protein: 4.54%, crude lipid: 2.00%, crude fiber: 17.24%, and carbohydrates: 65.84%. The leaves and stem also have high energy value (299.52kcal/100g)dry weight. Mineral ranges (mg/100g dry weight, DW) were: K (4.29), Na (3.95), Ca (13.14), Fe (1.89), and Zn (0.76). Comparing the root tubers mineral contents with recommended dietary allowances (RDA), the results indicated that *Chlorophytum comocum* root tubers could be a good supplement for some nutrients such as calcium, fibre and carbohydrates. The root tubers could be promoted as a carbohydrate supplement for cereal-based diets in poor rural communities. One discussed drawback to the use of vegetables in human nutrition is their high fibre content, which may cause intestinal irritation and a decrease of nutrient bioavailability.

Keywords:*Chlorophytum comocum*; micronutrients; proximate and mineral composition; root tubers.

P-01

Chemical composition and antimicrobial activity of the essential oil of

Thymus kotschyanus Boiss & Hohen.

Hamzeh Amiri*[1], Hossein Lari Yazdi[2], Fatemeh Jaidari[2], Nasrin Valipoor, Frozan Karimzadeh

The essential oil from leaves of *Thymus kotschyanus*. (Lamiaceae), obtained by hydro-distillation was analysed by gas chromatography–mass spectrometry (GC–MS) and also evaluated for in vitro antimicrobialactivity. From the 72 compounds representing 99.4% of the oils, thymol (39.8%), gamma-terpinene (11.5), carvacrol (8.6%), borneol (6.3%) and cymol (6.3%) appear as the main components. The oil was screened for antimicrobial activity against both Gram positive (*Staphylococcus aureus, Staphylococcus saprophyticus.*) and Gram negative (*Escherichia coli, Pseudomonas aeruginosae*) bacteria. The oil of *Thymus kotschyanus* showed the strongest antibacterial activity against of *Pseudomonas aeruginosae* while this oil was moderately active against of other studied bacteria. Results presented here may suggest that the essential oil of *T. kotschyanus* possesses antimicrobial properties, and is therefore a potential source of antimicrobial ingredients for the food and pharmaceutical industry.

Key words: antimicrobial activity, essential oil, *Thymus kotschyanus*

P-02

Evaluation of protein content, lysine and sulfur-containing amino acids content and electrophoretic patterns of soluble proteins for gamma irradiated semolina before and after milling of durum wheat

Firas S. Azzeh

Influenced of gamma irradiation (0, 0.25, 1, 2.5, 5 and 10 kGy) on total nitrogen, lysine and sulfur-containing amino acids content and electrophoretic patterns of soluble proteins of semolina was studied. The effect of irradiation before and after milling of durum wheat grain on previous parameters was also investigated. Protein content of semolina was not affected with gamma irradiation before and after milling. Up to 10 kGy dose, cystine and methionine were not significantly ($P \leq 0.05$) changed, although they increased slightly with increasing irradiation dose. Lysine content decreased significantly ($P \leq 0.05$) at irradiation dose higher than 5 kGy. At 10 kGy dose, lysine decreased 5% and 14% for irradiated semolina and that obtained from irradiated wheat grains, respectively. The bands number and intensity of soluble proteins decreased with increasing irradiation dose higher than 5 kGy, as shown on SDS-PAGE electrophoresis. Irradiated semolina and semolina obtained from irradiated wheat grains at 10 kGy showed 13 and 15 bands, respectively. Unirradiated sample showed 19 bands.

P-03

Iron-deficiency anaemia in pregnancy – is there a role for functional foods?

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Iron-deficiency anaemia is a condition affecting as many as 1 in 2 pregnant women[1]. Previously, high-dose iron supplements have been recommended for the treatment and prevention of this condition. However, these have been associated with a range of side- effects, including gastrointestinal perturbations[2] and compliance to iron supplementation programmes is generally inadequate[3].

Food-based approach is one way to help women attain dietary recommendations for iron whilst reducing the risk of side-effects associated with high-dose iron supplements. Teff (*Eragrostis tef*) which forms a staple food consumed in Ethiopia (usually in the form of *Enjera*, a flat bread) is a naturally rich source of iron. The iron-content and frequency of consumption of this food source have been linked to reduced rates of iron-deficiency anemia in this region[4]. However, there is a scarcity of research supporting this theory and lack of published evidence within this field.

At MMU we are currently in the process of developing breads containing Teff flour and grain and determining the bioavailability of iron from these food sources. In the second phase of the study we plan to undertake a double-blind randomised controlled trial to establish whether incorporating Teff bread into the daily diet may be an alternative way to improve iron status in pregnancy.

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P-04

Optimization of medium composition for the production of polygalacturonase from a new mutant Aspergillus sojae strain by submerged fermentation.

Canan Tarı, Nihan Göğüş, Hande Demir, Marcello Fernandez Lahore, Doreen Heerd

Pectinases are one of the commercially important enzymes which have wide applications in the food, textile, paper and waste water treatment industry. In food industry, pectinases hold a share of 25% in the global sales and find wide variety of applications such as clarification of fruit juices, extraction of vegetable oils, curing of coffee. Polygalacturonases (PG) are the most abundant ones among all the pectinolytic enzymes that hydrolyze the polygalacturonic acid chain. In this study the polygalacturonase production potential of a new mutant strain (*Aspergillus sojae* M3) was investigated and medium composition was optimized in order to enhance the enzyme activity.

It is known that for the production of fungal pectinases, the selection of the strain and the formulation of a balanced culture medium containing carbohydrates, nitrogen source, vitamins and mineral salts are critical aspects. Therefore screening and optimization studies with D-optimal experimental design and statistical tools were performed to optimize the carbon and nitrogen sources for the production of PG from *Aspergillus sojae* M3. At the screening step, the effects of carbon (pectin, sucrose, starch) and nitrogen (urea, ammonium sulphate, yeast extract) sources and the agitation speed (150, 250, 350 rpm) were determined. It was found that maximum enzyme activity was achieved when pectin is used as C source at 350 rpm agitation speed but nitrogen sources has no significant effect on PG activity. According to these results the concentrations of the important sources, ammonium sulphate and pectin were optimized between the levels of 0-16g/l and 0-40g/l respectively.

P-05

THE UTILIZATION OF BONITO FLESH AS FISH BALL

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Pectinases are one of the commercially important enzymes which have wide applications in the food, textile, paper and waste water treatment industry. In food industry, pectinases hold a share of 25% in the global sales and find wide variety of applications such as clarification of fruit juices, extraction of vegetable oils, curing of coffee. Polygalacturonases (PG) are the most abundant ones among all the pectinolytic enzymes that hydrolyze the polygalacturonic acid chain. In this study the polygalacturonase production potential of a new mutant strain (*Aspergillus sojae* M3) was investigated and medium composition was optimized in order to enhance the enzyme activity.

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P-06

Evaluation of Food Safety of home-made soy-cheese in South-West Nigeria.

Fasoyiro Subuola Bosede

Background: Soy-cheese is a cholesterol-free, cheap source of plant protein and minerals that is highly digestible. With the awareness of the nutritional and health benefits of soy-cheese, it is usually consumed by the rural and urban poor people in South -West Nigeria that could not afford the expensive animal protein diets. Soy-cheese is a high moisture food, coupled with its high protein and fat contents makes, it a high risk food. It is however mostly prepared by women or mothers in their homes having little or no knowledge of Good Hygiene Practices. Home-made soy-cheese has become a household income generating activity in South-West Nigeria. Previous reports confirmed presence of coliforms form locally processed soy-cheese samples from South-West Nigeria (Fasoyiro, 2008). These microbial hazards pose health risks to the consumers especially little children.

Objective: The purpose of the study is to investigate the physical and chemical hazards associated with home-processed soy-cheese.

Method: Thirty women were assessed for their methods of processing of soy-cheese in Ibadan, Nigeria. The women were visited in their kitchen and observations were made and recorded on sources of hazards noticeable in the processing methods.

Results- General processing methods utilized by the women include sorting of soybean seeds, washing, soaking, milling, boiling , coagulant addition and molding into soy-cheese. Improper sorting of soybeans with dirts, stones and foreign objects were noticeable, 95% of the processors utilized untreated well water for processing. Grinders used in milling and some knives for cutting the cheese were highly susceptible to rust subjecting the products to contamination. Improper cleaning and handling of utensils and cheese-cloth were noticeable.

Conclusion: Home-made processors of soy-cheese needed to be trained on simple food hygienic practices that will ensure safety of consumers.

Key words: food hazards, soy-cheese, local processor, Nigeria

P-07

In Vitro digestibility of pasta make with blend of common bean flour - semolina

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Pasta is a traditional product generally obtained from semolina that is considered the best raw material; its consumption has increased due its ease of transportation, handling, cooking and preparation. Past is recognized as low in sodium and fat with no cholesterol and a rich source of complex carbohydrates producing a low post-pandrial response to glucose and insulin in the blood. Several authors have been adding different ingredients to pasta to increase their nutritional values including common beans but these studies are not focus on the digestibility. The objective of this work was to evaluate in vitro digestibility of pasta making with blend of semolina – common bean flour. Pasta was obtained at four concentration of common bean flour (0, 15, 30 and 45 %), dried at 70°C. Total, resistant and available starches, soluble and insoluble fiber, glycemic index, in vitro protein digestibility were evaluated at all experimental samples. Data analysis was done by ANOVA and Tukey test (α=0.05). Lowest value for total starch was observed for pasta (45% bean flour) (55%); lowest value for available starch was observed in pasta (45% bean flour) (50%). The Highest value of resistant starch was observed for pasta with (45% bean flour) (6.5 %). Highest value of insoluble fiber was obtained in pasta with (45% bean flour) (26%). Low values of glycemic index were obtained for pasta (45% bean flour) (GI = 52). Highest value of PD was showed by pasta (45 % bean flour).

P-08

Effects of ozone on foaming properties of proteins

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Pasta is a traditional product generally obtained from semolina that is considered the best raw material; its consumption has increased due its ease of transportation, handling, cooking and preparation. Past is recognized as low in sodium and fat with no cholesterol and a rich source of complex carbohydrates producing a low post-pandrial response to glucose and insulin in the blood. Several authors have been adding different ingredients to pasta to increase their nutritional values including common beans but these studies are not focus on the digestibility. The objective of this work was to evaluate in vitro digestibility of pasta making with blend of semolina – common bean flour. Pasta was obtained at four concentration of common bean flour (0, 15, 30 and 45 %), dried at 70°C. Total, resistant and available starches, soluble and insoluble fiber, glycemic index, in vitro protein digestibility were evaluated at all experimental samples. Data analysis was done by ANOVA and Tukey test (α=0.05). Lowest value for total starch was observed for pasta (45% bean flour) (55%); lowest value for available starch was observed in pasta (45% bean flour) (50%). The Highest value of resistant starch was observed for pasta with (45% bean flour) (6.5 %). Highest value of insoluble fiber was obtained in pasta with (45% bean flour) (26%). Low values of glycemic index were obtained for pasta (45% bean flour) (GI = 52). Highest value of PD was showed by pasta (45 % bean flour).

P-09

Influence of tempering with ozonated water on the selected properties of wheat flour

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Soft and hard wheat samples were tempered using ozonated water (1.5 and 11.5 mg ozone/L). Milling (rate of extraction), rheological (farinograph and extensograph characteristics), chemical (protein, falling number, sedimentation volume), colour (Hunter Lab values) and microbiological (total bacterial and yeast/moulds) properties of the parent flours were evaluated. Results indicated that tempering with ozonated water did not significantly alter the chemical, physical and rheological properties of the flours. A statistically significant reduction in the total bacterial and yeast/mould counts were obtained after tempering with ozonated water ($p \leq 0.05$). Results suggest that the water ozonated up to 11.5 mg ozone/L can be successfully used in the tempering of soft and hard wheat without deterioration in the flour quality.

P-10

Inclusion of whey proteins in cheese curd through heating and microfiltration

Doris Jaros, Cora Chromik, Claudia Partschefeld, Thomas Henle, Harald Rohm

For improving the nutritional quality of cheese but also cheese yield, several attempts have been made to incorporate whey proteins into the cheese matrix. This poster reports on a project where we intended to adjust the denaturation degree of the whey proteins in cheese milk by heating. Subsequent concentration by microfiltration aimed to counteract the reduced rennetability which is frequently observed for heated milk.

After targeted whey protein denaturation through heating, skim milk was concentrated to concentration factors of 1.5 and 2. Unconcentrated and unheated milk served as control. After adjusting the fat content of the vat milk with cream and rennet-induced coagulation, the curd was cut and separated from the whey. Vat milk volume was 300 – 500 L, depending on the concentration factor. Processing steps were carefully adjusted to ensure a moisture content of the cheeses of approximately 50 %. Cheese yield was estimated by establishing mass balances, and the cheeses were analysed up to an age of 12 weeks.

In cheeses made from heated milk a higher amount of cysteine indicated a successful integration of whey proteins into the matrix. As measured by degree of proteolysis, maturation was slightly delayed with increasing heating intensity and higher concentration through microfiltration. Sensory assessments showed that the cheeses with whey proteins were insignificantly different from the control products. As the heat treatment intensity of the cheese milk increased, the protein content in both whey and permeate decreased. The corresponding numbers show that, within certain limits, the heat-induced denaturation of whey proteins is, when combined with microfiltration, an appropriate tool for their incorporation in the cheese and, hence, for yield improvement.

P-11

Purification and characterization of rice bran calmodulin

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Introduction: As an important Ca^{2+}-sensing protein in plants, calmodulin (CaM) plays its role in regulating cellular responses by activating specific CaM-binding proteins (CaMBPs). Glutamate decarboxylase (GAD) in some plants were found to be regulated by CaM.

Results and discussions: Rice bran calmodulin (RbCaM) was purified by Phenyl Sepharose CL-4B with the molecular weight of 17221.89 tested by mass spectrum. The UV-visible spectra、fluorescence spectra and circular dichroistic spectra were taken to study the structure of RbCaM. The structure of RbCaM changes in the medium with or without Ca^{2+}. The secondary structure of RbCaM was summarized by the results of circular dichroistic spectra and bioinformatics prediction: α-helix of 30%-50%, β-sheet of 0%-10%, β-turn of 0%-30% and random coil of 27%-44%. “Homology Modeling” study of RbCaM structure failed for no templet was found. But several fold regions were recognized by “Fold Recognition”. And the prediction result of PredictProtein server showed that RbCaM appears as compact, as a globular domain and may have Protein kinase C phosphorylation site、N-myristoylation site and Oleosins signature in it. The effect of RbCaM on rice bran glutamate decarboxylase (RbGAD) were also studied. The results showed that RbGAD was a kind of Ca^{2+} dependent CaM binding protein. The activity of RbGADL3 was regulated by Ca^{2+}/RbCaM. 6μg RbCaM was needed to half-active 1mg of RbGADL3 at the Ca^{2+} concentration of 0.23mmol/L.

Key words: Rice bran; Glutamate decarboxylase; Calmodulin

P-12

Wild Wrack (Ascophyllum nodosum) – A replacement for salt (as sodium chloride) in bread products.

Andrew Fairclough and Kritika Mahadevan

Purpose: FSA salt reduction targets for 2012 recommend 1g and 1.2g of salt/100g for bread and breads with additions respectively. A pilot study was conducted to evaluate the effect of Seagreens Human Food Quality Wild Wrack Seaweed (*Ascophyllum nodosum*) as a replacement for salt in bread products.

Methodology: Coarse and fine grade Seagreens *Ascophyllum nodosum* containing 0.09g salt/g were incorporated separately into standard white and wholemeal bread recipe as 50:50 wrack:salt or 100% salt replacement. This reduced the salt content of the loaves to 0.6g/100g and 0.09g/100g bread respectively. Controls (1.1g salt/100g loaf) were used for comparison. For breads with additions i.e. sundried tomato and basil bread, only coarse wrack at 50% and 100% salt replacement were included with controls having 1.3g salt/100g loaf. Sliced samples with no butter were presented to 12 panellists for assessment of bake and sensory qualities.

Result: In wholemeal and white bread, samples containing 50:50 coarse wrack:salt were preferred (67% and 75% respectively) followed by 50:50 fine wrack:salt (13% and 17%) and control (20% and 8% respectively). Total salt replacement with wrack elicited some negative organoleptic attributes in terms of darker appearance of crumb, sea/fishy flavour and cardboard-like texture. Sundried tomato and basil bread with 100% coarse wrack (0.3g salt/100g bread) was preferred by all panellists with no negative effect on bake and sensory quality. This study demonstrates for the first time that Seagreens *Ascophyllum nodosum* is a potential replacement for salt and can be used to achieve salt levels below the recommended limit specifically in breads with additions.

P-13

Effect of season on free amino acids content in cassava, sweet potato and cocoyam leaves

Margaret Maoni

Tropical root and tuber crops' leaves contribute significantly towards improving the livelihoods of the resource poor. A study was conducted to determine free amino acids content in three varieties of Malawian cassava, sweetpotato and cocoyam leaves. Free amino acids were determined using EZ: faast free amino acids analysis kit method and the samples were run on a GC/MS. The results revealed that all the three leaves contained some essential (isoleucine, leucine, lysine, methionine, phenylalanine, threonine and tryptophan) and non essential (asparagine, aspartic acid, glutamic acid, glutamine, tyrosine and serine) amino acids with cassava leaves on the lead. Free amino acid levels were higher in cassava leaves than the two leaves especially during the rainy season. Most essential amino acids were more favoured during the dry season than rainy season in sweetpotato and cocoyam leaves. Generally, season significantly influenced amino acid levels of the three leaves ($p<0.05$). Cassava leaves contained more of the essential amino acids than the two leaves though some were limiting or deficient. Based on amino acid score, cassava leaves have a better protein quality followed by cocoyam leaves .

Key words: Cassava, sweetpotato, cocoyam, leaves, free amino acids, season.

P-14

Beta-Galactosidase Activity of Bifidobacterium spp

Christopher, V. Padmanabha Reddy and K. Venkateswarlu

Probiotic fermented milk products containing *Bifidobacterium* spp. specifically selected for dietary benefits, are recently gaining entry into Indian markets. Beta-galactosidase (β-Gal) activity is often used as an indicator of the ability of *Bifidobacterium* spp. to reduce lactose intolerance. β-Gal activity of ten strains (including three faecal isolates) of *Bifidobacterium* spp. was assessed by determining o-nitrophenol released from the hydrolysis of o-nitrophenyl β-D-galactopyranoside (ONPG). The values for β- Gal activity were found to be ranging from 0.76 to 1.86 units/ ml (expressed as µmol of o-nitrophenol released per min) of skim milk. Commercial strains of *B. animalis* and *B. longum* had a higher β -Gal activity ($P \leq 0.05$) compared to *B. bifidum,* while wild isolates showed a poor β-Gal activity with ≤ 0.97 units/ml. *B. animalis* BB 12 showed highest β -Gal activity with 1.86 units/ml, followed by *B. longum* BB 536 (1.82 units) and 1941 (1.80 units). Among *B. bifidum* strains, DSM 20456 and NCDC 229/A had a higher β-Gal activity with 1.61 and 1.59 units/ml, respectively and differed significantly ($P < 0.05$) with other strains of *B. bifidum.* Wide variations were observed in the β- Gal activities of *Bifidobacterium* spp. and as such careful screening and selection of *Bifidobacterium* spp. is required for when they are used for probiotic purposes.

P-15

Antioxidant Activity of Peel Fraction of Seven Pomegranate

Mehrosadat Mirmohammadi

Antioxidant capacity and total phenolic of peel fraction of seven pomegranate varieties grown in Iran were determined. The effect of maturation on antioxidant activity was also determined. The results showed that Pust Ghermeze Shirin (sweet taste with red peel) had the highest antioxidant value among all varieties and followed by Pust Sefeede Shirin (sweet taste with white peel), Yazdi (sub acid taste with pink peel), Pust Ghermeze Torsh(sour taste with red peel), Pust Sefeede Torsh (sour taste with white peel), Malas (sub acid taste) and Makhmali (sub acid taste with velvet peel).Maturation of pomegranate increased the antioxidant capacity.

Key Words: Pomegranate, Peel, Antioxidant activity, Ripe, Unripe.

P-16

Physicochemical Characteristics of honey samples from phytogeographical areas of Burkina Faso

Dr Issa NOMBRE

Burkina Faso is in West part of Africa. It has been subdivided in four phytogeographical areas. In these areas, traditional and modern beekeeping was practised because it is a monetary incomes generating activity that can alleviates poverty of rural world. While the honey production goes through a control and a respect of production techniques whose main aim is the production of honey in quantity and particularly respecting the international norms of the Codex alimentarius in concerning its quality. The aim of this work is to assess the quality of honey produced by Burkinabe Faso beekeepers and to appreciate the action of the phytogeographical parameters on the honey Quality. Several honey samples coming from the four phytogeographical areas of Burkina Faso were analyzed according to the harmonised methods of the European Honey Commission. The actions of the phytogeographical factors as temperature, moisture and rainfall on honey physicochemical and organoleptic parameters were followed.

Honey samples analysed fulfilled the quality norms for the Codex and even for the European Union. The phytogeaographical areas with their different vegetations, climates have an impact on honey physicochemical characteristics and particularly on honey storage. According to phytogeographical parameters, honey consumption deadline must be reduced to one year.

P-17

Probiotic activity of yogurt bacterial strains grown in soya milk vs. cow's milk

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Probiotics are microorganisms that confer health benefits when ingested as part of food products. These effects depend on strain-specific characteristics and are further modulated by environmental factors. In order to introduce probiotics into a greater range of food products it is important to test their probiotic properties in different food environments.

Aim: To analyse and compare the probiotic properties of some yoghurt strains of lactic acid bacteria when grown in soya milk vs. cow's milk.

Methods: *Lactobacillus delbrueckii* ssp*. bulgaricus, Streptococcus thermophilus* and *Lactobacillus helveticus,* isolated from Alpro soya yoghurt and *Lactobacillus johnsonii* (Nestlé), were each grown in cow's milk and soya milk as single cultures and mixed cultures. Growth patterns, antibiotic resistance and tolerance to simulated gastric and pancreatic juice were analysed.

Results: Growth rates of *S. thermophilus* were not significantly different in both media ($p<0.05$) but there were significant differences in the case of *L. bulgaricus, L. helveticus* and *L. johnsonii* ($p<0.01$)*. L. johnsonii* appeared to be more sensitive to chloramphenicol (10 µg), erythromycin (10 µg) and tetracycline (10 µg) when grown in cow's milk than when grown in soya milk (halo diametre mean differences of 1.5, 2.5 and 0.5 mm respectively). Also, *L. johnsonii* grown in cow's milk appeared to be weakly resistant to pancreatic juice.

Conclusion: *L. johnsonii, L. helveticus, L. bulgaricus* and *S. thermophilus* exhibited different probiotic characteristics when they were grown in soya milk or cow's milk.

P-18

Enhancement of microbial quality of Kashar cheese with natamycin (NA) incorporated methylcellulose (MC) films

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Post-process contamination of foods by undesirable microorganisms especially with molds is the most common cause of food spoilage and substantial economic losses for the food industry. A technique that researchers work on to improve the safety and also to extend the shelf life of foods is incorporation of antimicrobial agents into bio-based packaging materials.

The goal of this study was to test the antifungal activities of MC films containing NA against *Aspergillus niger* and *Penicillium roquefortii* inoculated on the surface of Kashar cheese during refrigerated storage. Synergistic activity of rosemary extract (RE) with NA was also investigated to reduce fungal population on cheese surface.

MC films containing NA (2-20mg/10g) and NA and RE were prepared and cheese slices were wrapped with films following inoculation with 10^5 spore/ml fungal solution. Samples were kept at refrigerator and spores on samples were count every 10 days during storage. Release profile of NA from MC films was also obtained by analyzing cheese samples for NA using HPLC.

The packaging application of MC films caused about 1.5 log reduction in *A. niger* population at and above 5mg/10g after 30 days. MC films did not have an effect on *P. roquefortii*. Any significant interaction between NA and RE was not also observed. Increasing NA concentration in the films resulted an increase in NA migration and release from films levelled of around 20 days.

According to our results, use of MC films incorporated with NA looks promising to overcome the surface contamination of the dairy products.

P-19

Effects of Calcium and Whey Proteins Supplementation on Rheological Properties of Fermented Milk Gels Acidified by Exopolysaccharide Producing Strain of *Streptococcus thermophilus* as Analyzed by Response Surface Methodology

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The fermented milk gels were acidified by a ropy-EPS-producing strain of *Streptococcus thermophilus* ASCC 1275 at 42°C, stored at 4°C, 21 days. A central composite design containing two factors at five levels each: $CaCl_2$ (1-10 mM) and whey protein concentrate (WPC) or whey protein isolate (WPI) (1-5 % w/w). The total solid content of yoghurt bases was 14% (w/w). All fermented milk was analyzed for the culture growth, EPS concentration, viscoelastic and flow behavior, firmness, and water holding capacity (WHC). Second order polynomial models estimated response variables with R^2 ranging from 0.704 - 0.943. WPI or WPC had no effect on the cell growth during storage, but increased the EPS concentration. Calcium reduced cell growth especially in WPI-supplemented yoghurt. Calcium disrupted gel structure by lowering G' and firmness, increasing flow behaviour and WHC. WPC addition increased G', consistency index, and firmness significantly (P<0.05). The interaction between calcium and either whey protein preparation weakened the structure further. These results showed that the texture of yoghurt was modulated by Ca and whey proteins supplementations and the extent and directions of the magnitude depended on the Ca concentration and type of whey protein preparation.

Key Words: yoghurt, whey protein, calcium, rheology, water holding capacity

P-20

The Antioxidant Capacity and Polyphenol Content of Brown Seaweeds after Heat Processing

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Seaweeds or marine macroalgae are renewable living resources which are also used as food, feed and fertilizer in many parts of the world. They are able to produce a great variety of secondary metabolites characterized by a broad spectrum of biological behavior such as antibacterial and antioxidant activities. The effect of heat treatment was investigated on the level of bioactive compounds and changes in the overall antioxidant capacity of edible Irish brown seaweeds namely *Himanthalia elongata*, *Laminaria saccharina* and *Laminaria digitata*. In order to make the seaweeds safe and edible, they were heated at 85, 95, 100, 110 and 121°C for 15 min using an autoclave and the samples were extracted with 60% methanol. The total phenolic content (TPC), proanthocyanidin content (PC) and total radical scavenging capacity (RSC) against $DPPH^{\bullet}$ increased as the heating temperature increased to 95°C. Heating at 95°C significantly increased (p<0.05) the TPC (1.6, 1.8 and 1.9-fold), PC (1.9, 2.0 and 2.6-fold) and RSC (2.0, 1.4 and 2.1-fold) as compared to raw *H. elongata*, *L. saccharina* and *L. digitata*, respectively. However, reducing antioxidant power (FRAP) significantly increased by 2.6, 2.4 and 2.8-fold as compared to the raw samples at 110°C. A high and statistically significant (p<0.05) correlation was observed between TPC and RSC. The polyphenol content and antioxidant capacity in the water soluble extract of processed seaweeds were in the order of *H. elongata* > *L. saccharina* > *L. digitata*. The overall changes by processing could be attributed to the complete breakdown or modifications of cellular components by heat and pressure. It could be anticipated that heating around 100°C could be responsible for the disassociation of conjugate phenolic forms in seaweeds as their outer cell wall is much harder and heating at 100°C or above results in their deterioration. Results showed that the heat processing not only enhanced the contents of biologically active compounds in seaweeds but also the biological activity associated with these compounds as compared to the unprocessed seaweeds.

P-21

Physicochemical characterization of traditional and commercial instant corn flours used for arepa

Posidia Pineda Gómez, Mario Rodriguez

This work was focused in the study of physicochemical characterization of commercial and traditional instant corn flour used for arepa preparation. The chemical analysis of these corn flours shows that there are a low amounts of fiber, fat and minerals but the protein is kept equal than raw corn. The commercial flours are characterized by coarse particles size distribution. Analysis by Differential scanning calorimeter (DSC) permitted to corroborate that the flours are gelatinized; this behavior was correlated with structural changes shown via X-ray diffraction (XRD) and morphological studies by Scanning electron microscopy (SEM). A pasting characteristics analysis based on the pasting curves was done in order to study the apparent viscosity of these flours. The commercial instant corn flours show quick water absorption at low temperatures and major values in peak viscosity than the raw corn flour which was attributed to hydrocolloids presence. For traditional instant corn flour the profile of apparent viscosity showed a behavior of gelatinized starch.

P-22

Ultrasonic cutting of cheese: Effects of cutting parameters and product properties

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A number of food products are very sensible towards mechanical and thermal stress during processing. Because of visual quality demands this is of special importance for foods which are distributed sliced or pre-cut, and ultrasonic cutting has gained increasing importance in the last years. Ultrasonic excitation of a cutting tool is able to reduce the forces during cutting which, in turn, attenuate product deformations and contributes to the reduction of cutting tool fouling. On the other hand, there is a certain possibility that energy input caused by the vibration might elicit quality losses in case of thermal sensitive foods.

Using 8 cheese varieties (fat: 183 - 335 g/kg; moisture: 357 - 488 g/kg; crude protein: 202 - 292 g/kg) the influence of composition on cutting force, cutting work and energy demand for keeping a defined vibration were examined using a 40 kHz tool. Additionally, a full-factorial experiment was carried out for a systematical quantification of the influence of cutting speed (1000 - 2500 mm/min) and excitation amplitude (0 – 18 µm).

It is the general outcome of the investigation that cheese composition has a significant impact on the specific effects of ultrasonic excitation during cheese cutting. Whereas, at constant temperature, fat in dry matter was mainly responsible for a reduction of cutting work, the energy demand significantly depended on the ratio of moisture to solids-non-fat content. The influence of cutting speed and vibration amplitude on cutting work and energy demand do significantly depend on cheese variety. Visually perceivable quality defects were more likely in experiments with high energy input. These results underline the necessity of carefully adapting cutting parameters to the product which has to be processed.

P-23

An electronic technique to determine the adulteration in honey

Anwar Sadat

Honey is the natural complex food product produced by bees from nectar of plants and also from honeydew. Bee honey has significant nutritional and medicinal benefits. Honey adulteration has evolved from the basic addition of cane sugar and water to specially produced syrups. There is a need, therefore, for the development of methods to detect honey adulteration. A number of methods exist to check the adulteration. However, these methods have the drawbacks of slow testing and expensive experimental set up.

The analysis of the honey samples is based on its dielectric properties. A parallel plate capacitor is made use for testing honey with different percentage of adulteration, kept as dielectric and measuring its capacitance. The variation of the capacitance is found to be significant with the adulteration of honey. The variable capacitor is connected in the circuit of a relaxation oscillator. The change in capacitance modulates the output frequency of the oscillator. The frequency of the oscillator is measured using the digital counter. The results of this method indicate that the method is quite simple, quick and hence, suitable for large scale industrial monitoring of honey samples.

P-24

Monitoring the Quality Parameters of Extra Virgin Olive Oils from Different Geographical Regions during Storage

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This study reports the changes in oxidation parameters of extra virgin olive oils (EVOO) from two olive growing regions of Turkey during storage. West coast of Turkey along the Aegean Sea is one of the important olive growing regions. EVOO samples used in the study belong to the north and south parts of this region.

Four EVOO samples (two from each geographical origin) were monitored at room and refrigeration temperatures in the dark during 14 months. Total of 40 measurements were taken for 16 quality parameters: total phenol content, fatty acid concentrations and oxidation measures (peroxide value, free fatty acidity, K232, K270, anisidine value and iodine value). Rate of increase in the oxidation measures of samples in cold were slower than those stored in mild conditions. A continuous increase in oleic acid concentration was observed as linoleic and linolenic acid concentrations decreased especially at the end of fourth month. Peroxide value of almost all samples exceeded the legal limit of 20 meq/kg in about 7 months, while K232 and free fatty acid values were always below 2.5 and 1.0%, respectively. In refrigerated samples, K270 stayed below the limit of 0.20, as the samples kept in room temperature exceeded 0.20 at the end of 4^{th} month.

Simca models (class principal component analysis) were created to classify fresh and oxidized oils. The Coomans' plots showed that north and south Aegean fresh oils had different characteristics. Once the oxidation started, north and south oils could not be differentiated clearly.

P-25

Determination of the effects of fat, water and textured soy protein on heat transfer coefficient of meatballs with response surface methodology

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Heat transfer coefficient of the meatball dough, affected by the ingredients of the product, directly determines the cooking time needed to reach the deficient core temperature. The aim of the research was to determine the combined effect of fat, water and textured soy protein (TSP) content on heat transfer coefficient of meatballs at room temperature by using response surface methodology. Experiments were planned by using central composite design. In the experiments 20 samples of meatball with different formulations were produced and the fat, water and TSP contents were investigated within the intervals of 15-30%, 10-20% and 3-9%, respectively. The heat transfer coefficients were found between 0.18 and 0.38 W/m^{o}C. Response surface regression for heat transfer coefficient versus fat, water and TSP was determined and a new design for prediction of heat transfer coefficient was stated. According to the regression analysis, fat and TSP contents were found significantly ($p<0.05$) effective on the heat transfer coefficient of meatballs at room temperature within the selected addition intervals as 15-30% and 3-9%, respectively.

P-26

Identification of Ceramide from Fly Konjac Flour

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The investigation of isolation and purification of ceramide from fly konjac flour, a by-product of konjac powder, was carrried out, and the structure of the ceramide also was identified. A crude substance was extracted by organic solvent extraction with supersonic, and then the LSC and crystallization were used to obtain the purified. A white crystal was obtained which was proved as a monomeric compound with the molecular structure of ceramide. The structure was characterized by UV, IR, GC-MS, and NMR spectra(^{1}H NMR, ^{13}C NMR). A new kind of ceramide, named *N*-（1′hydroxymethyl-2′hydroxyl）-3-octadeolefin-2，3-dihydroxyl nonade fatty amide, was found.

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