

# 2<sup>nd</sup> Edition of Food Science & Technology Virtual

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# Abstract Book

2<sup>nd</sup> EDITION OF **FOOD SCIENCE**  
**AND TECHNOLOGY**  
VIRTUAL

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GMT 07:00 – 12:00

V-Food2022

## Wolyna Pindi<sup>1\*</sup>, Lim Wei Qin<sup>1</sup>, Elisha Munsu<sup>1</sup>, Hana Mohd Zaini<sup>1</sup>, Nurul Shaera Sulaiman<sup>1</sup> & Noorakmar Ab. Wahab<sup>1</sup>

<sup>1</sup>Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia.

### Effects of Addition of Seaweed (*Kappaphycus alvarezii*) on the Quality of Reduced Salt Chicken Patties

This study was conducted to determine the effect of salt reduction and the addition of seaweed (*Kappaphycus alvarezii*) on the quality of chicken patties. In this study, a control sample (1.5% salt and without seaweed) and four chicken patties formulations were studied using two levels of salt (1% and 1.5%) and two levels of seaweed (2% and 4%). The addition of seaweed was shown to improve water holding capacity, emulsion stability and cooking loss ( $p < 0.05$ ) on reduced salt chicken patties (1% salt). Besides, the addition of seaweed decreases the shrinkage of diameter and thickness on chicken patties ( $p < 0.05$ ). However, the addition of seaweed made the patties darker (lower  $L^*$ -value) ( $P < 0.05$ ). Furthermore, the hardness, chewiness, cohesiveness and elasticity increased with seaweed addition ( $p < 0.05$ ) due to the dietary fibre content in seaweed. Sensory evaluation showed that chicken patty with 1.5% salt and 4% seaweed had the highest overall acceptability. However, the chicken patties with reduced salt (1%) with 4% seaweed was significantly higher than the control sample ( $p < 0.05$ ). In conclusion, the addition of seaweed can potentially improve the quality of reduced salt chicken patties in terms of textural properties and emulsion stability.

#### Biography

Wolyna Pindi is a senior lecturer in the Faculty of Food Science and Nutrition at Universiti Malaysia Sabah. She received her MSc and PhD at the Universiti Kebangsaan Malaysia in Food Science (Meat Science). Her work focuses on developing meat product with improved nutritional and technological properties, as well as protein gelation with emphasis on the structure and rheological properties.

## Norfezah Md Nor<sup>1</sup>, Tengku Muaz Tengku Bahizalsah<sup>1</sup>, Saidatul Afzan Abd Aziz<sup>2</sup> and Noriza Ishak<sup>2</sup>

<sup>1</sup>Department of Foodservice Management, Faculty of Hotel & Tourism Management, Universiti Teknologi MARA (UiTM) Cawangan Pulau Pinang, Kampus Permatang Pauh 13500 Pulau Pinang, Malaysia.

<sup>2</sup>Faculty of Hotel & Tourism Management, UiTM Selangor Puncak Alam Campus, 42300 Selangor Darul Ehsan, Malaysia.

### **The effect of food innovation on local delicacies (“*kuih*”) Ready-Made Frozen Food (RMFF) towards sustainability**

The identity, culture, gastronomic legacy, and economic prosperity of the local delicacies (*kuih*) ready-made frozen food (RMFF) product are all essential. Consumers evolve with time, and their interests and preferences may shift. As a result, the food sector must actively evolve with innovation and grow its product in order to maintain or improve market share and profitability. This, however, must correspond to the desires of the buyer. As a result, the goal of this study is to identify the antecedents that influence consumer behaviour toward buying local delicacies (*kuih*) ready-made frozen food (RMFF) and to investigate the role of innovation in mediating the antecedents toward consumer behaviour toward buying local delicacies (*kuih*) ready-made frozen food (RMFF) (RMFF). In this study, an extended Theory of Planned Behavior (TPB) with modification was used. A Google Forms-based quantitative e-survey will be distributed. For descriptive analysis, the acquired data will be analysed using the Statistical Package for Social Sciences (SPSS) software. Partial least squares will be used to test the conceptual framework (PLS). The SmartPLS software version 3 will be used to estimate measurement models and structural models. These findings are intended to emphasise the need of food innovation in preserving the local delicacies (*kuih*) prepared Ready-Made Frozen food industry (RMFF).

#### **Biography**

Norfezah Md Nor has completed her PhD from Massey University, New Zealand in food product development and sensory. She is currently Associate Professor at Foodservice Department, Faculty of Hotel and Tourism Management, Universiti Teknologi MARA (UiTM), Cawangan Pulau Pinang, Malaysia. Her research interests are Food Safety & Hygiene, Food Quality & Consumer Behaviour, Food Product Innovation & Sensory and Hospitality Education.

## Toshihiro Ona<sup>1,2</sup> and Junko Johzuka<sup>2,1</sup>

<sup>1</sup>Graduate School of Bioresource and Bioenvironmental Sciences, Kyushu University, Fukuoka, Fukuoka, Japan.

<sup>2</sup>O'Atari Inc., Onojo, Fukuoka, Japan.

### Rapid and synchronized dormancy breaking to enhance medicinal properties of seeds and bulbs

In the development of functional foods, real food is favorable to take without extraction or concentration considered from long human eating habits. To achieve this, we have examined the possibility of dormancy-breaking by the following phenomena.

Plant seeds and bulbs change the ingredients into water soluble to use and break toxicity substances to inhibit germination. For them to sprout and grow, a lot of nutrients as well as life itself reside, including sugar, amino acids, minerals, hormones, and even substances boosting immunity to prevent diseases after sprouting.

However, the ingredients become uneven if they are not awakened at the same time. Therefore, a rapid method of awaking the plant seeds and bulbs synchronizedly was developed as proprietary Grandir recipe™ with maximum 5 days of dormancy breaking.

Here, the *in vitro* study was conducted to determine the enhanced efficacy and decreased toxicity by rapid and synchronized dormancy breaking (RSDB) in case of oral administration as food as follows.

1. The anti-cancer (cytotoxicity) and pro-immunity of natural killer cell were confirmed using RSDB grape seed endosperms of Kyoho (*Vitis labruscana*) grown in Japan and Isabella (*Vitis labruscana*) grown in India. They are suitable for fight and prevention against cancer diseases and against infection.
2. The liver fat reduction and liver activation were confirmed using RSDB ginger rhizome (*Zingiber officinale*) grown in Japan.
3. The inhibition of the carbohydrates breakdown was confirmed using RSDB jumbo leek rhizome (*Allium ampeloprasum*) grown in Japan, suitable for fight and prevention against obesity and diabetes.

### Biography

Toshihiro Ona has completed his PhD from Hokkaido University, Japan. He is an associate professor of Kyushu University, Japan, and a founder and CEO of O'Atari Inc., Japan. He has published more than 250 papers in reputed journals and received numerous academic honors and awards. Also, he has been serving functional food products from his company since 2015.

## Ismail, Intan Safinar<sup>1,2</sup> and Chong, Seok Geok<sup>2</sup>

<sup>1</sup>Natural Medicine and Products Research Laboratory, Institute of Bioscience, Universiti Putra Malaysia, 43400, Serdang, Selangor, Malaysia.

<sup>2</sup>Department of Chemistry, Faculty of Science, Universiti Putra Malaysia, 43400, Serdang, Selangor, Malaysia.

### Organic versus non-organic soybeans and their fermentation

**S**oybean (*Glycine max* [L.] Merr.) is widely consumed in Asia either in processed or fermented forms, and as a meat substitute for vegetarians. Malaysia does not cultivate this legume despite being one of the Southeast Asia countries that produces a high number of soymilk and soy food products. This country relies fully on the imported soybeans. With the recent trend on the popular choice of organic foods versus the conventional ones as the former are much claimed for better health benefits and good environmental sustainability but slightly higher in price, it is interesting to compare the metabolite contents between these two groups. There is yet no evidence on their phytochemical contents that could discriminate them due to their claimed quality, which is related much to their different market prices. Although a lot of researches have been done particularly on comparison between organic and conventional soybeans, also between the unfermented and fermented soybean (tempeh), the comparison between these groups' metabolomes to understand their discriminants are still not yet explored. The chemical profiles of the organic and conventional soybeans, along with their metabolite changes due to the fermentation by *Rhizopus* spp. by NMR-based metabolomic approach are presented.

### Biography

Associate Professor Dr. Intan Safinar Ismail completed her PhD and post-doctoral studies at Okayama University and Hoshi Medical University, Japan. She joined Universiti Putra Malaysia (UPM) in 2005 and became the Head of Laboratory of Natural Products at the Institute of Bioscience in November 2011 until May 2017. She is now the Head of Chemistry Department, Faculty of Science. Within the period of her affiliation to the Universiti Putra Malaysia, she has published around 180 papers in reputed journals and presented at conferences and international meetings as speakers including keynote and invited.

**Tsvetinka Grozdanova<sup>1</sup>, Boryana Trusheva<sup>1</sup>, Kalina Alipieva<sup>1</sup>, Milena Popova<sup>1</sup>, Lyudmila Dimitrova<sup>2</sup>, Hristo Najdenski<sup>2</sup>, Maya M. Zaharieva<sup>2</sup>, Yana Ilieva<sup>2</sup>, Bela Vasileva<sup>3</sup>, George Miloshev<sup>3</sup>, Milena Georgieva<sup>3</sup>, Vassya Bankova<sup>1</sup>**

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## **Natural deep eutectic solvents for extraction of antimicrobial, antioxidant and antiageing agents from medicinal plants**

**N**atural deep eutectic solvents (NADES) are a new green alternative to toxic organic solvents. In a particular combination and ratio some solid state natural primary metabolites produce a eutectic mixture which is liquid - NADES. The constituents of NADES are non-toxic, biocompatible and sustainable. Recently, NADES turned out to be effective in extraction of antioxidant and antimicrobial components from medicinal plants. In our study we used four known NADES for extraction of two popular medicinal plants: broadleaf plantain *Plantago major*, and mountain tea *Sideritis scardica*, and evaluated the antimicrobial and genotoxic potential of the extracts. The extraction efficiency was assessed by the amount of extracted total phenolics, and flavonoids. Higher amounts of total phenolics were extracted with choline chloride-glucose 5:2 with addition of 30% water; but unexpectedly these extracts showed no activity against the tested microorganisms. Extracts with the NADES citric acid-1,2-propanediol 1:4, and choline chloride-glycerol 1:2 were active against *S. aureus*, *S. pyogenes*, *E. coli*, *C. albicans*. All four NADES had low genotoxicity and cytotoxicity; the same was observed for the extracts with antimicrobial activity. Our results prove the potential of NADESs for extraction of bioactive phenolics and flavonoids from medicinal plants and indicate that NADES could enhance the biological effects of the extracts. We additionally proved the antiageing activity of the studied NADES extracts. Further research could clarify the influence of the NADES on the bioactivity of dissolved substances, and the possibility to use such extracts in the pharmaceutical and food industry.

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**Adele Papetti**

<sup>1</sup>Department of Drug Sciences, University of Pavia, Pavia, Italy

## ***In vitro* static current methodologies simulating food digestion**

**B**ioaccessibility and bioavailability of food components are key factors in the bioefficacy of ingested food. To evaluate them, in the last years, several *in vitro* digestion methods simulating similar-physiological conditions have been developed. Static methods (biochemical models) have a broad applicability as they are simple, can be used for the study of different types of molecules, and can be validated. Differently, dynamic models better reproduce similar physiological environments but have the disadvantage to be hardly reproducible. As about static methods, COST Action Infogest (2014) represented the starting point for the protocol standardization, thanks to the elaboration of an international consensus giving general guidelines to harmonize experimental conditions and thus allowing the comparison of studies and data. This protocol was differently implemented and modified by the enzyme and digestion phases' time modification, colon and jejunal phases addition, and adaptation to different age groups and pathological conditions. In the last years, different combined approaches, such as a static digestion model coupled with a cell-based system, have been set up to obtain complementary data. However, the application of cellular models lacks an international consensus and different kinds of setups have been already applied by researchers. This keynote aims to underline the impact of the Infogest consensus method and the evolution of this digestion model in the following years, focusing on food applications.

## **Biography**

Papetti Adele has completed her PhD and postdoctoral studies from University of Pavia, Italy. She is Associate Professor in food chemistry at the Department of Drug Sciences (University of Pavia), the director of Nutraceutical & Food Chem Toxicol Analysis Laboratory and Academic Director of Master degree (NUTRIALIA). She has published more than 80 papers in indexed journals and has been serving as an editorial board member of *Molecules*, *Applied Food Biotechnology*, *Current Research in Nutrition and Food Science*, *Journal of Food Research*, and *Frontiers in Chemistry* and *Frontiers in Nutrition-Food Chemistry* Section.

## Lee Suan Chua<sup>1,2</sup> and Song Hok Lim<sup>2</sup>

<sup>1</sup>Department of Bioprocess and Polymer Engineering, School of Chemical and Energy Engineering, Faculty of Engineering, Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor Bahru, Johor, Malaysia.

<sup>2</sup>Institute of Bioproduct Development, Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor Bahru, Johor, Malaysia.

### Effect of fermentation time on nutritional quality of black garlic

**B**lack garlic is one of the ready to eat foods with medicinal value in Asian cuisines for centuries. Often, it is prepared through an aging process in a high humidity (70 to 90%) environment at a controlled temperature (60 to 90°C) for days or even up to months. In the present study, about 22 raw garlics was placed into a three-layer closed fermenter (5 L) and operated at 70-75°C in 80-90 % relative humidity up to 12 days. Sampling was performed after a week of fermentation. The results showed that the fermented garlic or black garlic was tasted to be soft and sweet without pungent smell. The loss of pungent smell from raw garlic was due to the degradation of organosulfur containing compounds catalysed by alliinase which is the major enzyme in garlics. Alliin was degraded into allicin and other small metabolites. The enzymatic hydrolysis together with the endophytic bacterial action had degraded fructans and oligosaccharides producing simple sugars like fructoses and glucoses for sweet taste. The raw garlic bulbs were turned into black because of the formation of melanoidin resulted from Maillard reaction during fermentation. This non-enzymatic browning reaction would also produce a carcinogenic byproduct, 5-hydroxymethylfurfural (5-HMF). The pH of garlic was dropped from 6.6 to < 4.0. The results showed the optimal fermentation time was 10 days based on the high content of glucose at the initial stage of exponential increment in 5-HMF content.

### Biography

LS Chua has completed his PhD in bioprocess engineering from Universiti Teknologi Malaysia. She is the research fellow of Institute of Bioproduct Development, Malaysia. She has published more than 100 papers in reputed journals, and serving as editorial board members of few high impact journals.

## Anupama Singh

Department of Food Engineering, National Institute of Food Technology Entrepreneurship and Management, Sonapat, Haryana, India.

### Optimization of extraction parameters for anthocyanin stability

**P**igments are natural chemical compounds that are synthesized in plants to color our nature and play many important biological functions. The color of foods is the result of natural pigments. There are a variety of pigments found in nature *viz*; carotenoids, chlorophyll, anthocyanins, etc. However, a number of factors affect the stability of these pigments. The stabilization of natural pigments is the main challenge to overcome for their utilization as food colorants. Since the stability depends on the type of pigments, a suitable method of pretreatment that should be used to increase the stability also depends on pigment types. Besides, different green extraction techniques such as microwave-assisted extraction, ultrasound-assisted extraction, pulsed electric field, supercritical fluid extraction high-pressure processing, and combinational methods are used to maintain the stability of these natural pigments. In addition, the microencapsulation of natural pigment could be beneficial in retaining the stability of pigments for a longer time.

### Biography

Dr. Anupama Singh has over 27 years of academic experience in the agri-food processing sector. Her research interest includes Biowaste utilization, Sustainable food processing novel technologies, product development, and value addition. Dr. Singh has received various accolades, recognitions, and fellowships, and awards at the national and international levels, including the prestigious Norman Borlaug Fellowship by USDA/ICAR and the National Fellow Award by ICAR, India. After a sterling career, spanning over 25 years, at GB Pant University of Agriculture & Technology, Pantnagar, Dr. Anupama Singh is currently Professor and Head at Department of Food Engineering, National Institute of Food Technology Entrepreneurship and Management (NIFTEM), India.

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## Aghababaei, F<sup>1</sup> and Ferragut, V<sup>1</sup>

<sup>1</sup>Centre d'Innovació, Recerca i Transferència en Tecnologia dels Aliments (CIRTTA), TECNIO-UAB, XIA, Departament de Ciència Animal i dels Aliments, Universitat Autònoma de Barcelona, UAB-Campus, 08193-Bellaterra, Spain.

### **Incorporation of spray-dried emulsions rich in omega-3 fatty acids and buttermilk into yogurt: effect of ultra-high pressure homogenization (UHPH) treatment on feeding emulsions**

**B**uttermilk (BM) is the by-product that is produced when whipping cream into butter. The formulation of emulsions by using BM, to encapsulate omega-3 rich oils, such as chia oil, may create a system to substitute saturated fats by polyunsaturated essential oils. Spray-dried emulsions are commonly obtained because it preserving emulsions. Stability of emulsions for further spray drying is essential to obtain a good quality final product. This is why, the use of ultra-high-pressure homogenization is a strategy to produce fine feeding emulsions (Hebisy et al., 2017), in which omega-3 oils are well protected by the emulsifying compounds of BM.

Feeding emulsion formulations consisted in 10 % (w/w) oil mixture (50:50) of chia (*Salvia hispanica* L.) and sunflower (*Helianthus annuus* L.) oils; 7% (w/w) commercial buttermilk as emulsifying agent, and 30% (w/w) maltodextrin. Feeding emulsions were obtained by conventional homogenization (CH) at 30 MPa and by UHPH at 200 MPa. For each type of emulsion, yoghurts with 4 and 6% SDE were formulated. Rheological behavior (viscoelasticity), texture analysis, water holding capacity and sensory assessment were performed.

Results showed that the physical-chemical and sensory characteristics of the yoghurts were not particularly affected by the application of SDE. However, the study of the viscoelastic properties revealed a possible affectation in the structure in yogurt if the feeding emulsion were treated by UHPH. In turn, it was found that yoghurts with 6% ED had a better holding-water capacity (CRA) compared with yoghurts containing 4% ED. On a sensory level, significant differences were not perceived between yoghurts.

### **Biography**

Fatemeh Aghababaei is a PhD student at Universitat Autònoma de Barcelona, Spain. She has published one paper and participated in one conference. Dr. Victoria Ferragut is the professor of Universitat Autònoma de Barcelona, Spain. She has published more than 80 papers in reputed journals and has been participating in several conferences.

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## **Centhyea Chen<sup>1</sup>, Ruzaidi Azli M. M.<sup>2</sup> and Nor Qhairul Izzreen M. N.<sup>1,\*</sup>**

<sup>1</sup>Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, 88400 Kota Kinabalu, Sabah, Malaysia.

<sup>2</sup>Biotechnology Research Institute, Universiti Malaysia Sabah, 88400 Kota Kinabalu, Sabah, Malaysia.

### **The Effect of Maturity Stages on Antioxidant Activity of Mulberry (*Morus Alba*) Fruits and Leaves**

**M**ulberry (*Morus alba* Linnaeus) is rich in biomolecules and antioxidative bioactive compounds such as phenolic acids, flavonoids, flavonols, anthocyanins and others. Nevertheless, the values and activities of these compounds are remarkably influenced by different cultivation locations, maturity levels and extraction solvents. This study investigated the antioxidant activity of highland grown mulberry at two different maturity stages of fruits (red mature and black ripe) and leaves (young and mature), extracted using 70% methanol. The analyses conducted were total phenolic content (TPC), total flavonoid content (TFC), total anthocyanins content (TAC), 2,2-Dyphenyl-1-Pikrilhidrazil (DPPH) radical scavenging, radical cation 2, 2'-Azino-bis(3-ethylbenzthiazoline-6-sulphonic acid) (ABTS) and ferric reduction antioxidant power (FRAP) assays. Results showed that black ripe fruits and young leaves revealed significantly ( $p < 0.05$ ) higher total bioactive compound and antioxidant activity values than the red mature fruits and mature leaves, respectively. The strong Pearson's correlation coefficient between TPC and TFC of all extract with antioxidant assays indicated the antioxidative potency of compounds in mulberry fruits and leaves. In conclusion, mulberry fruits demonstrated maturity-dependent increment while the leaves revealed maturity-dependent reduction. The 70% methanol were preferred for monomeric anthocyanins extraction and were able to extract phenolics and flavonoids from mulberry fruits and leaves

**Keywords:** bioactive compound, antioxidant activity, polyphenolic content, mulberry fruits, mulberry leaves

**Simonetta Muccifora<sup>1</sup>, Lorenza Bellani<sup>1,2</sup>, Lucia Giorgetti<sup>2</sup>**

<sup>1</sup>Department of Life Sciences, University of Siena, 53100 Siena, Italy.

<sup>2</sup>Institute of Agricultural Biology and Biotechnology, Italian National Research Council, 56124 Pisa, Italy.

## **Cooking and sprouting influence on antioxidant content in two legume species of food interest**

**L**egumes are among the most ancient seeds cultivated since prehistory and are important sources of protein and antioxidants. This work aimed at assessing the content of total polyphenols, flavonoids and antioxidant activity in the raw seed, after the soaking and cooking processes, in the respective soaking and cooking water and in the sprouts. The species *Phaseolus vulgaris* L. var. giallo and *Lens culinaris* var. Onano, growing in the same region of central Italy, were chosen. These species differed in the methods of preparation and cooking: the bean should be soaked before cooking for about 12 hours, while the lentil can be cooked without soaking. In both species, the raw seeds had a good content of phytochemical and antioxidant activity, polyphenols and flavonoids being mostly present in the integument. Cooking reduced the content of total polyphenols in both species. The content of flavonoids was almost unchanged in lens, while in beans it was reduced by 60% after soaking and 76% after soaking and cooking. The phytochemicals lost during seed processing were partly transferred to cooking and soaking water. Sprouting induced a decrease in all phytochemicals tested and in antioxidant activity. Our study posed a reflection on the variation of nutraceutical compounds present in legume seeds after cooking or at the time of consumption as sprouts.

### **Biography**

Simonetta Muccifora, Researcher in Plant Physiology at Siena University, Department of Life Sciences, Professor of Plant Physiology and Biochemistry and of Plant Ecophysiology. Has published more than 38 papers in indexed journals, is Topical Editor of the Journal "Plants" and reviewer of numerous articles of reputed journals.

## **Aina García-García\*, Santiago Rodríguez, Eduardo Garcia, Rosario Martin, and Teresa García**

Nutrition and Food Science Department, Faculty of Veterinary Medicine, Complutense University of Madrid,  
28040 Madrid, Spain.

### **Isolation of recombinant domain antibodies against ovomucoid (Gal d 1) for egg detection in foods**

In recent years, public awareness of food safety has increased, an issue mainly associated with the growing prevalence of food-related diseases. In this regard, the food industry and researchers are strongly urged to develop applicable methods to detect the traceability of potentially harmful allergens in foods. Immunological techniques, based on the high affinity interaction found between antibodies and antigens, are frequently the standard method for the detection and quantification of food allergens. Among the different technologies available for antibody development, directed-evolution methods have become pioneering at a level similar to that of hybridoma-derived monoclonal antibodies.

In this work, phage display technology has been used for the isolation of recombinant single domain antibodies (sdAb) against ovomucoid (Sigma-Aldrich) from a semi-synthetic phage-antibody naïve library (Source BioScience). Ovomucoid (Gal d 1) is the most important protein in egg white capable of causing allergic reactions since it maintains immunogenicity after boiling. Due to its high resistance to heat and enzymatic digestion, sensitization to ovomucoid is a marker of persistent egg allergy and lack of tolerance to cooked egg. A biopanning strategy was carried out to enrich the library in ovomucoid-specific sdAb variants. After characterization of the binding properties of the isolated sdAb, the most promising clones were produced in its soluble format in the *Escherichia coli* expression system for the development of an indirect immunoassay for egg detection in food products.

#### **Biography**

Aina García-García has completed her PhD in Veterinary Medicine from Complutense University of Madrid. She is Assistant Professor of Food Hygiene, Inspection & Food Safety. She is member of the research group "Development of Advanced Methodologies of Traceability, Detection of Microorganisms in Food and Food Biosecurity". She has participated in 6 research projects with regional, national and international funding aimed at the development of genetic and immunological techniques for food allergen detection. She is co-author of 12 JCR research articles, 2 book chapters, 24 communications in international and national congresses and reviewer for indexed scientific journals.

**Laura Mitrea<sup>1</sup>, Bernaddette-Emoke Teleky<sup>1</sup>, Silvia-Amalia Nemes<sup>1</sup>,  
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## **Biogenic succinic acid encapsulated in bio-polymeric matrices for technological stability and nutritional effectiveness**

**S**uccinic acid is an organic compound with a wide applicability in various industries (e.g., intermediate in the synthesis of biodegradable materials, food additive excipient in pharmaceuticals, etc.), and its market demand exceeds 1.6 million tons per year. The development of a new functional product in the form of extra fine powders for the food or pharmaceutical sector would bring many benefits, including facilitating the integration of succinic acid into various functional foods for people with health problems related to carbohydrate metabolism, succinic acid and its derivatives as being natural stimulants in insulin biosynthesis. Another benefit of microencapsulated succinic acid is its stability in the bio-polymeric protective matrix, which gives it a controlled release in the intestine, thus increasing its bioavailability. The originality and innovation of this product is that succinic acid is formulated in the form of a functional powder making it available as such and not in the form of succinic derivatives, a product that can be easily integrated into various food matrices or pharmaceuticals dedicated to people with carbohydrate metabolism disorders, especially to people suffering of

### **Biography**

Laura Mitrea has completed her PhD in 2019 at the age of 28 years from the University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca, Romania, and now she is a scientific researcher within The Institute of Life Sciences 'King Michael I of Romania' from UASMV-CN. She is the manager of a post-doctoral project (SuccinYst, 2019-2022, no. PN-III-P1-1.1-PD-2019-0679) that aims to convert waste cooking oils into succinic acid. She has published more than 18 papers in reputed journals, 4 book chapters, and has been serving as an editorial board member of repute.

## **Hind Mokrane<sup>1</sup>, Ahmed Bensalem<sup>1</sup>, Salem Mosbahi<sup>1</sup>, Houda Chiheb<sup>1</sup>, Nawel Saidji<sup>1</sup> and Habiba Boukerche<sup>1</sup>, Nora Ghalaoui<sup>1</sup>**

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Cheikh Mohamed El-Bachir El-Ibrahimi, Kouba, Algiers, Algeria,

### **Natural Dye Encapsulation In Pseudocereal Non Gluten Proteins**

**I**n the last two past decades, natural pigments have been extensively used in various fields of daily life such as food, textile, pharmaceutical and cosmetic industries. However, their use is still limited because of their high instability against environmental variation such as light, pH, temperature, oxygen and water activity. For that reason, recent researches suggest using microencapsulation as alternative to increase natural dyes stability and preserve their biological activities.

Against this background, the aim of this study was to use a non gluten protein pennisetin of pearl millet as novel food grade shell material. Curcumin a yellow polyphenol was extracted from rhizome of turmeric *Curcuma longa L.* Pennisetin microparticles were characterized by light microscopy (LM) and scanning electron microscopy (SEM) and spectrophotometric techniques.

LM and SEM showed that pennisetin microparticles were spherical with smooth surface with average diameter of 5µm. Fourier transform infrared (FTIR) and UV-Visible spectra confirmed the curcuma extract encapsulation, FTIR showed that during pennisetin microparticles formation,  $\alpha$ -helical and  $\beta$ -sheet structure increased indicating high aggregation of proteins.

In this study, novel carriers for curcuma dyes extract were successfully formulated with non gluten proteins extracted from under used cereals.

### **Biography**

Ms. HIND MOKRANE is a full professor in Ecole Normale Supérieure, Kouba, Algiers in Algeria. She has completed her PhD in Biosciences Engineering from Katholieke Universiteit Leuven, Belgium and her PhD in environmental engineering from Ecole nationale polytechnique of Algiers, Algeria. She is the head of research team “Biopolymers Valorization” in Laboratoire des produits bioactifs et valorisation de la biomasse, Algiers Algeria. She has published more than 15 papers in reputed journals and has been serving as reviewer several international journals.

## **Chyer Kim<sup>1</sup>, Ramesh Dhakal<sup>2</sup>, Eunice Ndegwa<sup>3</sup>, and David Crosby<sup>4</sup>**

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### **The Importance of Food Safety Research and Education**

**R**ecognizing the importance of food safety education toward students and stakeholders, the Food Safety and Microbiology program at Virginia State University (VSU) works continually to improve the safety and quality of our nation's food supply through research, teaching and outreach. The program's research is designed to increase knowledge of microbial ecology with regard to the routes of contamination from on-farm investigations to food distribution. The program also evaluates methods and approaches to better prevent, intervene and verify the presence of foodborne pathogens from farm to table. Program resources are utilized to teach and train students on current and emerging food safety issues. The program trains students in both conventional and advanced techniques in food safety analysis, empowering them to meet global societal needs. The program works closely with Cooperative Extension specialists to benefit resource-limited small-scale farmers and processors. The program endeavors to develop a regional educational and training initiative for stakeholders on safe food production and handling. In keeping with the vision of the program, active collaborations with intra- and extra-mural institutions and government agencies are sought to promote multidisciplinary approaches and to strengthen research and education capacity related to current and developing issues in food safety. Therefore, our presentation will include an overview on the importance of food safety research and a summary of ongoing projects.

### **Biography**

Dr. Chyer Kim has completed his PhD and postdoctoral studies from the University of Georgia, USA. He is a Principal Investigator of the Food Safety and Microbiology Program at the Agricultural Research Station of Virginia State University. Recognizing the importance of food safety education toward students and stakeholders, he strives to improve the safety and quality of our region's food supply through research, teaching, and extension outreach. Some of his accomplishments include a grantsmanship over \$3.1M, training and mentorship of more than 80 students, 45 scientific article publications and service as an editorial board member in reputed journals.

2<sup>nd</sup> EDITION OF **FOOD SCIENCE**  
**AND TECHNOLOGY**  
VIRTUAL

APRIL

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V-Food2022

**Pooja Nikhanj<sup>1</sup>**

<sup>1</sup>Punjab Horticultural Postharvest Technology Centre, Punjab Agricultural University Campus,  
Ludhiana, Punjab, India.

## Technology for fresh cut fruits and vegetables

**F**resh-cut horticultural produce stand out as convenient novel foods that fit the many needs of a modern lifestyle. In the last years, their consumption has continued to grow rapidly linked to the increased public awareness of their health benefits. For fresh cut fruit and vegetables production technology, five different disinfectants viz. sodium hypochlorite, potassium metabisulphite, citric acid, acetic acid and benzoic acid were evaluated over fresh cut fruits and vegetables (guava, papaya, pear, tomato, cucumber and carrot) to check their bactericidal efficacy. Amongst five disinfectants evaluated, sodium hypochlorite showed maximum microbial reduction of the 51.58-54.02% Total Plate Count; 60-63.33% Yeasts & Moulds count and 50.72-54.16% coliforms count with respect to control. Optimization of sodium hypochlorite concentration revealed maximum decrease in microflora @ 100ppm level. Further, optimization of pretreatment temperature, pH and contact time was statistically designed and analyzed using response surface methodology. Numerical optimization of results revealed a temperature of 9-10°C; pH 7; contact time of 25-30 minutes was found to be optimized t with a desirability level of 93%. Validation of results was done at 3kg scale under all optimized conditions. Shelf life analysis of pretreated under all optimized conditions and untreated fresh cut fruits stored under refrigeration conditions (5-7°C) revealed enhancement in shelf life of treated fresh cut fruit and vegetables during which all physicochemical parameters of pretreated fresh cut fruits were non-significantly differ along with microbial load under acceptable limits and a good sensory score.

## Biography

Dr. Pooja has completed his PhD (Microbiology) from Punjab Agricultural University, Ludhiana in 2016. She is working as Microbiologist in the Department of Microbiology since 2018. She has more than 20 publications including research papers, book chapters, review articles in reputed journals and has been serving as a Microbiologist in Punjab Horticultural Postharvest Technology Centre and is involved in developing the efficient postharvest technologies and microbial fermentations to decrease the postharvest losses of horticulture produce.

## Priya Katyal and Vishu Chaudhary

Department of Microbiology, Punjab Agricultural University, Ludhiana, Punjab, India.

### **Monascus based Biocolorant production and characterization**

**M**onascus biopigment extraction parameters were found optimal with 60 % ethanol at 60 °C for 80 min; yielding the highest biopigment color value of 49.65 ODU/g DMS having recovery of 30.60 % DMS with tray-type fermenter. Red biopigment was stable up to 100°C, can withstand 0.6% (w/v) of various food preservatives, but sensitive to UV/ sunlight and alkaline pH >10. Qualitative test for cardiac glycosides, hormones, alkaloids, and saponins was found to be negative but existence of different bioactive components (i.e. phenolics, flavonoids and tannins contents) was confirmed. Total phenolic, flavanoids and tannins were found to increase by increasing the concentration of biopigment. Similarly, iron-chelating activity of red biopigment was observed to vary from 2.44 to 67.15 %. Antibacterial and antifungal activity of biopigment was tested against *Bacillus cereus*, *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumonia*, *Pseudomonas aeruginosa*, *Aspergillus flavus*, *Fusarium oxysporum*, and *Alternaria alternata*. The DPPH antioxidant assay revealed significant free radical scavenging activity. Therapeutic potential of biopigment was observed at higher concentration (50 µg/ml) with 1.905 fold increase in the value of SOD-2. Similarly, in case of GPX, an inhibitory effect has been observed with fold change value decrease from 0.627 to 0.424. The anti-inflammatory potential of red biopigment was confirmed from increased IL-10 expression in LNCaP cells in comparison to untreated cells. The trypan blue, MTT and Cell viability assay revealed that red biopigment significantly reduced the viability of LNCaP cells showing its potential as anticarcinogenic agent. Moreover, it was found to be free from citrinin and contain aflatoxin within the permissible limits.

### **Biography**

Dr (Mrs.) Priya Katyal has completed her Ph.D from Punjab Agricultural University, Ludhiana, Punjab, India in the year 2005. She worked as Assistant Professor, Biotechnology in Maharshi Markandeshwar University, Mullana from the year 2010 to 2014 and presently working as Microbiologist in the Department of Microbiology, P.A.U. since 2014. She has published more than 15 papers in reputed journals and has been serving as reviewers in several journals of repute. She has guided 11 M.Sc and 1 Ph.D student as major Advisor. Her area of specialization include Enzymatic potential of microbes and its applications, Baker's yeast and Bioactive molecules from mushrooms and other fungi for medicinal value.

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## Liene Jansone, Zanda Kruma, Solvita Kampuse

Faculty of Food Technology, Latvia University of Life Sciences and Technologies, Jelgava, Latvia.

### Dehydrated sauerkraut juice in food applications

In the production process of sauerkraut up to 30% of cabbage cell juices are released due to osmotic pressure and it is considered as by-product. Yet it is rich in bioactive components like phenolic compounds, organic acids, vitamins and minerals. In order to reduce food waste, innovative and sustainable solution for utilization this valuable sauerkraut juice was acquired and technology developed was - dehydration via spray drying using starch solution as a wall material. The aim of the current research was to evaluate dehydrated sauerkraut juice applications in food. Spray drying was performed on vertical, laboratory scale spray dryer Buchi 290. Physicochemical, nutritional and sensory parameters of dehydrated juice were determined. The dehydrated juice was tested in the production of meat, bread and trial tests in soup mixes, salad dressings and marinades. For developed products physicochemical and sensory properties were tested. A sauerkraut juice powder was acquired with sweet, sour and salty taste attributes. Total phenol content was  $284.48 \pm 16.0$  mg GAE  $100\text{ g}^{-1}$ , antiradical activity (by DPPH)  $22.12 \pm 1.4$  mg TE  $100\text{ g}^{-1}$ , dry matter, salt content 8.83%, moisture  $6.99 \pm 0.54\%$ . It contains minerals like magnesium, calcium, iron and potassium, being the most abundant.

Dehydrated sauerkraut juice tenderizes meat, gives different taste nuances like garlic, mayonnaise in salad dressings and sweet taste and in bread products. It was not suitable in soup mixes giving off bitter taste and aftertaste. Dehydrated sauerkraut juice is suitable in food applications with previous investigations done before.

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### Biography

Liene Jansone, currently a PhD candidate in Latvia University of Life Science and Technologies, Faculty of Food Technologies. Her thesis is “Production and application of sauerkraut juice powder obtained from cabbage grown in different agricultural systems.” Works as a guest lecturer in the university presenting lectures and practical classes in “Technology of food preparation”.