



International Society for Nutraceuticals and Functional Foods

ISNFF Newsletter

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July 23, 2024

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## MESSAGE FROM THE ISNFF

Greetings from the ISNFF!

We sincerely hope that you have had a wonderful 2024 so far. Whether you are enjoying summer, winter, a rainy or sunny season, we hope you find joy and encouragement in your work this year. Like the photo of ripe and unripe blueberries on the right, sometimes, the choice we have in front of us is obvious. Other times, our choices may not be so obvious. Nonetheless, we appreciate that you “chose” to join the ISNFF. Consider deepening your role as a member by attending our Annual Meeting, contributing a newsletter article, leading a technical session, or publishing in our society journal, the *Journal of Food Bioactives*.



We are excited to announce that the 2024 ISNFF Conference will be held in Wuxi, China December 3-6. The conference is a collaboration of “Food4Future” between the ISNFF, Jiangnan University, and Elsevier (FIFS & ISNFF: Food4Future). The conference will be held at the WorldHotel Grand Juna Wuxi. We hope you can make the trip. Additionally, please consider nominating a colleague, student, or trainee for our society awards. Further details can be found on page 7 of the Newsletter. Further information and details will be forthcoming.

We look forward to meeting you in Wuxi!

Sincerely yours,

Dr. Fereidoon Shahidi (Principal Founder and Executive Board Member of ISNFF)  
Dr. Bradley Bolling (ISNFF Chair)



## SCIENTIFIC REVIEW ARTICLES

### Do plant proteins support gut health and immunity?



Restituto Tocmo, PhD  
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University of Reading, Reading, Berkshire  
United Kingdom

Diet has a profound impact on gut microbiota composition and function to the benefit or detriment of human health. To understand the complex relationship between diet, the intestinal microbiota, and host health, research has focused on the influence of dietary components including individual micro- and macronutrients. For example, dietary fiber has been studied extensively for its impact on host health by modulating the gut microbiota. However, the impact of dietary protein, a major component of the human diet, on gut microbiota has gone largely unexplored. Emerging evidence suggests that plant-derived protein is an important modulator of microbiota composition and function, and that microbiota-plant protein interactions may have profound impact on long-term host health<sup>[1,2]</sup>. Majority of plant proteins have lower digestibility compared to animal-based proteins<sup>[3]</sup>. Since protein digestibility is an important determinant of how much protein reaches the gut undigested, it is important to investigate how various sources of plant protein with varying digestibility affect the gut microbiome. Furthermore, proteins with diverse amino acid compositions may exert distinct effects on microbial metabolism<sup>[4]</sup>. Up to 90% of dietary protein is absorbed in the small intestine, but a fraction of peptides and amino acids escapes digestion and reaches the colon and serves as substrate for microbial metabolism<sup>[5]</sup>.

Multiple large cohort studies have revealed that increased plant protein intake is associated with beneficial host health outcomes<sup>[6-9]</sup>. In addition, recent pre-clinical studies using animal models have shown that plant proteins influence gut microbiota composition by enhancing beneficial microorganisms while decreasing harmful species<sup>[10-14]</sup>. Animal studies have also associated changes in microbiota function with different plant protein sources. Specifically, plant proteins may have significant influence on the production of short-chain fatty acids including propionate, acetate, and butyrate, which are major products of microbial fermentation of amino acids<sup>[15]</sup>. For example, butyric acid increased<sup>[16]</sup> while propionic acid concentrations decreased<sup>[17]</sup> in soy-fed rats. Pea, quinoa, and soy protein hydrolysates increased acetate, propionate, and butyrate in *in vitro* and *in vivo* studies<sup>[10,18,19]</sup>. Participants who consumed soy supplemented diet, had higher relative concentrations of the amino acid microbial fermentation metabolites valerate, phenylacetate, and tyramine, compared to those who consumed animal protein-supplemented diet<sup>[20]</sup>. Overall, results from a growing number of studies have revealed the ability of plant proteins to promote the proliferation of beneficial microorganisms and alter gut microbiota metabolite production, underlining their potential to influence intestinal health.

Studies in animal models have suggested that some plant protein sources may have significant effects in maintaining intestinal homeostasis and enhancing intestinal barrier integrity by triggering host immunological responses. For example, quinoa, pea, oat, rice, and soy proteins have been demonstrated to alleviate symptoms of ulcerative colitis and Crohn's disease-like ileitis by modulating the gut microbiota, inhibiting pro-inflammatory responses, and protecting the intestinal barrier<sup>[11-14,21]</sup>. In addition, protein hydrolysates from various plant sources have shown anti-inflammatory and immunomodulatory effects in mice<sup>[22-27]</sup>. These effects can be explained through the enhanced availability of free amino acids in protein hydrolysates that could serve as building blocks for macromolecule synthesis in the damaged mucosa or as precursors to immunoregulatory metabolites<sup>[28,29]</sup>. Plant protein hydrolysates may also contain immunomodulatory peptides<sup>[30,31]</sup>. Taken together, pre-clinical studies have just started to reveal positive



associations between plant protein intake and intestinal health through modulation of gut microbiota and immune responses. Further mechanistic investigations will contribute to an in-depth understanding of plant protein-gut microbiota interaction and its potential contribution to dietary management of intestinal inflammatory diseases.

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## Advanced Analytic Methods for Authentication, Standardization and Efficacy Evaluation of Proanthocyanidins



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Authentication, standardization and efficacy evaluation of nutraceuticals and functional foods are essential to supporting consumer's expectations of safe and effective products. Ingredients and finished goods that are enriched in proanthocyanidins (PAC) have been promoted for their gut health, urinary tract health, and cardiovascular health outcomes. PAC are a class of oligomeric polyphenols found in many plants such as cranberry, grapes, pine bark, lingonberry and sorghum. However, due to their large structural heterogeneity (variation in degree of polymerization, nature of interflavan bonds and unique polyphenolic ring substitutions) PAC have historically presented significant analytic challenges.

Research on the application of Matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) for the analysis of PAC has been developed over the last quarter century [1-7]. MALDI-TOF MS is ideally suited to characterize the unique structural features of PAC and represents a 'fit-for-purpose' analytic method for authentication of PAC. Methods for deconvoluting overlapping isotope patterns enable relative ratios of A-type to B-type interflavan bonds to be quantified at each degree of polymerization [4,6]. MALDI-TOF MS data combined with multivariate analysis, such as principal component analysis and linear discriminant analysis have been applied to differentiate and discriminate PAC from apple, cranberry, peanut skin, cocoa, grape and chokeberry [5,6].

The 4-(dimethylamino)cinnamaldehyde (DMAC) method has been developed for standardization (quantification) of soluble PAC [8-11]. In the case of cranberry PAC, the use of commercially available procyanidin A2 dimer was shown to result in a significant underestimation of soluble PAC [8-11]. To overcome this problem a custom cranberry proanthocyanidin (cPAC) reference standard, reflective of the structural heterogeneity found in cranberry fruit, was used to provide a more accurate quantification of soluble cranberry PAC [8,9]. Careful consideration should be given to the choice of reference standards to enable both precise and accurate quantification when analyzing PAC from different botanical sources.

Following DMAC quantification of soluble PAC, sequential analysis of the extracted insoluble residue may be performed by the method of butanol-hydrochloric acid (BuOH-HCL), enabling the quantification of insoluble proanthocyanidins that remain associated with cell wall and protein components [12].

*In vitro* hemeagglutination assays have been developed to evaluate bacterial anti-adhesion activity of cranberry soluble PAC in relation to urinary tract health [13-16]. These methods evaluate cranberry PAC ability to inhibit uropathogenic *Escherichia coli* (p-type and type 1) adhesion to red blood cells.

Complementary *in vitro* agglutination and epithelial cell invasion models have been developed to support mechanisms of soluble PAC activity in relation to gut health and urinary tract health [17,18]. The development of novel methods for evaluating bioactivity of insoluble PAC are urgently needed.

Collectively, this suite of advanced analytic methods can be applied to support the authentication, standardization and efficacy evaluation of PAC containing nutraceuticals and functional foods. The quantitative data can be used to set specifications and support consistency in manufacturing, enabling manufactures to be in compliance with current good manufacturing practices (cGMP).

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## ISNFF 2024 INFORMATION

Jiangnan University, the ISNFF, and Elsevier are delighted to announce that "The 2024 International Conference on Food Bioscience and Food Nutrition joint with the 16<sup>th</sup> ISNFF Annual Conference and Exhibition: Food4Future" will take place in Wuxi, China, December 3-6, 2024  
The conference hotel is the WorldHotel Grand Juna  
(i.e., the same location as ISNFF 2015)

### [The ISNFF Program-At-A-Glance 2024]


	Dec 3 / Tue		Dec 4 / Wed		Dec 5/ Thu		Dec 6/ Fri		
All day	Registration	All day	Registration		Registration		Optional Tours:  Jiangnan University and/or other activities		
08:00 - 15:00	Registration	08:00 - 09:00	Opening Ceremony		Other Activities/plenaries (13-14)				
		09:00 - 10:30	Plenaries (1-3)		Plenaries (7-9)				
		10:30 - 10:45	Nutrition Break		Nutrition Break				
		10:45 - 12:15	Plenaries (4-6)		Plenaries (10-12)				
		12:15 - 13:30	Lunch Break / Poster Session		Lunch Break / Poster Session				
		13:30 - 15:30	S1	S2	S3	S4		S9	S10
15:00 - 18:00	Editorial Board Meetings ISNFF AGM Meeting	15:30 - 16:00	Nutrition Break / Poster Session		Nutrition Break / Poster Session				
		16:00 - 18:00	S5	S6	S7	S8		S13	S14
18:00 - 20:00	Dinner	18:30 - 20:30	Dinner		Congress Gala Dinner, Awards and Closing Ceremony				



## UPDATES ON SOCIETY JOURNALS


The **Journal of Food Bioactives** (JFB), another dedicated publication of the ISNFF, has now published 26 volumes since the launch of the journal in 2018. Please consider submitting your work to the *Journal of Food Bioactives*: <isnff-jfb.com>.

Volume 25 March 2024




# Journal of Food Bioactives

An Official Scientific Publication of the International Society for Nutraceuticals and Functional Foods (ISNFF)

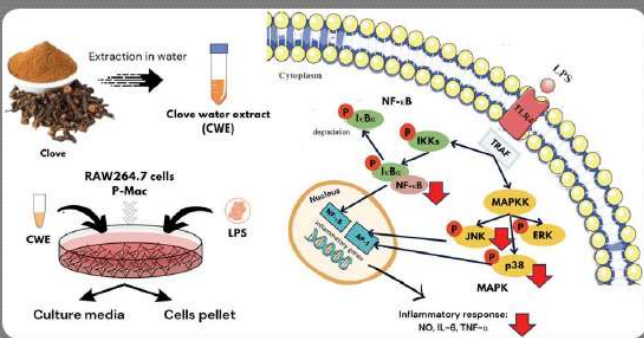


An Official Journal of the International Union of Food Science and Technology (IUFeST)



Editor-in-Chief  
Fereidoon Shahidi

Co-Editor-in-Chief (Honorary)  
Beiwei Zhu



ISNFF & ASSOCIATES Publishing Company, Inc.





## UPCOMING NUTRACEUTICALS AND FUNCTIONAL FOODS EVENTS

2024

### July 2024

14-17 IFT FIRST Annual Meeting; Chicago, Illinois, USA

### August 2024

18-22 American Chemical Society Fall 2024 Meeting; Denver, Colorado, USA

### September 2024

8-12 The 22<sup>nd</sup> World Congress of Food Science and Technology (IUFoST), Rimini, Italy

19-20 Polyphenols Applications 17<sup>th</sup> World Congress, Milan, Italy

### October 2024

16-19 11<sup>th</sup> International Conference on Polyphenols & Health; Boston, Massachusetts, USA

### November 2024

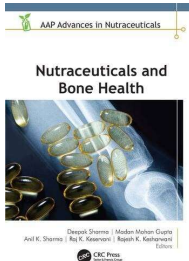
4-7 4<sup>th</sup> International Flavor and Fragrance Conference, Auckland, New Zealand

### December 2024

3-6 ISNFF 2024 Annual Conference & Exhibition; Wuxi, China



## NEW TITLES

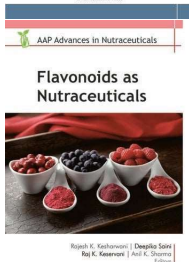


### **Nutraceuticals and Bone Health**

**Publication Date:** April, 2024

**Editors:** Deepak Sharma, Madan Mohan Gupta, Anil K. Sharma, Raj K. Keservani, Rajesh K. Kesharwani

**Publisher:** CRC Press

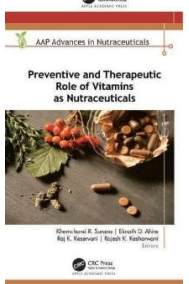


### **Flavonoids as Nutraceuticals**

**Publication Date:** April, 2024

**Editors:** Rajesh K. Kesharwani, Deepika Saini, Raj K. Keservani, Anil Kumar Sharma

**Publisher:** CRC Press

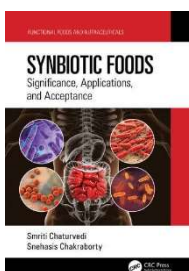


### **Preventive and Therapeutic Role of Vitamins as Nutraceuticals**

**Publication Date:** April, 2024

**Editors:** Khemchand R. Surana, Eknath D. Ahire, Raj K. Keservani, Rajesh K. Kesharwani

**Publisher:** CRC Press

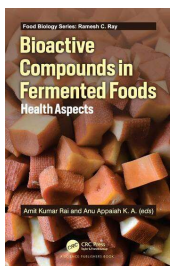


### **Synbiotic Foods: Significance, Applications, and Acceptance**

**Publication Date:** June, 2024

**Editors:** Smriti Chaturvedi, Snehasis Chakraborty

**Publisher:** CRC Press



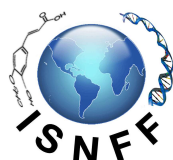
### **Bioactive Compounds in Fermented Foods**

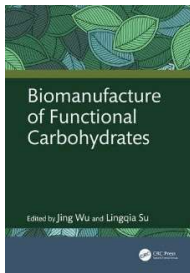
**Publication Date:** January 2024

**Editors:** Amit Kumar Rai, Anu Appaiah K. A.

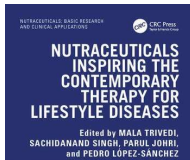
**Publisher:** CRC Press

### **Biom manufacture of Functional Carbohydrates**



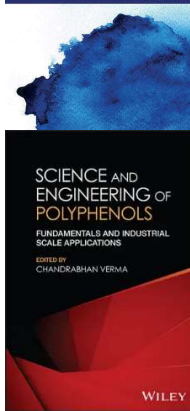


**Publication Date:** June,2024  
**Editors:** Jing Wu, Lingqia Su  
**Publisher:** CRC Press



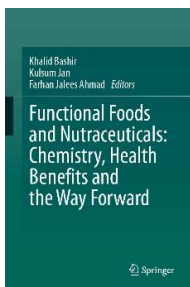
**Nutraceuticals Inspiring the Contemporary Therapy for Lifestyle Diseases**

**Publication Date:** June, 2024  
**Editors:** Mala Trivedi, Sachidanand Singh, Parul Johri, Pedro Lopez-Sanchez  
**Publisher:** CRC Press



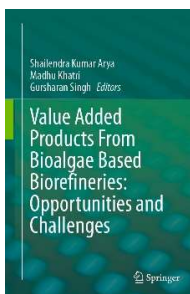
**Science and Engineering of Polyphenols: Fundamentals and Industrial Scale Applications**

**Publication Date:** March, 2024  
**Editor:** Chandrabhan Verma  
**Publisher:** Wiley



**Functional Foods and Nutraceuticals: Chemistry, Health Benefits and the Way Forward**

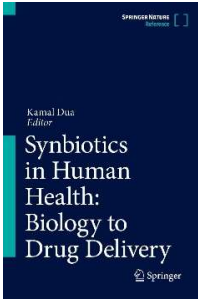
**Publication Date:** July, 2024  
**Editors:** *Khalid Bashir, Kulsum Jan, Farhan Jalees Ahmad*  
**Publisher:** Springer



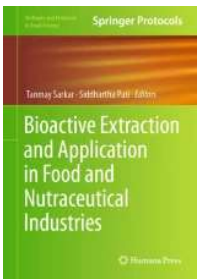
**Value Added Products From Bioalgae Based Biorefineries: Opportunities and Challenges**

**Publication Date:** May, 2024  
**Editors:** Shailendra Kumar Arya, Madhu Khatri, Gursharan Singh  
**Publisher:** Springer





**Synbiotics in Human Health: Biology to Drug Delivery**  
**Publication Date:** March, 2024  
**Editor:** Kamal Dua  
**Publisher:** Springer



**Bioactive Extraction and Application in Food and Nutraceutical Industries**  
**Publication Date:** January, 2024  
**Editors:** Tanmay Sarkar, Siddhartha Pati  
**Publisher:** Humana Press





International Society  
for Nutraceuticals & Functional Foods

### MEMBERSHIP APPLICATION 2024

Last Name: _____		First Name: _____	
Membership #: ISNFF- _____			
Company / Institution / University: _____			
Address: _____			
Telephone: (    ) _____		Fax: (    ) _____	
Email address: _____			

New Membership		<input type="checkbox"/>
Renewal		<input type="checkbox"/>
Cancel Membership		<input type="checkbox"/>
Member	\$95	<input type="checkbox"/>
Student Member	\$45	<input type="checkbox"/>
Corporate Member	\$2,000	<input type="checkbox"/>
Corporate Member (Renewal)	\$500	<input type="checkbox"/>
Affiliate and Chapter Member	\$2,000	<input type="checkbox"/>
<b>Payment Method:</b>		
Money Order:	<input type="checkbox"/>	
Credit Card:	VISA <input type="checkbox"/> MASTERCARD <input type="checkbox"/>	
Credit Card #:	_____	
Card Holder:	_____	
Expiry Date:	_____	
<p>Please complete form and return to:</p> <p>ISNFF, P.O. Box 29095, 12 Gleneyre Street, St. John's, NL, A1A 5B5 Canada          Or scan and forward by Email: <a href="mailto:ISNFFsecretary@gmail.com">ISNFFsecretary@gmail.com</a></p>		

