

# Encounters of Functional Foods and Asian Traditional Medicines

VOLUME 25



EDITED BY DR. DANIK  
MARTIROSYAN  
AND DR. MIKIO NISHIZAWA

**Encounters of Functional Foods and Asian Traditional Medicines**

**Organized by Functional Food Center, Dallas, TX, USA and  
Ritsumeikan University, Osaka-Ibaraki Campus, Osaka,  
Japan**

## Encounters of Functional Foods and Asian Traditional Medicines

Volume 25

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This publication is neither a medical guide nor manual for self-treatment. If you should suspect that you suffer from a medical problem, you should seek competent medical care. The reader should consult his or her health professional before adopting any of the suggestions in this book.

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## ACKNOWLEDGMENTS

I would like to extend our warmest gratitude to each contributor of this book for having shared his or her abstracts with us. We have included abstracts authored by esteemed experts from many different countries, including: Australia, Cameroon, Brazil, Nigeria, USA, Korea, Thailand, Taiwan, Japan, Canada, China, Italy, Indonesia, Germany, Belgium, Philippines, Republic of Kazakhstan and many more.

It is our hope that those who read this book will become more knowledgeable about functional, healthy and medical foods, bioactive compounds, and biomarkers in health and disease.

Special thanks to the members of our organizing committee including:

- Mikio Nishizawa, **Co-chairman**, MD, PhD, Professor, College of Biomedical Sciences, Ritsumeikan University, Kusatsu, Shiga, Japan
- Danik Martirosyan, **Co-chairman**, PhD, President, Functional Food Center/Functional Food Institute, Dallas, TX, USA
- Yasuhito Shirai, PhD, Professor, Graduate School of Agricultural Science, Department of Agrobioscience, Kobe University, Kobe, Japan
- Kenji Sato, PhD, professor, Graduate School of Agriculture, Faculty of Agriculture, Kyoto University, Kyoto, Japan
- Jun Nishihira, PhD, Professor, Department of Medical Management and Informatics, Hokkaido Information University, Ebetsu, Hokkaido, Japan

We would like to thank these people and institutions for their passion in spreading the word about this year's conference and helping us gather support in our efforts.

Also, we would like to thank Ritsumeikan University, Functional Food Center, the Journal of Functional Foods in Health and Disease (FFHD), International Journal of Molecular Sciences, and the Journal of Bioactive Compounds in Health of Disease (BCHD), ReGenera Research Group, Lion Corporation, Amino Up Chemical, Tamagokichi, for their help in promoting and sponsoring our conference this year.

**Danik M. Martirosyan, PhD**, President of Functional Food Center, Functional Food Institute, Dallas, TX, USA

**Mikio Nishizawa, MD, PhD, Professor**, College of Biomedical Sciences, Ritsumeikan University, Kusatsu, Shiga, Japan

## INTRODUCTION

The Functional Food Center has successfully held 25 International Conferences, including this one, since 2004. We take special interest in enabling the assimilation of scientific knowledge at our conferences under the series “Functional Foods and Chronic Diseases: Science and Practice.” The 25<sup>th</sup> International Conference was held October 27<sup>th</sup> through October 28<sup>th</sup>, in Osaka, Japan. This conference was titled “Encounters of Functional Foods and Asian Traditional Medicines.”

Main conference sessions and topics include:

- Functional Food Definition and the Status in Japan and USA
- Japanese traditional medicine (Kampo medicine)
- Traditional medicines in China, Taiwan, South Korea, and Indonesia
- Traditional medicines and functional foods
- Functional Food Ingredients: Sources and Potential Benefits in Public Health
- Immunomodulation by Functional Foods: Promising Concept for Chronic Disease and Healthy Aging
- Functional Foods and Chronic Diseases
- Current Research and Development of New Functional Food Products

The Functional Food Center’s research has allowed modern society to evade the side effects of modern pharmaceuticals and the problems associated with treating chronic diseases through surgical procedures. Presented in this book are scientists, food manufacturers, and healthcare professionals who are committed to

functional food research that have brought together ideas and research to treat chronic illnesses and improve the quality of life through the utilization of functional foods with bioactive compounds.

**Danik Martirosyan, PhD**, President of Functional Food Center, Functional Food Institute, Dallas, TX, USA

**Mikio Nishizawa, MD, PhD, Professor**, College of Biomedical Sciences, Ritsumeikan University, Kusatsu, Shiga, Japan

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## Welcoming remark

**Kazuo Kojima, PhD**

Dean, College of Life Sciences, Ritsumeikan University, Kusatsu,  
Shiga, Japan

On behalf of all the faculty and staff of the College of Life Sciences and College of Pharmaceutical Sciences at Ritsumeikan University, it is my great pleasure to welcome all participants in the 25th International Conference of FFC - 13th International Symposium of ASFFBC titled “Encounters of Functional Foods and Asian Traditional Medicines” to Ritsumeikan University Osaka Ibaraki Campus (OIC) in Ibaraki City, Osaka Prefecture. OIC was established in 2015.

It is our great honor to have such a famous conference at OIC. I would like to express my gratitude to Dr. Danik Martirosyan, president of FFC, and all the persons concerned for determining to hold this conference at OIC on the occasion of the 10th anniversary of our two colleges at Ritsumeikan, which were both established in 2008. I would also like to give special mention to Prof. Mikio Nishizawa from the College of Life Sciences for his immense contributions in preparing for this conference.

The College of Life Sciences and College of Pharmaceutical Sciences are located on Ritsumeikan’s Biwako-Kusatsu Campus (BKC), in Kusatsu City, Shiga Prefecture. The College of Life Sciences has four departments: Applied Chemistry, Biotechnology, Bioinformatics, and Biomedical Sciences. The College of Pharmaceutical Sciences consists of two departments: Pharmacy and Pharmaceutical Sciences. In these colleges, many researchers and students are studying about foods, including functional foods, and some of them will present their research findings at this conference.

Ritsumeikan University just established the College of Gastronomy Management, our 15<sup>th</sup> college, at BKC in April of this



## The Angiotensin-I converting enzyme inhibitor of Indonesia herbs that may benefit antihypertension therapy

Dian Laila Purwaningroom<sup>1</sup>, Widodo<sup>2</sup>, Sholihatul Maghfirah<sup>1</sup>, Dianita Rifqia Putri<sup>1</sup>, Siti Munawaroh<sup>1</sup>, Cholik Harun Rosjidi<sup>1</sup>, Muhaimin Rifa'i<sup>2</sup>

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**Keywords:** Indonesian Medicinal Plants, ACE-inhibitor, Antioxidant, *Morinda citrifolia*, *Citrullus lanatus*, and *Cucumis melo*.

**Background:** Indonesia has high biodiversity, with some of these fruits used for traditional medicine. The fruit of Noni (*Morinda citrifolia*), Watermelon (*Citrullus lanatus*), and Cantaloupe (*Cucumis melo*) traditionally have been employed as a functional food for hypertension therapy. However, the mechanism of the fruits as anti-hypertension is still limited. The Angiotensin-I Converting Enzyme (ACE) was a primary target of the antihypertensive drug such as captopril, lisinopril, and enalapril. However, the long-term application of the drugs may cause various side effects, such as dry cough, skin rashes, and angioedema. The pathophysiology of hypertension stimulated by oxidative stress can damage various tissues and implications for cardiovascular disease. Therefore, the ideal hypertension drug may have a dual function of reducing the blood pressure and antioxidant activity without side effects.

**AIM:** This research aims to examine the activity of ACE-inhibitor and phenol content of extracts of *Morinda citrifolia*, *Citrullus lanatus*, and *Cucumis melo*.

**Method:** The fruits were dried and extracted using ethanol 80%, then freezed. The dried extracts were dissolved using distilled water at a concentration of 25 ppm, 50 ppm, 100 ppm, 200 ppm, and 400 ppm, and then adjusted to pH 4. The extracts were examined for ACE inhibition activity using KIT-WST Dojindo according to protocol. The content of total phenol of the fruits was analyzed using a spectrophotometric.

**Result:** Inhibition rate on *Morinda citrifolia*, *Citrullus lanatus*, and *Cucumis melo* were 23.18%, 52.44%, 52.44% (25 ppm); 30.81%, 65.08%, 74.21% (50 ppm); 61.15%, 77.66%, 81.24% (100 ppm); 83.45%, 88.15%, 80.67% (200 ppm); and 83.69%, 99.89%, 82.54% (400 ppm). The IC<sub>50</sub> of ACE-inhibition of *Morinda citrifolia*, *Citrullus lanatus*, and *Cucumis melo* were 77.29 ppm, 20.90 ppm, and 8.06 ppm respectively. In contrast, the total phenol were 529.08 ± 2.16 mg/L, 441.33 ± 3.61 mg/L, and 294.90 ± 1.44 mg/L respectively.

**Conclusion:** This study suggested that the three fruits have activity as ACE-inhibitor. The most potent fruit was *Cucumis melos*, while *Morinda citrifolia* had the highest phenol content.

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**Editorial Assistant:** Krystal Khan

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Danik Martirosyan, PhD, and Mikio Nishizawa, MD,  
PhD, Professor

