Nutraceutical Science and Technology 4

Nutraceutical Proteins and Peptides in Health and Disease

Edited by

Yoshinori Mine

Fereidoon Shahidi

CRC Taylor & Francis
Taylor & Francis Group

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CRC Taylor & Francis
Taylor & Francis Group
Boca Raton London New York

A CRC title, part of the Taylor & Francis imprint, a member of the Taylor & Francis Group, the academic division of T&F Informa plc.

Published in 2006 by
CRC Press
Taylor & Francis Group
6000 Broken Sound Parkway NW, Suite 300
Boca Raton, FL 33487-2742

Printed in the United States of America on acid-free paper
10 9 8 7 6 5 4 3 2 1

International Standard Book Number-10: 0-8247-5354-2 (Hardcover)
International Standard Book Number-13: 978-0-8247-5354-2 (Hardcover)
Library of Congress Card Number 2005043917

Library of Congress Cataloging-in-Publication Data

Nutraceutical proteins and peptides in health and disease / Yoshinori Mine and Fereidoon Shahidi, editors.
p. cm. -- (Nutraceutical science and technology ; 4)
Includes bibliographical references and index.
ISBN 0-8247-5354-2
1. Functional foods. 2. Food--Protein conntent. 3. Protein drugs. 4. Proteins in human nutrition. I. Mine, Yoshinori. II. Shahidi, Fereidoon, 1951- III. Series.

QP144.F85N88 2005
612.3'98--dc22 2005043917

T&F informa
Taylor & Francis Group
is the Academic Division of T&F Informa plc.

Visit the Taylor & Francis Web site at http://www.taylorandfrancis.com

and the CRC Press Web site at http://www.crcpress.com

Nutraceutical Proteins and Peptides in Health and Disease

NUTRACEUTICAL SCIENCE AND TECHNOLOGY

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Preface

Recent advancement of science has demonstrated myriad biological activity associated with food proteins and peptides. Reports of the beneficial health effects of some peptides, short-chain and otherwise, have been appearing in the literature. A variety of such peptides may be prepared upon hydrolysis of proteins, using either chemical or enzymatic processes, from a number of source materials, including milk, soy protein, and other plant as well as animal sources. These peptides may have a positive influence on calcium absorption, regulation of serum cholesterol, and the action of proteins as immunomodulators. Furthermore, a number of peptides may possess antimicrobial properties and, hence, may enhance the body's defense mechanisms or be used for rendering microbial stability to foods. Hydrolysis of proteins may also lead to the production of hypoallergenic products, and some may have, in part, inhibitory effects for angiotensin-I-converting enzymes (ACE). Thus, they may have applications in the treatments for blood pressure, heart failure, and myocardinal infarction, as well as diabetic conditions. Bioactive peptides may also be influential in stress reduction through an opiate-like effect.

Quantitative structure–activity relationships have been developed for evaluating the biological role of peptides. Some of the effects are arising from the specific amino acid sequence of individual peptides. Meanwhile, the antioxidant activity of such products has been demonstrated, and this activity may be responsible, at least in part, for some of the biological properties of peptides. Finally, recent developments in proteomics may help in providing novel means for further clarifications regarding the activity and role of biopeptides.

We are grateful to all the authors for their state-of-the-art contributions that made the publication of this book possible. This is the first book covering discussions on bioactive proteins and peptides in the area of nutraceutical and functional foods and can serve as a compendium of information for biochemists, nutritionists, food scientists, and health professionals in universities as well as in government and industry research laboratories. The book could also be used as a reference by senior undergraduate and graduate students. We extend our appreciation to Jennifer Kovacs-Nolan for her help in editing the manuscript.

Yoshinori Mine
Fereidoon Shahidi

Editors

Fereidoon Shahidi, Ph.D., FACS, FCIC, FCIFST, FIFT, FRSC, has reached the highest academic level, university research professor, in the Department of Biochemistry at Memorial University of Newfoundland (MUN). He also is cross-appointed to the Department of Biology, Ocean Sciences Centre, and the aquaculture program at MUN. Dr. Shahidi is the author of over 500 research papers and book chapters, has authored or edited some 40 books, and has given over 300 presentations at scientific conferences. His research contributions have led to several industrial developments around the globe.

Dr. Shahidi's current research interests include different areas of nutraceuticals and functional foods as well as marine foods and natural antioxidants. Dr. Shahidi serves as the editor-in-chief of the *Journal of Food Lipids* and editor of *Food Chemistry* as well as an editorial board member of the *Journal of Food Science*; *Journal of Agricultural and Food Chemistry*, *Nutraceuticals and Food*; and the *International Journal of Food Properties*. He was the recipient of the 1996 William J. Eva Award from the Canadian Institute of Food Science and Technology in recognition of his outstanding contributions to food science in Canada through research and service. He also received the 1998 Earl P. McFee Award from the Atlantic Fisheries Technological Society in recognition of his exemplary contributions in the seafood area and their global impact.

He has been recognized as one of the most highly cited authors in the world in the discipline of agriculture, plant, and animal sciences and was the recipient of the 2002 ADM Award from the American Oil Chemists' Society. Dr. Shahidi is the recipient of the 2005 Stephen Chang Award from the Institute of Food Technologists. He is the past chairperson of Lipid Oxidation and Quality of the American Oil Chemists' Society as well as the agricultural and food chemistry division of the American Chemical Society. He serves as a member of the Expert Advisory Panel of Health Canada on Standards of Evidence for Health Claims for Foods, the Standards Council of Canada on Fats and Oils, the Advisory Group of Agriculture and Agri-Food Canada on Plant Products, and the Nutraceutical Network of Canada. He is a member of the Washington-based Council of Agricultural Science and Technology on Nutraceuticals.

Yoshinori Mine, Ph.D., received an MSc degree in 1987 from the Faculty of Agricultural Science (Food Science), Shinshu University, Japan and a Ph.D. degree in biochemistry from Tokyo University of Agriculture and Technology, Japan in 1993. He joined the University of Guelph, Canada in 1995 as a faculty member in the Department of Food Science. His research of over 15 years has been related to biologically active proteins and peptides in eggs and the molecular biology of egg allergens. Currently, he is professor and industrial research chair in Egg Material Science. He was the recipient of the PREA award (Premier's Research Excellence

Award) in 2000. He has published 11 book chapters, 10 review articles, and 86 peer-reviewed original papers in his field. Dr. Mine has also served as a member of the editorial boards of the *Journal of Agricultural Food Chemistry* and *International Journal of Food Science & Technology*. Dr. Mine is a member of several national and international egg material sciences, nutraceuticals, and functional foods research societies.

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