

## Allelochemicals: Biological Control of Plant Pathogens and Diseases

# Disease Management of Fruits and Vegetables

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VOLUME 2

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# Allelochemicals: Biological Control of Plant Pathogens and Diseases

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 Springer

A C.I.P. Catalogue record for this book is available from the Library of Congress.

ISBN-10 1-4020-4445-3 (HB)  
ISBN-13 978-1-4020-4445-8 (HB)  
ISBN-10 1-4020-4447-X (e-book)  
ISBN-13 978-1-4020-4447-2 (e-book)

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Published by Springer,  
P.O. Box 17, 3300 AA Dordrecht, The Netherlands.

*www.springer.com*

*Printed on acid-free paper*

Cover photo:  
Bio Control of powdery mildew pathogen *Phyllactinia dalbergae* on  
*Dalbergia sisoo* by hyperparasite *Cladosporium spongiosum*.  
(Microphotograph taken by Prof. K.G. Mukerji and Mr. S.K. Das)

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Printed in the Netherlands.

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## Preface

Biological control of plant diseases and plant pathogens is of great significance in forestry and agriculture. There is great incentive to discover biologically active natural products from higher plants that are better than synthetic agrochemicals and are much safer, from health and environmental considerations. The development of natural products as herbicides, fungicides, and their role in biological control of plant disease promises to reduce environmental and health hazards. Allelopathic techniques offer real promise in solving several problems linked with biological control of plant pests. The allelopathic effect of plants on microorganisms, and microorganisms on microorganisms is of great environmental and economic significance. This book is organized around the premise that allelochemicals can be employed for biological control of plant pathogens and plant diseases. Specifically, this volume focuses on (i) discovery and development of natural product based fungicides for agriculture, (ii) direct use of allelochemicals as well as indirect effects through cover crops and organic amendments for plant parasitic pest control and (iii) application of allelopathy in the pest management.

In an effort to address above points, contributing authors provided up-to-date reviews and discussion on allelochemicals-related biological control of plant diseases and pathogens. Chapters 1 - 3 discuss discovery and development of allelochemicals and their role in the management of plant diseases. Chapter 4 discusses the effects of pathogens on the competitiveness and allelopathic ability of their hosts. Chapter 5 highlights the importance of allelopathy for weed control in aquatic ecosystems. Chapters 6-7 deal with bacterial potential in weed management and plant disease control. Chapter 8 describes the role of organic compound ginsenosides from rhizosphere soil and root exudates of american ginseng plant in control of fungal diseases. Antimicrobial and nematicidal substances from the rhizome of chicory has been discussed in Chapter 9. The role of allelochemicals induced in mycorrhizal plants in imparting disease resistance is given in Chapter 10. The last chapter discusses the biocontrol of plant pathogens and diseases by allelochemicals from *Ageratum conyzoides* a weed and rice plants has been highlighted in Chapter 11.

We are grateful to all authors for providing their valuable work to this volume. The articles are original and some have been written for the first time in any book. We are indebted to the following referees for their constructive comments and suggestions: Ana L. Anaya, Mark Bernards, Nancy Kokalis Burelle, Chester L. Foy, John M. Halbrendt, Robert Kremer, Azim Mallik, Susan Meyer, Reid J. Smeda, Tony Sturz, David Wedge and Jeff Weidenhamer. The editorial help of Ineke Ravesloot, Publishing Department, Springer is sincerely appreciated. It is our hope that this book will serve scientific community well, and equally hope that the book will stimulate young students to work on biological control of plant pathogens and diseases through natural allelochemicals.

Inderjit and K.G. Mukerji  
October 2005