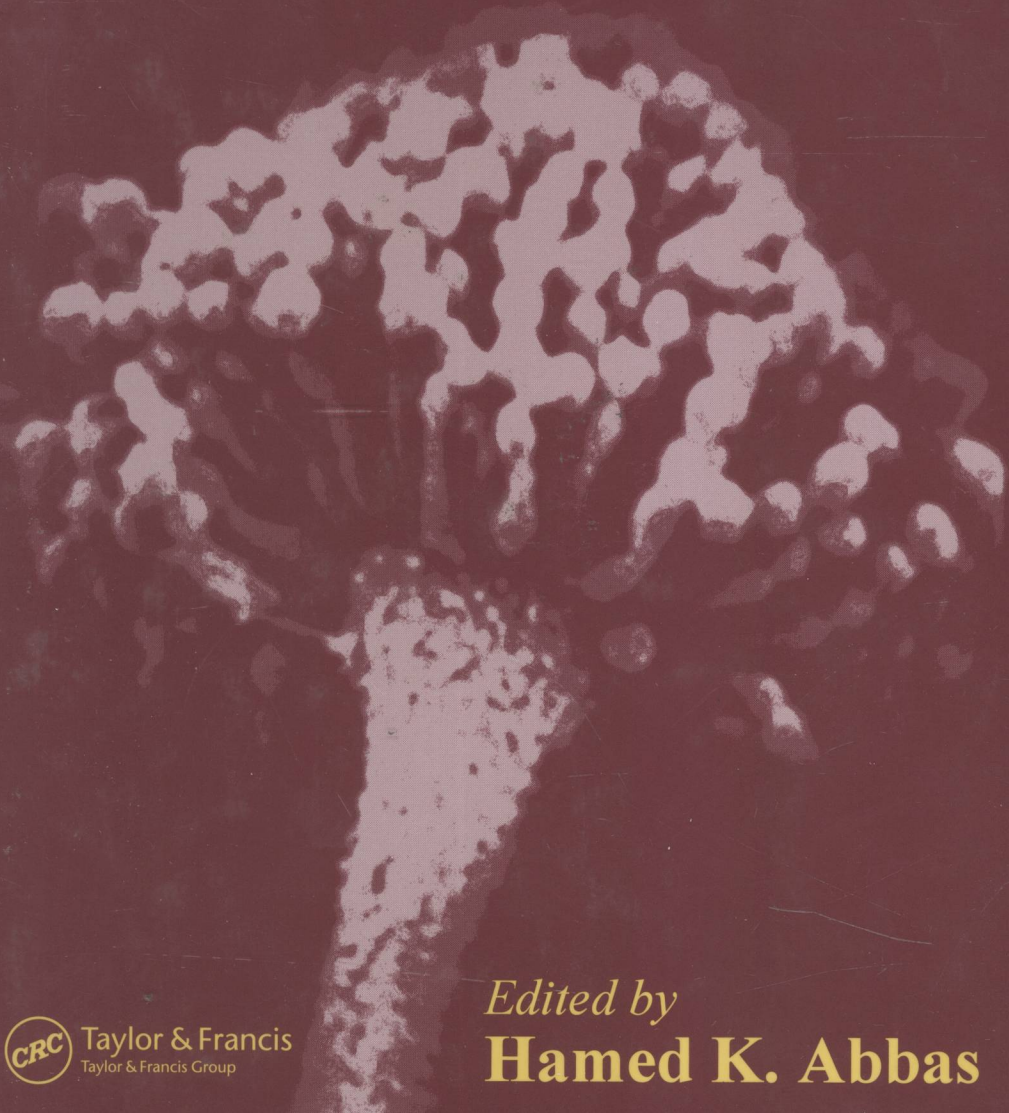


# *Aflatoxin and Food Safety*



*Edited by*  
**Hamed K. Abbas**

 Taylor & Francis  
Taylor & Francis Group

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E2008000102



**Taylor & Francis**

Taylor & Francis Group

Boca Raton London New York

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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 2005 by  
CRC Press  
Taylor & Francis Group  
6000 Broken Sound Parkway NW, Suite 300  
Boca Raton, FL 33487-2742

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CRC Press is an imprint of Taylor & Francis Group

No claim to original U.S. Government works  
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: 0-8247-2303-1 (Hardcover)  
International Standard Book Number-13: 978-0-8247-2303-3 (Hardcover)  
Library of Congress Card Number 2005047024

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### Library of Congress Cataloging-in-Publication Data

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Aflatoxin and food safety / Hamed K. Abbas, editor.  
p. cm. -- (Food science and technology series ; no. 149)

Includes bibliographical references and index.

ISBN 0-8247-2303-1 (alk. paper)

1. Aflatoxins. 2. Food--Safety measures. I. Abbas, Hamed K. II. Title. III. Series: Food science and technology (CRC Press) ; 149.

RA1242.A344A35 2005  
615.9'5295657--dc22

2005047024

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*Aflatoxin  
and  
Food Safety*

*Dedicated to my family (Jean and my four children), whose  
patience, support, and inspiration are deeply appreciated.*

*Also, to my late parents and my siblings in Iraq who  
put up with me during my formative years.*

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# Preface

Aflatoxins are a class of toxins produced by *Aspergillus* species, including *A. flavus* Link, *A. parasiticus* Speare, and *A. nomius* Kurtzman, Horn & Hesselstine. These toxins are responsible for damage to 25% of the world's food crops. The fungi produce the contaminating toxins both pre- and postharvest. Aflatoxin is responsible for large economic losses to agriculture in the United States and other developed countries, but in developing countries, where the use of contaminated grain cannot always be avoided, aflatoxins also cause human and animal disease. Aflatoxin exposure contributes to the development of liver cancer in parts of the world where it is endemic, making it a significant contributor to a major public health problem. The presence of other mycotoxins, particularly fumonisins, along with aflatoxin in field samples brings additional concerns for the safety of food and feed supplies.

Until the 1980s, numerous reports and reviews were available on the impact of aflatoxins on livestock. From the 1990s to today, numerous works have appeared reporting studies on toxicological problems caused by aflatoxins, focusing mainly on the molecular biology of aflatoxin in both the fungus and host, aflatoxin management through conventional breeding, and genetic engineering to produce resistant lines of the susceptible crops and their release to general use. Biological control of aflatoxin using nontoxigenic strains of *Aspergillus flavus* in corn, peanut, and cotton made substantial progress during this period. Commercial use of this technology in the field is now showing promise for controlling aflatoxin contamination.

The goal of this book is to provide a comprehensive discussion regarding the progress made over the past 15 years in solving this problem by the world's finest aflatoxin scientists. The book began with the preparation of two special issues on the topic for the *Journal of Toxicology–Toxin Reviews*. Given the lack of books devoted to aflatoxin during the past decade and the low number devoted to other mycotoxins, a distinct need was identified for a book updating research progress in this area. Certainly, the field of aflatoxin research has continued to produce many important scientific publications that would benefit from being brought together in one resource. The general public's interest in aflatoxins has greatly increased in recent years due to publicity about biological terrorism, and scientists around the world share in this interest.

This volume should be of great interest to the scientific research community; to students in a wide range of biological, biomedical, and agricultural fields; to educators; to growers; and to government regulatory agencies in the United States and around the world. Every effort has been made to make this book a comprehensive resource on the subject for all interested persons.

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# The Editor

**Hamed K. Abbas, Ph.D.**, is a lead scientist of the Mycotoxin Project and a Senior Research Plant Pathologist at the U.S. Department of Agriculture–Agricultural Research Service (USDA-ARS), Crop Genetics and Production Research Unit, Mid-South Area, Stoneville, Mississippi. Dr. Abbas completed his undergraduate and master's education at Baghdad University, Baghdad, Iraq, in 1977. He then immigrated to the United States, where he completed his doctorate in mycotoxin research at the Department of Plant Pathology, University of Minnesota, in 1987. Dr. Abbas has been involved in mycotoxin research throughout his career, initially working with biological control agents produced by fungi and bacteria. Over the last 3 years, Dr. Abbas has focused on aflatoxin and fumonisin contamination in cereal crops. Dr. Abbas has authored publications, including contributions to over 150 research journals, and is a sought-after speaker at scientific meetings. He has extensive experience with mycotoxins from the perspectives of both safety and biological control.

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# Acknowledgments

I am most grateful for the contributions of the authors as well as the support of many other individuals (especially Professor W. Thomas Shier, Bobbie J. Johnson, and Jennifer L. Tonos) who provided assistance during the preparation of this volume.



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