

Dry Beans and Pulses

Production, Processing and Nutrition



Edited by
Muhammad Siddiq
Mark A. Uebersax

 WILEY-BLACKWELL

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A John Wiley & Sons, Inc., Publication

This edition first published 2013 © 2013 by John Wiley & Sons, Inc.

Wiley-Blackwell is an imprint of John Wiley & Sons, formed by the merger of Wiley's global scientific, technical, and medical business with Blackwell Publishing.

Editorial offices: 2121 State Avenue, Ames, Iowa 50014-8300, USA
The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK
9600 Garsington Road, Oxford, OX4 2DQ, UK

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Library of Congress Cataloging-in-Publication Data

Dry beans and pulses production, processing and nutrition / editors, Muhammad Siddiq, Mark A. Uebersax.
pages cm

Includes bibliographical references and index.

ISBN 978-0-8138-2387-4 (hardback)

1. Dried beans. 2. Dried food industry. I. Siddiq, Muhammad, 1957– editor of compilation.
- II. Uebersax, Mark A., editor of compilation.

TP444.B38D79 2013

664'.0284—dc23

2012019772

A catalogue record for this book is available from the British Library.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Cover design by His and Her Design

Set in 10/12 pt Times Roman by Toppan Best-set Premedia Limited

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Preface

The common beans and pulses are diverse food resources of high nutritional value (protein, energy, fiber, and vitamins and minerals) with broad social acceptance. These legume crops demonstrate global adaptability, genotypic and phenotypic diversity and multiple means of preparation and dietary use. Beans and pulses are produced in regions as diverse as Latin America, Africa, Asia and North America. However, these food crops have not been afforded their due importance to a scale similar to some other crops such as wheat, corn, rice or soybean.

Numerous factors influence utilization, including: bean type and cultivar selection, cropping environment and systems, storage conditions and handling infrastructure, processing and final product preparation. Further, nutrient content and bioavailability are dramatically influenced by these conditions. In recent years, beans and pulses have been cited for imparting specific positive health potentiating responses, such as hypocholesteremic response, mitigation of diabetes and colorectal cancer, and weight control. Enhanced dry bean utilization focused on improved dietary health is an opportunity within both subsistent and developed populations.

This book provides a contemporary source of information that brings together current knowledge and practices in the value chain of bean/pulse production, processing, and nutrition. This work provides an in-depth coverage on a wide variety of pertinent topics: breeding, postharvest technologies, composition, processing technologies, food safety, quality, nutrition, and significance to human health. An experienced team of over 25 contributors from North America, Asia and Africa has written 15 chapters, divided into three sections. These contributors come from a field of diverse disciplines, including crop sciences, food science and technology, food biochemistry, food engineering, nutritional sciences and culinology.

Part I of the book—"Overview, production and postharvest technologies of beans and pulses"—contains chapters on global production and consumption; breeding and production technologies; market classes and physical and physiological characteristics; and postharvest storage quality, packaging and distribution. Part II—"Composition, value-added processing and quality"—has eight chapters: composition of processed beans/pulses; hydration, blanching, and thermal processing; canning and canned products; extrusion processing and products; processing of flours and fractions; cowpea processing and products; utilization of beans and pulses in Africa; and common pulses, including chickpea, lentil, mungbean, black gram, pigeon pea and Indian vetch. The last part—"Culinology, nutrition and significance in human health"—has three chapters: culinary perspective of beans and pulses; nutrition and human health benefits; and chemistry and implications of antinutritional factors. This value-chain approach to the topics covered is a distinctive feature of this book.

The editors acknowledge many individuals for their support from conception through final development of this book. Foremost is our sincere thanks and gratitude to all authors for their contributions and for bearing with us during the review and finalization process of their chapters. We are grateful to our family members for their understanding and support enabling us to complete this work. We dedicate this work to the worthy contributions of the numerous researchers and students throughout the world for their decades-long devoted efforts to improve the quality and utilization of dry beans and pulses.

Muhammad Siddiq
Mark A. Uebersax

Part I

Overview, Production and Postharvest Technologies

1 Dry Beans and Pulses Production and Consumption—An Overview

Muhammad Siddiq and Mark A. Uebersax

| | |
|---|---|
| Introduction | Value-added processing and products |
| History and origin | Nutritional and health considerations |
| Production and trade | Nutritional profile |
| Global production and trade | Health significance |
| US production and trade | Beans and pulses use in weaning foods |
| Consumption trends of dry beans | Constraints to beans and pulses utilization |
| Dry beans and pulses as a diverse food resource | Beans and pulses in world food security |
| Traditional utilization | Summary |
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INTRODUCTION

Legumes (dry beans and pulses) occupy an important place in human nutrition, especially among the low-income groups of people in developing countries. They are a good source of protein (significantly higher than that of cereals), dietary fiber, starch (Osorio-Diaz et al. 2003), minerals and vitamins (Kutos et al. 2002). They are a staple food and low-cost source of protein in developing countries where protein energy malnutrition (PEM) is prevalent (Van Heerden and Schonfeldt 2004). Many reports claim that inclusion of legumes in the daily diet has many beneficial physiological effects in controlling and preventing various metabolic diseases such as diabetes mellitus, coronary heart disease and colon cancer (Tharanathan and Mahadevamma 2003). Further, legumes belong to the group that elicits the lowest blood glucose response and contains considerable amount of phenolic compounds. The role of legumes as therapeutic agents in the diets of people suffering from metabolic disorders has gained significant interest in recent years.

Legume crops demonstrate global adaptability, genotypic and phenotypic diversity, and multiple means of preparation and dietary use (see Fig. 1.1 for a selection of common dry