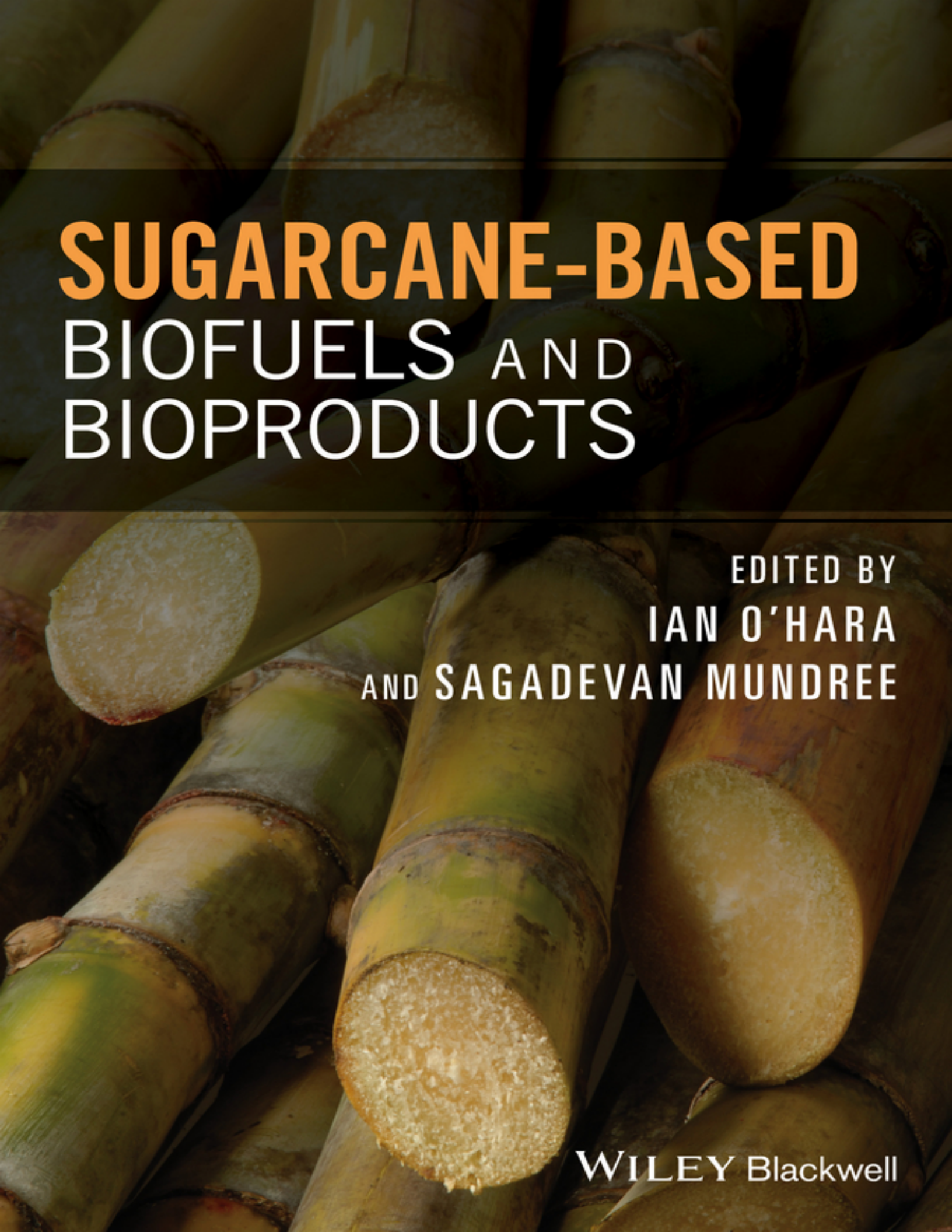
SUGARCANE-BASED
BIOFUELS AND
BIOPRODUCTS
EDITED BY
IAN O'HARA
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Sugarcane-Based Biofuels and Bioproducts

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Preface

As a society we are faced with significant issues. There is an urgent need to address the challenge of climate change while continuing to promote development in the world's poorest countries. From an agricultural perspective, our land, water, energy, and food systems are inextricably linked. New technologies are needed to provide sustainable energy solutions and at the same time enhance food availability and distribution.

Sugarcane is one of the world's most important agricultural crops with a long history of use for the production of food, energy, and coproducts. Growing across many countries in tropical and subtropical regions, sugarcane has a significant global footprint. The high photosynthetic efficiency and high biomass production makes sugarcane an ideal feedstock for both food production and the coproduction of non-fossil-based chemicals, polymers, and energy products.

While the opportunities for the use of sugarcane for ethanol production are well-known, there are many other potential products of similar or higher value that can be produced from the crop. Technology developments, most particularly in the fields of agricultural and industrial biotechnology, are providing new opportunities to diversify the revenue base for sugar producers. Not only does the application of this technology promote economic viability of sugarcane producers and their regional communities, it also helps to address our over-reliance on products from fossil-based resources, and hence contributes to global decarbonization activities. These economic, social, and environmental benefits, however, will only be achieved where technologies are adopted in an appropriate manner.

This book provides a comprehensive overview of current and future opportunities for the production of biofuels and bioproducts from sugarcane. The first section of the book (Chapters 1 and 2) provides an overview of the sugarcane industry and presents the opportunities and challenges in this area. This section also examines the sugarcane crop biotechnology and the opportunities that this field presents in enhancing opportunities for the production of bioproducts. The second section of the book (Chapters 3–12) provides detailed overviews of the current state-of-the-art relating to a variety of biofuel and bioproduct opportunities from sugarcane. These opportunities include more traditional products such as ethanol production, pulp and paper, animal feed products and cogeneration to future opportunities such as the production of fermentable sugars from bagasse and their subsequent conversion into specialty chemical products. The final section of the book addresses aspects relating to sugarcane biofuel and bioproduct sustainability, techno-economics, and whole-of-system process integration.

The editors are very grateful to the many authors who contributed to this book. All of the authors are recognized as leading experts in their fields and provide unique perspectives as a result of their many decades of experience in sugar, biofuels, and bioproducts research. Without their contributions, this book would not have been possible and we appreciate their insights and highly value the contributions that they have made.

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Sagadevan G. Mundree
9 July 2015
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Part I
Sugarcane for biofuels and bioproducts