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Tasneem Abbasi - S.M. Tauseef
S.A. Abbasi

Biogas Energy

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ISBN 978-1-4614-1039-3 e-ISBN 978-1-4614-1040-9
DOI 10.1007/978-1-4614-1040-9
Springer New York Dordrecht Heidelberg London

Library of Congress Control Number: 2011939062

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Printed on acid-free paper

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Dedicated to

*Aunties Neelu, Sophia, and Rubi
–Tasneem Abbasi*

*Papa (Abid Hussain Saheb),
Ammi (Tasneem Fatima Sahiba),
and my beloved wife Rabab
–S.M. Tauseef*

*Didi (Nilofer Changi),
Aapa (Sophia Kapasi), and Rubi behn
–S.A. Abbasi*

Foreword

For most of the twentieth century “biogas” was perceived as a poor man’s fuel. India and China led the initiative of the developing countries in extracting biogas from animal manure to meet the much needed source of energy for farmers in villages. To developed countries, however, biogas was too lean and too inconvenient a fuel compared to the then abundantly available and cheaper petroleum-based fuels. Hence they either released the biogas that got generated in to atmosphere during manure management or from sanitary landfills, or flared it off when there was a danger of it forming a flammable cloud upon release.

For a short while developed countries did look at biogas as a potential fuel during 1973 and 1979 when “oil shocks” crisis hit them. But when the crisis passed off and oil prices dipped through the 1980s, the biogas again went out of contention in the developed world just as other non-conventional energy sources did.

The perceptions saw a sea change at the beginning of twenty-first century in the wake of an imminent threat to the existence of life on the planet earth due to global warming.

The world has realized that methane – which is the major component of “biogas” – is the second biggest contributor to global warming, next only to carbon dioxide. It is a fact that each molecule of methane potentially causes several times more global warming compared to a molecule of carbon dioxide, it is also a fact that the same methane, if captured and used as fuel, provides one of the cleanest sources of energy. This has brought methane capture to the forefront of global R&D thrust.

Interestingly, the status of biogas has also changed from a “poor man’s fuel” to a “global priority” in such a short time that a large part of the world was not adequately prepared for it. I also understand there are hardly any dedicated books related to this emerging important clean fuel source. Hence I feel that the work presented in this book would be a trail-blazer and contribute to the R&D efforts in biogas generation and use.

Professor S.A. Abbasi has been associated with R&D on biogas since the 1970s and has pioneered the use of aquatic weeds in biogas generation, reporting research findings regularly since 1979. He has produced this book jointly with his two junior associates who also have substantial exposure in this area. I congratulate Springer for their foresight in commissioning this book and wish it critical, as well as commercial, success.

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Prof. J.A.K. Tareen
Vice Chancellor

Preface

Like carbon dioxide, methane is also generated in nature through a number of different routes and plays a crucial role in keeping the earth warm enough to be habitable. But during the last two centuries, and more so in the last few decades, anthropogenic activities have been contributing more *extra* methane to the earth's atmosphere than is good for the health of the Earth.

Each methane molecule contributes about 25 times as much to global warming as a molecule of carbon dioxide but methane has one major attribute which carbon dioxide does not have – methane can be used as a fuel. These twin aspects makes it doubly gainful to “capture” anthropogenic methane.

In developing countries, especially India and China, the importance of capturing methane that is generated from animal manure was recognized from the early twentieth century and major programmes were launched to popularize the “biogas digesters” that made this methane capture possible. Then the advent of several “high-rate” digesters during the late 1960s and early 1970s dramatically enhanced the reach of anaerobic digestion to wastewaters which were, till then, considered to be too “dilute” to be profitably handled by anaerobic digestion. Now a third, and perhaps the most important, phase of the evolution of biogas technology is underway wherein treatment of municipal solid waste, crop waste, and other forms of “high-solids” biowaste is being increasingly brought under its preview.

We deem it a privilege to have been asked by Springer to articulate this book at a time when there is a great resurgence of interest in methane capture – hence biogas technology – all over the world.

TA and SAA thank the Department of Biotechnology, Government of India for support in the form of an R&D project. SMT thanks the Council of Scientific and Industrial Research (CSIR), New Delhi, for Senior Research Fellowship. We also thank Ms M. Premaltha, Senior Research Fellow, for her help in locating and organizing on lot of material that has gone in the making of this book. Above all we thank Professor J.A.K. Tareen, Vice Chancellor, Pondicherry University, for his perceptive *Foreword* and the all-important moral support.

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