

Preface

Dwindling fossil fuel reserves and concerns about the enormous impact of climate change attributable to the burning of fossil fuels have focused the world's attention on the search for sustainable sources of renewable energy. A glance at any daily newspaper is very likely to find at least one article treating this subject which has obviously very forcefully entered the public consciousness. While some inroads to these problems have been made through the deployment of technologies that are ready at present, principally generation of electricity with wind or hydro turbines, these resources are insufficient for the enormous challenge in front of us, and certainly are incapable of satisfying more than a tiny fraction of the world's hunger for mobile power sources.

Biofuels, fuels made from biological sources, appear to be the only way to make the necessary liquid or gaseous fuels in sufficient quantities in a renewable way with minimal environmental damage. The only other remotely possible alternative, hydrogen generation with nuclear power, would have a very hard sell after the recent *Fukushima* Daiichi nuclear disaster. It might be possible to someday use biological means to extract energy directly from water in the form of hydrogen. Otherwise, suitable fuels can be derived from biomass, plant material made by the natural process of solar energy capture by photosynthesis. These resources are abundantly available and a variety of processes might be used to derive suitable fuels from them. Some processes use physico-chemical means to directly convert biomass to a biofuel, but these are not discussed here. Rather, the purpose of this book is to introduce the reader to the great variety of biological mechanisms for converting readily available resources, ultimately solar energy, to renewable sustainable fuels. Enough is known now to realize that biofuels cannot be made in sufficient quantities from crops that could ultimately serve as food sources, corn, wheat, or some oil plants, the so-called first generation biofuels, and that the future lies in second generation

biofuels made using advanced technologies. The aim of this book is to survey the science of the possible in this area and to lay out the great diversity in approaches that exist. Further work in the future will be needed to develop the art of the practical in realizing large-scale advanced biofuels production.

Montréal, Québec, Canada

Patrick C. Hallenbeck

Microbial Technologies in Advanced Biofuels Production

Hallenbeck, P.C. (Ed.)

2012, X, 274 p., Hardcover

ISBN: 978-1-4614-1207-6