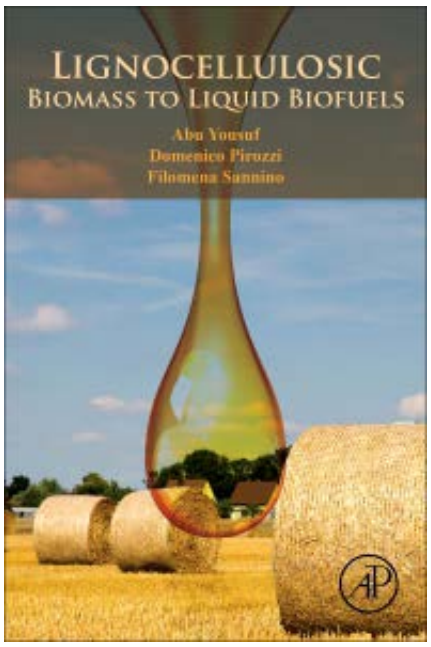

LIGNOCELLULOSIC BIOMASS TO LIQUID BIOFUELS

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Contents

Syngas fermentation to bioethanol

Minhaj Uddin Monir [1,2], Abu Yousuf [3] and Azrina Abd Aziz [1]

1 Faculty of Engineering Technology, Universiti Malaysia Pahang, Gambang, Malaysia

2 Department of Petroleum and Mining Engineering, Jessore University of Science and Technology, Jessore, Bangladesh

3 Department of Chemical Engineering and Polymer Science, Shahjalal University of Science and Technology, Sylhet, Bangladesh

Abstract:

Syngas fermentation is one of the most favorable biochemical conversion techniques for the production of biofuels [1–4]. In this process, syngas is used as a substrate for microorganisms [2], which is produced through a thermochemical process from biomasses [5–8]. Commonly, carboncontaining lignocellulosic biomass (forest residue, coconut shell, empty fruit bunch of palm oil, municipal solid waste, etc.) is converted into gases, such as carbon dioxide (CO2), carbon monoxide (CO), and methane (CH4) [5,6,9–11], and it is further converted into biofuels by utilizing carbon-fixing microbes [1,2,12]. Biomass-derived syngas fermentation from gasification of carbonaceous feedstocks is the most promising conversion technologies of biomass to liquid biofuels. Bioethanol along with acetate, butanol, butyrate, formaldehyde, peptone, and methane (produced from chemical catalytic and biosynthetic processes) is converted to clean and sustainable transportation fuel produced from the lignocellulosic biomasses, such as forest or agricultural biomass [4,5]. Syngas comprises various mixture of CO, CO2, H2, and CH4, which can be produced through gasification of lignocellulosic biomass [6,13]. The composition of syngas varies with the type of biomass used as the feedstock. Different types of gasifiers, such as downdraft, fluidized-bed, and fixed-bed, are used to produce syngas, and it goes through several cleaning stages before entering to the fermenter. Up to this time, it is an on-going research at laboratory scale and novel concepts are integrating to develop the commercial scale.

Keyword: Microorganisms; Microbial culture medium; Acetogenic; Hydrogenogenic