Recent developments on biofuels production from microalgae and macroalgae

Biofuels from algae are considered as promising alternatives of conventional fossil fuels, as they can eliminate most of the environmental problems. The present study focuses on all the possible avenues of biofuels production through biochemical and thermochemical conversion methods in one place, bringing together both microalgae and macroalgae on the same platform. It provides a brief overview on the mechanism of different biofuel production from algae. Factors affecting the biofuel process and the associated challenges have been highlighted along with analysis of techno-economic study available in literature. Undoubtedly, biodiesel is the center of attraction among other biofuels. However, their routes and process need to be optimized in order to bring the minimum fuel selling price (MFSP) of biodiesel competitive. Technological challenges have not been overcome to make biofuel production process energetically and commercially viable. Macroalgae are low in lipid content. Therefore, the use of macroalgae is restricted for gaseous fuels or fermentative methods of liquid biofuels production. Anaerobic digestion of algal biomass is easy and seems promising as the process is simple in terms of engineering and infrastructure requirement. Hydrogen production by microalgae through biophotolysis seems interesting as it directly converts the solar energy into hydrogen. However, the process has not been scaled-up till today. Hydrothermal liquefaction (HTL) is more promising due to handling of wet biomass at moderate temperature and pressure and conversion of whole biomass into high quality oil. However, HTL process is energy intensive.

General information
State: Published
Organisations: Department of Environmental Engineering, Residual Resource Engineering, Indian Institute of Technology, Kharagpur
Number of pages: 15
Pages: 235-249
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Renewable and Sustainable Energy Reviews
Volume: 65
ISSN (Print): 1364-0321
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 10.54 SJR 3.036 SNIP 3.594
Web of Science (2017): Impact factor 9.184
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 9.52 SJR 2.998 SNIP 3.501
Web of Science (2016): Impact factor 8.05
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 8.35 SJR 2.921 SNIP 3.368
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 7.79 SJR 3.03 SNIP 3.72
Web of Science (2014): Impact factor 5.901
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 7.88 SJR 2.98 SNIP 3.893
Web of Science (2013): Impact factor 5.51
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 7.24 SJR 2.734 SNIP 3.861
Web of Science (2012): Impact factor 5.627