Review

A Review on Hydrothermal Pre-treatment Technologies and Environmental Profiles of Algal Biomass Processing

Bhavish Patel, Miao Guo, Arash Izadpanah, Nilay Shah, Klaus Hellgardt

PII: S0960-8524(15)01343-7
DOI: http://dx.doi.org/10.1016/j.biortech.2015.09.064
Reference: BITE 15573

To appear in: *Bioresource Technology*

Received Date: 7 July 2015
Revised Date: 15 September 2015
Accepted Date: 20 September 2015

Please cite this article as: Patel, B., Guo, M., Izadpanah, A., Shah, N., Hellgardt, K., A Review on Hydrothermal Pre-treatment Technologies and Environmental Profiles of Algal Biomass Processing, *Bioresource Technology* (2015), doi: http://dx.doi.org/10.1016/j.biortech.2015.09.064

A Review on Hydrothermal Pre-treatment Technologies and Environmental Profiles of Algal Biomass Processing

Bhavish Patel, Miao Guo, Arash Izadpanah, Nilay Shah and Klaus Hellgardt*

Imperial College London, Dept. of Chemical Engineering, Exhibition Road, South Kensington, London SW7 2AZ, UK

E-mail: k.hellgardt@imperial.ac.uk | Tel: +44 (0)20 7594 5577

Abstract

The need for efficient and clean biomass conversion technologies has propelled Hydrothermal (HT) processing as a promising treatment option for biofuel production. This manuscript discussed its application for pre-treatment of microalgae biomass to solid (biochar), liquid (biocrude and biodiesel) and gaseous (hydrogen and methane) products via Hydrothermal Carbonisation (HTC), Hydrothermal Liquefaction (HTL) and Supercritical Water Gasification (SCWG) as well as the utility of HT water as an extraction medium and HT Hydrotreatment (HDT) of algal biocrude. In addition, the Solar Energy Retained in Fuel (SERF) using HT technologies is calculated and compared with benchmark biofuel. Lastly, the Life Cycle Assessment discusses the limitation of the current state of art as well as introduction to new potential input categories to obtain a detailed environmental profile.

Keywords: Environmental Impact, LCA, Hydrothermal Technology, Microalgae, Biofuels