Thermochemical conversion of microalgal biomass into biofuels

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ABSTRACT

Thermochemical conversion of biomass into biofuels is a beneficial process for the production of renewable energy. It is a process in which thermal decomposition of organic compound takes place to generate biofuels. Production of first generation biofuels from food crops and second generation biofuels from non-food crops is common now. But for the production of third generation biofuels use of algal biomass is very effective. Microalgal biomass is known for its rapid growth, less time consuming and higher efficiency for carbon fixation features. Also considered as most exclusive among all the renewable energy sources because of its property of storing solar energy. It is among those renewable resources of carbon which can be converted into solid, liquid and the gaseous biofuels using different process. Under thermochemical conversion the algal biomass can be converted into biofuels using the process of pyrolysis, gasification, hydrothermal liquefaction (HTL), direct combustion and torrefaction. Pyrolysis is the process through which conversion of biomass into bio-oil, syngas or biochar takes place in absence of oxygen and require temperature of 300-700 °C. In gassification the conversion of biomass into gaseous fuels done by the partial oxidation of biomass at very high temperature of >800 °C. HTL produce liquid fuel at temperature of 250-350 °C. Terrofication occurs at 200-300 °C. Need more research to maintain a balance between economy and energy generation. This method can be utilized for the production of huge amount of renewable energy (generation of heat and power).

Keywords: Thermochemical conversion, biofuels, microalgal biomass, pyrolysis, gasification

