

Examination of Microalgal Pyrolytic Bio-char Properties

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Abstract:

Pyrolysis products of microalgae are bio-oil, bio-char, and bio-syngas. Bio-char is the main product of microalgae slow pyrolysis. Compared to fossil fuels, microalgal bio-char gives more energy and releases less CO₂ after its combustion. Bio-char can be used as fertilizer or in the production of nanotubes, activated carbon, carbon fibers. Bio-char retains its stability under most conditions and it has high C content. Under slow pyrolysis conditions at 500 °C, it has been known that *Spirulina* sp. bio-char has more C content and High Heating Value (HHV) compared to bio-char of *Chlorella vulgaris* sp. microalgae. In this study, pyrolysis of *Spirulina* was carried out in semi-batch reactor, at 25 mL/min N₂ gas flow rate, at 10 °C/min heating rate, with 60 min residence time and 15 g feedstock. Temperature was altered from 470 to 620 °C during the experiments. Yields of products were computed. Nitrogen adsorption, Scanning electron microscope, and elemental analysis were done for the bio-char. It was detected that C content of bio-chars was between 56-58 % by weight.

Keywords: Bio-char characterization, Biomass, Spirulina, Thermal degradation