



Biochar Production from Microwave Pyrolysis of Biomass and its Utilization: A Review

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Abstract

The biochar is produced by decomposition of biomass using thermochemical process. Biochar production helps in the reduced emission of CO into the atmosphere. It is very eco-friendly and also a good substitute for activated carbon. The different biochar processes includes gasification, pyrolysis, hydrothermal carbonization, etc. This process is very much economical and can be used for waste management, greenhouse gas production (GHG), soil filling and energy production, etc. Now-a day's microwave heating became very popular in food process industries due to volumetric heating. The production of biochar and biofuel by pyrolysis using microwaves is very much cost effective. This review provides information about biochar pyrolysis, biochar yield with its properties and the common catalyst used for the purpose in the microwave pyrolysis. Also the comparison between the conventional pyrolysis and the microwave pyrolysis with its effective utilization is listed. Microwave energy act as a catalysts and interacts with vapour, gas and solid in the reactors. It also helps in product quality improvements. The highest biochar yield can be >60% in microwave pyrolysis. The Brunauere Emmette Teller (BET) surface of the biochar was found to be 400-600 m/g. The biochar thus produced can be utilized for adsorption of air and water pollutants, biodiesel production and soil conditioning. The quality of the biomass and operating conditions are the parameters that determine the quality of the biochar. The effects of process parameters on the product of biomass were also included in this review.

Keywords: Biochar; Microwave heating; Carbonization; Biochar yield; BET surface

The main contributor to the global warming is carbon dioxide gases from the greenhouse gases. The emission these gases led to increase in the amount of carbon dioxide in the atmosphere to the level of 280 to 400 ppm (Xie *et al.*, 2014). Pyrolysis what's more, gasification are getting to be noticeably encouraging innovations for biomass usage with a positive natural effect. Biomass pyrolysis is a warm corruption process in the nonattendance of oxygen or air to deliver different vaporous and watery items and additionally roast deposits (Basu, 2010). The warmth required by endothermic pyrolysis responses is generally given by coordinate warming or backhanded warming from hot gasses, hot solids, fluid warmth exchange media,

oxidation and incomplete oxidation responses. Microwave-assisted pyrolysis has been exhibited as a promising other option to ordinary pyrolysis in the previous decades, predominantly on account of its quick warming rate, specific warming, volumetric also, uniform warming, along these lines quickening response rates and expanding vitality effectiveness. Microwave warming gives simplicity of operation by moment on/off control and enhances the yield also, nature of the items. Besides, it decreases risky

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