

Microwave-assisted pyrolysis of biomass waste: a mini review

ABSTRACT

The utilization of biomass waste as a raw material for renewable energy is a global concern. Pyrolysis is one of the thermal treatments for biomass wastes that results in the production of liquid, solid and gaseous products. Unfortunately, the complex structure of the biomass materials matrix needs elevated heating to convert these materials into useful products. Microwave heating is a promising alternative to conventional heating approaches. Recently, it has been widely used in pyrolysis due to easy operation and its high heating rate. This review tries to identify the microwave-assisted pyrolysis treatment process fundamentals and discusses various key operating parameters which have an effect on product yield. It was found that several operating parameters govern this process such as microwave power and the degree of temperature, microwave absorber addition and its concentration, initial moisture content, initial sweep gas flow rate/residence time. Moreover, this study highlighted the most attractive products of the microwave pyrolysis process. These products include synthesis gas, bio-char, and bio-oil. The benefits and challenges of microwave heating are discussed.

Keyword: Microwave-assisted pyrolysis; Biomass; Operating parameters; Bio-char; Bio-oil