

ABSTRAK

Proses hidrotermal merupakan salah satu metode konversi biomassa dimana produknya dapat digunakan sebagai bahan bakar. Salah satu tantangan utama dalam teknologi *hydrothermal* adalah produk samping yang dihasilkan yaitu air limbah hasil degradasi biomassa melalui reaksi yang berbeda seperti hidrolisis, dehidrasi, dekarboksilasi dan polimerasi. Air yang dihasilkan dari proses hidrotermal mengandung sejumlah besar bahan organik terlarut, konsentrasi karbon organik total dan COD yang tinggi.

Penelitian ini membahas tentang pengaruh *recycle* air *hydrothermal treatment* terhadap produk padat dan produk cairan dari biomassa biji kacang panjang dan biji kangkung dengan variasi suhu 180, 200 dan 220°C dan rasio biomassa-air 1:5 serta residence time 40 menit. Produk padat dianalisis nilai *yield*, nilai kalor, analisis proksimat, analisis ultimat dan produk cairan dilakukan analisis pH dan *Gas Chromatography Mass Spectrometry*.

Hasil analisis menunjukkan dengan meningkatnya jumlah *recycle* air dan suhu proses *hydrothermal* memberikan pengaruh terhadap peningkatan nilai *yield*, nilai kalor, kadar volatil dan kadar karbon terikat pada *hydrochar* dari biji kangkung dan biji kacang panjang. Nilai *yield hydrochar* biji kangkung mengalami peningkatan sebesar 11% dihasilkan dari *recycle* ketujuh sebesar 62,73% dan 58,92% untuk *hydrochar* biji kacang panjang dengan peningkatan sebesar 12%, sedangkan nilai kalor tertinggi dihasilkan dari *recycle* kelima suhu 220°C sebesar 5.499 kal/g *hydrochar* biji kangkung dan 5.465 kal/g *hydrochar* biji kacang panjang.

Kata Kunci : Biomassa, *recycle*, *hydrothermal treatment*, biji kacang panjang, biji kangkung.

ABSTRACT

The hydrothermal process is one method of biomass conversion while the product can be used as fuel. One of the main challenges in hydrothermal technology is the byproduct that is produced is wastewater that is degraded through different reactions such as hydrolysis, dehydration, decarboxylation, and polymerization. Water produced from the hydrothermal process contains a large proportion of dissolved organic matter, high total organic carbon, and COD.

This study discusses the effect of hydrothermal water recycling on solid products and liquid products from a long bean and kale seed biomass with a temperature variation of 180, 200 and 220°C and a biomass-water ratio of 1: 5 and a residence time of 40 minutes. Solid products yield value, calorific value, proximate analysis, ultimate analysis, and liquid products were analyzed by pH and Gas Chromatography, Mass Spectrometry.

The analysis shows that comparing the amount of water recycling process and hydrothermal temperature provides a comparison to the increase in yield value, heat value, volatile content and carbon content in hydrocarbons from water spinach and long bean seeds. The value of water spinach seed hydrocarbons increased by 11% resulting from the seventh recycling of 62.73% and 58.92% for long bean seed hydrocarbons with an increase of 12%, while the increased heat value resulting from recycling 220 220C temperature of 5.499 cal /g hydrochar water spinach seeds and 5,465 cal /g hydrochar long bean seeds.

Keywords : Biomass, recycle, hydrothermal treatment, cowpea seed, ipomoea sp.