INOVASI SINTESIS LIMBAH PLASTIK *POLYETHYLENE* SEBAGAI BAHAN BAKAR MINYAK BERBANTUAN KATALIS KARBON AKTIF KULIT SINGKONG (*MANIHOT UTILLISIMA*) TERAKTIVASI $ZnCL_2$ SEBAGAI UPAYA MEWUJUDKAN SDG'S 2045

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ABSTRAK

Krisis kebutuhan energi berupa bahan bakar minyak maupun bahan bakar gas semakin meningkat. Disamping itu jumlah limbah plastik mengalami peningkatan hingga 15% per tahun yang menyebabkan berbagai persoalan lingkungan. Penanggulangan limbah plastik seperti *polyethylene* saat ini dinilai kurang optimal, sehingga diperlukan alternatif lain salah satunya dengan proses sintesis *polyethylene* menjadi bahan bakar. Sintesis dilakukan melalui proses *catalytic cracking* dengan bantuan katalis karbon aktif kulit singkong teraktivasi $ZnCl_2$. Hasil uji menunjukkan bahwa karbon aktif kulit singkong sebagai katalis sangat baik karena memenuhi Standard Nasional Indonesia (SNI) yaitu kadar air 6,11%, kadar abu 5,83%, kadar zat mudah menguap 9,88%, dan kadar karbon terikat 84,29%. Hasil bahan bakar yang didapatkan juga optimal yaitu sebanyak 22 ml dengan bantuan katalis karbon aktif, sementara hasil bahan bakar tanpa bantuan katalis karbon aktif sebanyak 5 ml.

Kata kunci: karbon aktif, *polyethylene*, energi terbarukan

ABSTRACT

The crisis of energy demand in the form of fuel oil and gas fuel is increasing. Besides that, the amount of plastic waste has increased by up to 15% per year which causes various environmental problems. Management of plastic waste such as polyethylene is currently considered less than optimal, so other alternatives are needed, one of which is the synthesis of polyethylene into fuel. The synthesis was carried out through a catalytic cracking process with the help of activated carbon catalyst, activated cassava peel, $ZnCl_2$. The test results showed that cassava peel activated carbon as a catalyst was very good because it met the Indonesian National Standard (SNI), namely water content of 6.11%, ash content of 5.83%, volatile matter content of 9.88%, and bound carbon content of 84, 29%. The fuel yield obtained is also optimal, namely as much as 22 ml with the help of an activated carbon catalyst, while the fuel yield without the help of an activated carbon catalyst is 5 ml.

Keywords: activated carbon, polyethylene, renewable energy