

## ABSTRAK

**Nia Veronika, NIM 4192510006 (2019). Konversi Bio-Oil Dari Kulit Kopi Dengan Metode Pirolisis Dan *Upgrading* Melalui Reaksi Hidrodeoksigenasi Menggunakan Katalis Ni/Zeolit .**

Bio-oil hasil pirolisis kulit kopi potensial untuk dijadikan sebagai sumber bahan bakar bio-hidrokarbon. Pada penelitian ini dilakukan proses pirolisis kulit kopi pada suhu 500 °C, kemudian bio-oil yang diperoleh ditreatment untuk meningkatkan kualitasnya melalui reaksi hidrodeoksigenasi (HDO) menggunakan katalis zeolite, Ni/Zeolit 3M, Ni/Zeolit 5M dan Ni/Zeolit 7M pada suhu 350 °C selama 2 jam. Produk HDO dianalisis dengan menggunakan instrument *Gas Chromatography Mass Spectrometry* (GC-MS), analisis elementer dan analisis sifat fisika-kimianya. Hasil analisis yang diperoleh menunjukkan bahwa bio-oil hasil proses pirolisis mengandung senyawa potensial seperti fenol dan furan. Pada proses hidrodeoksigenasi katalis Ni/Zeolit 7M memiliki aktivitas yang lebih baik, hal ini terlihat dari besarnya yield produk cair yang dihasilkan. Sementara itu katalis Ni/Zeolit 5M menunjukkan selektivitas yang lebih baik dibandingkan katalis lainnya dalam mengonversi senyawa hidrokarbon sikloalkana. Sifat fisika-kimia dari produk cair katalis Ni/Zeolit 5M juga menunjukkan peningkatan kualitas bio-oil dengan berkurangnya kadar air dan peningkatan HHV.

**Kata Kunci :** Bio-oil, Pirolisis, Hidrodeoksigenasi, Katalis, Zeolit, Logam Ni.



## ABSTRACT

**Nia Veronika, NIM 4192510006 (2019). Converting Bio-Oil From Coffee Skins Using Pyrolysis Methods And Upgrading Through Hydrodeoxygenation Reactions Using Ni/Zeolite Catalysts.**

Bio-oil resulting from the pyrolysis of coffee husks has the potential to be used as a source of bio-hydrocarbon fuel. In this study, the pyrolysis process of coffee husks was carried out at 500°C, then the bio-oil obtained was treated to improve its quality through the hydrodeoxygenation (HDO) reaction using zeolite catalysts, Ni/Zeolite 3M, Ni/Zeolite 5M and Ni/Zeolite 7M at 350°C for 2 hours. HDO products were analyzed using a Gas Chromatography Mass Spectrometry (GC-MS) instrument, elemental analysis and analysis of their physico-chemical properties. The analysis results obtained show that the bio-oil produced by the pyrolysis process contains potential compounds such as phenols and furans. In the hydrodeoxygenation process the 7M Ni/Zeolite catalyst has better activity, this can be seen from the high yield of liquid product produced. Meanwhile the 5M Ni/Zeolite catalyst showed better selectivity than other catalysts in converting cycloalkane carbon compounds. The physico-chemical properties of the 5M Ni/Zeolite liquid catalyst product also showed an increase in the quality of bio-oil with reduced water content and increased HHV.

**Keywords:** Bio-oil, Pyrolysis, Hydrodeoxygenation, Catalyst, Zeolite, Ni Metal.

