

**KATALIS NIKEL-MOLIBDENUM TERDISPERSI PADA KARBON
AKTIF DARI LIMBAH BONGGOL JAGUNG UNTUK
HYDROTREATING MINYAK NYAMPLUNG BERBANTUAN
MICROWAVE MENJADI BIOAVTUR**

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INTISARI

Penelitian ini berhasil mensintesis katalis nikel (Ni) dan molibdenum (Mo) yang terdispersi pada karbon aktif berbahan baku limbah bonggol jagung yang digunakan untuk proses konversi minyak nyamplung menjadi bioavtur. Karakterisasi katalis dilakukan menggunakan instrumen FTIR, XRD, SAA, NH₃-TPD, SEM-EDX, dan TEM. Penelitian ini dilakukan dengan *hydrotreating* minyak nyamplung berbantuan gelombang mikro menggunakan variasi urutan impregnasi katalis logam pada karbon aktif.

Hasil penelitian menunjukkan bahwa katalis NiMo/AC, Ni-Mo/AC, dan Mo-Ni/AC memiliki luas permukaan sebesar 145,88; 397,99; dan 334,51 m²/g; volume pori sebesar 0,07; 0,18; dan 0,15 cm³/g; serta rata-rata diameter pori sebesar 1,77; 1,77; dan 1,76 nm. Kinerja katalis Ni-Mo/AC terbukti lebih unggul dibandingkan dengan katalis C, AC, NiMo/AC, maupun Mo-Ni/AC. Karakterisasi menunjukkan bahwa katalis Ni-Mo/AC memiliki nilai keasaman total 0,57 mmol/g NH₃. Katalis ini mampu menghasilkan bioavtur dengan *yield* sebesar 57,38% pada daya reaksi *microwave* 800 W, rasio katalis : umpan (1:100), dan waktu reaksi 30 menit. Evaluasi *reusability* menunjukkan katalis ini masih dapat mempertahankan aktivitas yang cukup baik setelah tiga kali siklus penggunaan, dengan *yield* bioavtur pada siklus ketiga sebesar 31,92%.

Kata kunci: bioavtur, gelombang mikro, *hydrotreating*, karbon aktif, minyak nyamplung

NICKEL-MOLYBDENUM CATALYST DISPERSED ON CORN COB-DERIVED ACTIVATED CARBON FOR MICROWAVE- ASSISTED HYDROTREATING OF TAMANU OIL INTO BIO-JET FUEL

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ABSTRACT

This research has succeeded in synthesizing nickel (Ni) and molybdenum (Mo) catalysts dispersed in activated carbon derived from corn cob waste, which were used for the conversion process of tamanu oil into bio-jet fuel. The catalyst was characterized using FTIR, XRD, SAA, NH₃-TPD, SEM-EDX, and TEM instruments. This research was conducted by *hydrotreating* tamanu oil assisted by microwave heating, with variations in the impregnation of metal catalysts on activated carbon.

The results showed that the NiMo/AC, Ni-Mo/AC, and Mo-Ni/AC catalysts had surface areas of 145.88; 397.99; and 334.51 m²/g; pore volumes of 0.07; 0.18; and 0.15 cm³/g; and average pore diameters of 1.77; 1.77; and 1.76 nm. The performance of Ni-Mo/AC catalysts proved superior compared to C, AC, NiMo/AC, and Mo-Ni/AC catalysts. Characterization showed that this catalyst has a total acidity value of 0.57 mmol/g NH₃. The catalyst was able to produce a bio-jet fuel with a yield of 57.38% at a microwave reaction power of 800 W, a catalyst-to-feed ratio of (1:100), and a reaction time of 30 minutes. The reusability evaluation showed that the catalyst maintained good activity after three cycles of use, with a bio-jet fuel yield in the third cycle of 31.92%.

Keywords: activated carbon, bio-jet fuel, hydrotreating, microwave, tamanu oil