

ABSTRAK

ANALISIS MODIFIKASI PIPA KONDENSASI PENUKAR PANAS (*HEAT EXCHANGER*) PADA ALAT DISTILASI BIODIESEL

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Penelitian ini menganalisis pengaruh variasi desain kondensor terhadap hasil dan efisiensi produksi biodiesel pada alat distilasi. Desain pipa kondensasi dimodifikasi dengan variasi bentuk tube kondensor dan memiliki luas penampang yang identik. Data hasil distilasi dianalisis menggunakan uji *T-test* melalui SPSS untuk mengevaluasi parameter efektivitas, efisiensi produksi, angka setana, titik nyala, titik bakar, dan kadar air. Hasil penelitian menunjukkan bahwa kondensor spiral lebih efektif dalam meningkatkan efisiensi dan kualitas biodiesel dibandingkan kondensor lurus, dengan nilai setana, rendemen, dan efektivitas yang lebih tinggi. Namun, kadar air tidak menunjukkan perbedaan signifikan antara kedua desain kondensor. Kesimpulannya, kondensor spiral lebih unggul dalam mendukung proses distilasi biodiesel, meskipun kadar air tetap serupa pada kedua tipe kondensor.

Kata Kunci: Alat Distilasi, *Heat Exchanger*, Biodiesel.

ABSTRACT

ANALYSIS OF MODIFICATION OF HEAT EXCHANGER CONDENSATION PIPE IN BIODIESEL DISTILLATION EQUIPMENT

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xiv + 34 Pages+ 22 Pictures + 18 Tables + 4 Attachments

This study analyzes the effect of condenser design variations on the yield and efficiency of biodiesel production in a distillation apparatus. The condenser tube was modified with different shapes but maintained an identical cross-sectional area. The distillation results were analyzed using T-tests in SPSS to evaluate parameters such as effectiveness, production efficiency, cetane number, flash point, fire point, and water content. The findings revealed that the spiral condenser is more effective in enhancing efficiency and biodiesel quality compared to the straight condenser, showing higher cetane numbers, yields, and overall effectiveness. However, the water content did not significantly differ between the two condenser designs. In conclusion, the spiral condenser is superior in supporting the biodiesel distillation process, although the water content remains similar across both condenser types.

Keywords: *Distillation Equipment, Heat Exchanger, Biodiesel.*