

Scale up produksi biodiesel rute non alkohol dalam reaktor unggun isian = Scale up of biodiesel production by non alcohol route in packed bed reactor

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Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20310981&lokasi=lokal>

Abstrak

Sintesis biodiesel rute non alkohol dalam Reaktor Unggun Isian merupakan proses alternatif yang berpotensi baik dengan pemanfaatan minyak goreng bekas sebagai sumber trigliserida pada reaktan. Oleh karena itu, dilakukan scale up untuk meningkatkan kapasitas produksi dengan mempertahankan kualitas produk biodiesel sama dengan hasil eksperimen skala laboratorium. Scale up produksi untuk memperoleh 5000 mL/hari biodiesel berdasarkan prinsip similaritas geometri menghasilkan laju alir substrat 307 mL/jam, diameter reaktor 4 cm, tinggi reaktor 144 cm, dan diameter material penyangga 4 mm. Uji stabilitas dilakukan pada kondisi operasi laju alir substrat 144 mL/jam, rasio mol 1/12 antara minyak dengan senyawa alkil, dan temperatur konstan 37°C selama 50 jam reaksi. Enzim *C. rugosa* lipase terimmobilisasi berperan sebagai biokatalis dalam reaksi interesterifikasi antara minyak goreng bekas dengan metil asetat dalam Reaktor Unggun Isian. Reaktan dan produk dianalisa menggunakan uji HPLC (High Performance Liquid Chromatography). Hasil uji stabilitas menunjukkan bahwa enzim terimmobilisasi memiliki aktivitas yang baik selama 30 jam tanpa mengalami penurunan yield biodiesel. yield biodiesel yang dihasilkan dalam percobaan ini adalah sebesar 71,26 % dan kapasitas produksi reaktor sebesar 2500 mL/hari.

.....Synthesis of biodiesel by non alcohol route using packed bed reactor is a potentially alternative process to the use of used cooking oil as a source of triglycerides in the reactants. Therefore, scale up was done to increase biodiesel production capacity by maintaining similar quality of biodiesel with the results of laboratory scale experiments. Scale up of the biodiesel production to obtain 5000 mL / day of biodiesel based on the principle of geometric similarity resulted flow rate of 307 mL/hr, reactor diameter of 4 cm, reactor height of 144 cm, and support material diameter of 4 mm. In the continuous reactor, stability test was conducted with the operating conditions of the substrate flow rate was 144 mL/hr, mole ratio of 1/12 between the oil with alkyl compounds, and constant temperature at 37°C for 50 hours the reaction. *C. rugosa* lipase immobilized acts as a biocatalyst in the interesterification reaction between used cooking oil with methyl acetate in the packed bed reactor. Reactants and products were analyzed using HPLC test (High Performance Liquid Chromatography). The results of stability tests showed that the immobilized enzyme has good activity for 30 hours without decreasing of biodiesel yield. Yield of biodiesel that obtained in this experiment was 71.26% and production capacity of the reactor was 2500 mL/day.