

**Title:** Biodiesel production from waste frying oils over lime catalysts

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**Abstract:** Biodiesel production from semi-refined oils (SRO) and waste frying oils (WFO) was studied using commercial CaO as heterogeneous catalyst. The methanolysis tests were carried out in mild reaction conditions (62 A degrees C, atmospheric pressure). With such conditions, SRO (soybean and rapeseed) allowed to produce a biodiesel containing 97-98 % of methyl esters (FAME), whereas WFO only provided 86-87 % of FAME. The lower FAME yield for WFO oil is ascribable to the partial neutralization of the catalyst by free fatty acids. Also, soaps formation from the WFO oil reduced the weight yield of the oil phase (containing FAME) obtained and increased the MONG content of the glycerin phase. The catalysts stability tests showed high stability even when WFO oil was processed. Catalytic tests performed with blends of WFO/semi-refined oils showed blending as a good strategy to process low value raw oils with minor decay of the catalyst performance. Both WFO and semi-refined oils showed S-shape kinetics curves thus discarding significant differences of the reaction mechanisms.

**Author Keywords:** Biodiesel; Waste frying oils; CaO catalyst; Oil acidity; S-shape kinetics

**KeyWords Plus:** Near-Infrared Spectroscopy; Heterogeneous Catalysts; Soybean Oil; Calcium-Oxide; Cooking Oil; Solid Base; Transesterification; Hydrotalcites; Quality; Models

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