ISSN: 2320-5407

International Journal of Advanced Research

Publisher's Name: Jana Publication and Research LLP

www.journalijar.com

REVIEWER'S REPORT

Manuscript No.: IJAR-53019 Date: July 26, 2025

Title: Effects of calcination temperature on the catalytic activity of CaO synthesized by alkaline precipitation in the transesterification reaction,

Recommendation:
Accept as it is .....
Accept after minor revision.....
Accept after major revision .....
Do not accept (*Reasons below*) .....

Rating	Excel.	Good	Fair	Poor
Originality		X		
Techn. Quality		X		
Clarity			X	
Significance			X	

Reviewer Name: Dr Lakhdar Guerine **Date:** July 26, 2025

Detailed Reviewer's Report

This study evaluates the effect of calcination temperature (750, 850, and 950 °C) on the catalytic activity of CaO synthesized by alkaline precipitation from $CaCl_2$. The catalyst was applied in the transesterification of soybean oil to produce biodiesel (FAME). Results show that all powders exhibited catalytic activity, with FAME yields ranging from 65% to 91%. CaO calcined at 850 °C demonstrated the best stability, maintaining yields above 85% even after two reuses. However, overall process yields varied between 33% and 60%, indicating losses during purification steps. The findings confirm the potential of CaO as a heterogeneous catalyst while highlighting the need to improve reusability and minimize losses.

Strengths

a) Optimal temperature identified (850 °C), ensuring high activity and reusability.

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b) Simple and cost-effective synthesis method for CaO.
c) High FAME yields (up to 91%) during the first use.
d) Comprehensive experimental characterization (XRD, viscosity, yield).

Weaknesses

1) Significant losses during purification steps, leading to low overall process yield.
2) Limited reusability; performance drops after two cycles.
3) No detailed analysis of surface area and porosity of catalysts.
4) Formation of $Ca(OH)_2$ and $CaCO_3$ due to air exposure, reducing catalyst purity.

Recommendation: Minor revison

Formatting and layout issues

1) Misplaced Figures 3 and 4, disrupting the reading flow.
2) Lack of tables, making numerical comparison difficult.

Incomplete discussion

a) No detailed analysis of textural properties (surface area, porosity).
b) No quantitative comparison with other studies to contextualize performance.

Language and scientific style

1) Some sentences are overly descriptive rather than analytical.