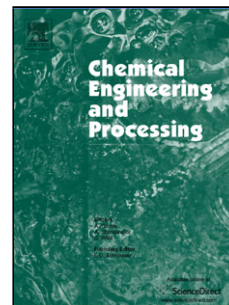


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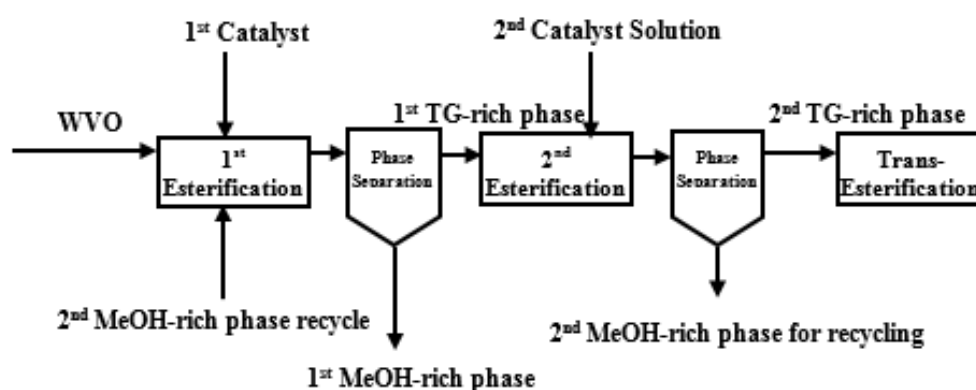
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Graphical Abstract



HIGHLIGHTS

- Waste vegetable oil (WVO) is a cost-effective feedstock in biodiesel production.
- High FFA and moisture in WVO have to be treated prior to transesterification.
- Two-step esterification is better than one-step to reduce FFA to a desirable level.
- Recycling of catalyst solution reduced over 20% consumptions in MeOH and H₂SO₄.

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