





Techno-economical and energy analysis of sunflower oil biodiesel synthesis assisted with waste ginger leaves derived catalysts

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Highlights

- Novel ginger leave-based catalysts CGL, KGL and NGL.
- Biodiesel yield (93.83%) highest with KGL under optimum conditions.
- Profit cost ratios 1.434 for KGL, 1.420 for NGL and 1.397 for CGL catalyst.
- The renewable energy to non-renewable energy ratio for KGL is found to be superior.

Abstract

The present study was carried out to investigate biodiesel production via transesterification of sunflower oil employing heterogeneous catalyst derived from indigenous ginger (*Zingiber Officinale*) leaves. It also aims to compare the techno-economy performance of the ginger-based