



REVIEWER'S REPORT

Manuscript No.: IJAR-55113

Title: Sulfonated Cellulosic Fabric Catalyst for Biodiesel Production from Waste Oils.

Recommendation:

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

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

Reviewer Name: Mr. Bilal Mir

Reviewer's Comment for Publication.

The manuscript presents a comprehensive investigation into the green synthesis of ZnO nanoparticles using *Ocimum sanctum* leaf extract through a solution combustion method and effectively demonstrates the extract's dual role as a natural fuel and reducing agent. The study explains how the phytochemical-rich leaf extract forms a uniform precursor gel with zinc nitrate, enabling controlled combustion and moderate-temperature ignition without external additives, thus reinforcing the eco-friendly and sustainable nature of the process. The combustion was characterized by an extended flame duration, indicating efficient internal redox activity that facilitated complete oxidation of organic components and yielded predominantly inorganic ZnO. Subsequent calcination at 450–550 °C further enhanced crystallinity by eliminating residual carbon and reducing lattice imperfections. FE-SEM analysis confirmed nanoscale particle formation with morphology influenced by phytochemical capping, while EDS results verified high elemental purity and a near-stoichiometric Zn:O ratio, demonstrating that the plant extract did not introduce unwanted impurities. The observed particle size of 30–80 nm and the presence of porosity—arising from rapid gas evolution during combustion—indicate compatibility with applications requiring high surface area such as photocatalysis and sensing, though some degree of agglomeration remained typical of combustion-based synthesis routes. The report also highlights the dual stabilizing and reducing functions of *O. sanctum* constituents, which moderated growth patterns and contributed to the desirable structural features of the nanoparticles. In addition to the ZnO synthesis component, the work includes an evaluation of a sulfonated cellulose-based catalyst for biodiesel production, demonstrating high acidity, efficient processing of degraded oils, strong catalytic activity, and promising reusability, underscoring its industrial relevance in sustainable fuel production. Overall, the study confirms that green solution combustion offers a low-cost, scalable, and

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environmentally friendly alternative to conventional chemical routes for producing high-purity ZnO nanoparticles. The conclusion is well supported by the results, though future studies should expand characterization (XRD, FTIR, UV-Vis), test different plant extracts, optimize precursor ratios to improve size uniformity, and explore scale-up potential. The work is significant for advancing sustainable nanomaterial synthesis but is limited by natural variability in plant composition, partial particle agglomeration, and limited structural characterization. Nonetheless, the manuscript is clear, technically sound, and suitable for acceptance.