

## The Reducing Agent of Glycerol for the Reduction of Metal Oxides under Microwave Heating

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**Abstract :** In recent years, the environmental challenges due to the excessive use of fossil fuels have led to heightened greenhouse gas production. In response, biodiesel has emerged as a cleaner alternative, offering reduced pollutant emissions compared to traditional fuels. The large-scale production of biodiesel, involving ester exchange of animal fats or vegetable oils, results in a surplus of crude glycerin. With environmental regulations on the rise and an increasing demand for biodiesel, glycerin production has seen a significant upswing. This paper focuses on the economic significance of glycerin through its pyrolysis as a raw material, particularly in the synthesis of metals. As industries pivoted towards cleaner fuels, glycerin, as a byproduct of biodiesel production, is poised to remain a cost-effective and surplus product. In this work, for evaluating the possible performance of using the gaseous products from the pyrolysis reaction of glycerol, we concerned the glycerin pyrolysis reactions, emphasizing the catalytic role of activated carbon, various reaction pathways and the impact of carrier gas flow rate on hydrogen production, providing valuable insights into the evolving landscape of sustainable fuel alternatives.

**Keywords :** biodiesel, glycerin pyrolysis, activated carbon catalysis, syngas

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