

## **Effects of Cerium Oxide Nanoparticle Addition in Diesel and Diesel-Biodiesel Blends on the Performance Characteristics of a CI Engine**

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**Abstract :** An experimental investigation is carried out to establish the performance characteristics of a compression ignition engine while using cerium oxide nano particles as additive in neat diesel and diesel-bio diesel blends. In the first phase of the experiments, stability of neat diesel and diesel-bio diesel fuel blends with the addition of cerium oxide nano particles are analyzed. After series of experiments, it is found that the blends subjected to high speed blending followed by ultrasonic bath stabilization improves the stability. In the second phase, performance characteristics are studied using the stable fuel blends in a single cylinder four stroke engine coupled with an electrical dynamo meter and a data acquisition system. The cerium oxide acts as an oxygen donating catalyst and provides oxygen for combustion. The activation energy of cerium oxide acts to burn off carbon deposits within the engine cylinder at the wall temperature and prevents the deposition of non-polar compounds on the cylinder wall results reduction in HC emissions. The tests revealed that cerium oxide nano particles can be used as additive in diesel and diesel-bio diesel blends to improve complete combustion of the fuel significantly.

**Keywords :** engine, cerium oxide, biodiesel, deposit

**Conference Title :** ICABBBE 2015 : International Conference on Agricultural, Biotechnology, Biological and Biosystems Engineering

**Conference Location :** Istanbul, Türkiye

**Conference Dates :** August 17-18, 2015