

## Fuel Quality of Biodiesel from *Chlorella protothecoides* Microalgae Species

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**Abstract :** Depleting fossil fuel resources coupled with serious environmental degradation has led to the search for alternative resources for biodiesel production as a substitute of Petro-diesel. Currently, edible, non-edible oils and microalgal plant species are cultivated for biodiesel production. Looking at the demerits of edible and non-edible oil resources, the focus is being given to grow microalgal species having high oil productivities, less maturity time and less land requirement. Out of various microalgal species, *Chlorella protothecoides* is considered as the most promising species for biodiesel production owing to high oil content (58 %), faster growth rate (24-48 h) and high biomass productivity (1214 mg/l/day). The present paper reports the results of optimization of reaction parameters of transesterification process as well as the kinetics of transesterification with 97% yield of biodiesel. The measurement of fuel quality of microalgal biodiesel shows that the biodiesel exhibit very good oxidation stability (O.S) of 7 hrs, more than ASTM D6751 (3 hrs) and EN 14112 (6 hrs) specifications. The CP and PP of 0 and -3 °C are finding as per ASTM D 2500-11 and ASTM D 97-12 standards. These results show that the microalgal biodiesel does not need any enhancement in O.S & CFP and hence can be recommended to be directly used as MB100 or its blends into diesel engine operation. Further, scope is available for the production of binary blends using poor quality biodiesel for engine operation.

**Keywords :** fuel quality, methyl ester yield, microalgae, transesterification

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