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KARNATAKA STATE BIOFUEL DEVELOPMENT BOARD

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**“PRODUCTION AND OPTIMIZATION OF BIODIESEL FROM MIXED
FEEDSTOCK OIL (KARANJA & NEEM) USING RESPONSE SURFACE
METHODOLOGY”**

BACHELOR OF ENGINEERING

In

BIOTECHNOLOGY

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ABSTRACT

Energy use is the most fundamental requirement for human existence. Consumption of fossil fuels has increased to a greater extent and the use of these energy resources is having major environmental impact. Energy diversification is seen as an insurance policy against geopolitical risks and government insecurity about fossil fuel costs and fuel safety. These concerns have increased the interest in developing second generation biofuels produced from non-food feedstock such as non-edible oils which potentially offer greatest opportunities in the longer term. It has received considerable attention in recent years due to its following merits: biodegradable, renewable, non-toxic reduces life cycle greenhouse gas emission, low energy density, low temperature operability, storage stability. Since there is imbalance in the demand and supply ratio, there is an urgent need to maximize the production of Biodiesel using available resources. In this concern, the present study is intended to increase the production of biodiesel from the mixture of oils in the ratio of 1:1 *i.e.*, neem oil and Karanja oil.

The process for production of Biodiesel was optimized using Response surface methodology (RSM) (Design expert v.9.0, Stat Ease, USA). The optimized maximum yield obtained was about 91% and which holds good with the predicted value of 89.51% by the Design expert software. The physiochemical parameters of Biodiesel was determined using standard protocols. The fuel properties like Flash point, Fire point, Density and Viscosity was determined and found to be 193⁰C, 205⁰C, 890kg/m³ and 5.9 Cst respectively. The obtained fuel properties were compared with the standard ASTM range of values and the obtained value was found to be within the range.

The model for predicting the biodiesel yield can be successfully employed in the biodiesel industry to maximize the yield. The produced biodiesel from mixed feedstock oil can be used as an alternative fuel in near future. Thus Biodiesel can be blended with normal diesel without any alteration in the engine. If the developed process is scaled up to commercial levels, then excellent business opportunity will be offered by the biodiesel and it could be a major step towards the creation of an eco-friendly transportation fuel that is relatively clean on combustion.

Keywords: Biodiesel, Mixed Feedstock oil, Optimization, Response Surface Methodology