# ABSTRACT

Biofuels are gaining in popularity because they reduce greenhouse gas emissions and provide economic opportunities for rural areas besides strengthening local energy security. In India, biofuels production has grown dramatically in the past few years. It is now poised for even stronger growth in response to higher energy prices, climate change mitigation strategies, and greater mass awareness. There are well-developed markets of biofuels in many countries of the world. The key to success in the biofuels market is a high-quality product capable of competition with petro-fuels. Biodiesel is an alternative fuel that can be obtained from both plant and animal lipids and fats. The production of biodiesel from non-edible oil is a promising alternative to petro-diesel. The present study aims at investigating the possible conversion of Tea seed oils to biodiesel. Tea is a major plantation crop of the region and its seeds are abundantly available. Transesterification of tea seed oil in methanol was studied with the use of potassium hydroxide as a catalyst. The biodiesel produced was characterized by $^{1}$HNMR, $^{13}$CNMR and FTIR analysis. The biodiesel produced was also characterized as alternative diesel fuel through BIS test methods. The properties of the produced biodiesel were compared with that of commercial diesel oil. Rheological parameters of tea seed oil biodiesel were compared with soyabean oil biodiesel. Blend parameters of tea seed oil biodiesel with commercial diesel oil were optimized to meet the BIS parameters of diesel oil. The biodiesel of tea seed oil is blended in different proportions with high speed diesel such as 5:95 (B5) and 10:90 (B10) to check the engine performance and the exhaust gas analysis. The engine performance and exhaust gas analysis results of the blends of tea seed oil biodiesel is compared with that of high speed diesel. The investigation so far made points towards the feasibility of conversion of tea seed oil to quality biodiesel.

***Keywords***: *Biofuel, biodiesel, tea seed ,engine performance.*