Due to the quick advancements in the usage of vehicles and rejuvenation of present world the import of the petroleum based fuels keeps increasing. The demanding cost of petroleum fuels and its efficacy in curbing the emission of green house gases has made the alternating fuel a promising one. These fuels are categorized as mineral and biological alternate fuels based on the source. The mineral based oils are non-renewable and produce greenhouse gas emission but biological based fuels are renewable and eco-friendly. Many biofuels had been identified, one among those is the plant oil, which has a high cetane number and can be used and tested in the CI engines with and without fuel modifications.

Generally plant oils possess high viscosity, poor volatility, heavier molecular structure and unsaturation and hence it cannot be used in neat form in the CI engine. However, the neat oils upto 20% by volume would not cause any problem. The proportions more than 20% causes adverse engine related issues such as severe combustion deterioration which leads to carbon deposition, lube oil dilution and smokey exhaust.

The present work is also one such study where a novel plant oil named Jojoba oil (botanical name is Simmondsiachinensis) had been applied in normal & modified CI engine in both neat & modified forms. The objective of this work is to fix the maximum proportion of jojoba oil and resulting diesel replacement in all modes of operation. The current study has identified five different methodologies to accomplish its objectives. Firstly, Jojoba oil was applied in normal CI engine as jojoba-diesel blends, secondly, the jojoba proportion, engine performance and emission behaviors were studied and in the third method the engine performance and emission behaviors were tested with Modified Operating Parameter (MOP) and Thermal Barrier Coating (TBC). In all the above said methods Jojoba oil was applied as Jojoba-diesel
blends. Finally in the other two methods jojoba oil was applied through turpentine and methyl ester of jojoba respectively.

All these methods determined the maximum proportion of jojoba oil that can be fuelled and its engine performance and emission characteristics. From the detailed experiments, it was found that the oil of jojoba can be applied to a maximum proportion of 30%, 50% and 70% by volume in a normal engine, engine with MOP and engine with MOP&TBC respectively. It was also found that the jojoba oil upto 60% can be applied in normal CI engine with help of turpentine oil. It also disclosed that the engine performance and emission characteristics can be increased by the addition of turpentine oil. Likewise, methyl ester of jojoba was also used in this work to study its performance and emission behaviour in normal CI engines.