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**FEASIBILITY STUDY OF BIO DIESEL PRODUCTION FROM
LOCALLY AVAILABLE NON EDIBLE OILS**

A PROJECT REPORT PRESENTED BY

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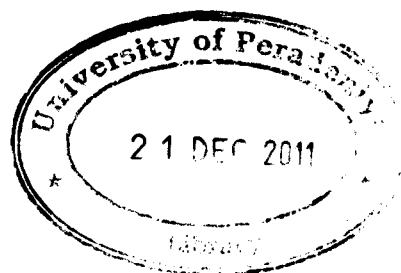
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There is a growing interest in bio-fuels as a potential source of renewable energy, especially from non-edible, oil-bearing trees such as *Jatropha*, *Pongamia*, *Caster* and *Neem* due to diminishing of petroleum oil. Sri Lanka is not self sufficient in edible oil production, hence, some non-edible oil seeds available in the country are required to be tapped for biodiesel production. With abundance of forest and plant based non-edible oils being available in our country such as *Ricinus communis* (caster), *Calophyllum inophyllum* (domba), *Jatropha curcas* (jatropha), *Azadirachta indica* (neem) and *Hevea brasiliensis* (rubber), no much attempt has been made to use esters of these non-edible oils as substitute for diesel production.

The objectives of this research were feasibility study of synthesis of bio-diesel from locally available non edible oils of *Calophyllum inophyllum* (*Domba*), *Azadirachta indica* (*Neem*) and waste cooking oil (coconut oil) and its practical application.

Biodiesel were produced from oils expelled from the seeds of *Domba* and *Neem*. Oil yields from expelling were dry basis in *Domba* and *Neem* seed 59.8% and 38.3%. One-step alkali base catalyzed transesterification and Two-Step Acid - Base Catalyzed Transesterification were carried out for methyl/ethyl ester production process from *Domba* Seed Oil, *Neem* Seed Oil, and Waste Cooking Oil. In One-step method, reaction was carried out temperature at 65 °C, agitation rate at 400 rpm, and reaction time for 2 h, catalyst NaOH-to-oil ratio 0.5% w/w and alcohol-to-oil ratio 25%. In two- step method, first step was carried out with 0.30 v/v alcohol-to-oil ratio in the presence of 1% v/v H₂SO₄ as an acid catalyst in one hour reaction at 50 °C. After the reaction, the mixture was allowed to settle for two hour and the methanol-water mixture separated at the top layer was removed. The second step was transesterified using 0.2 v/v alcohol to oil and 1.4 % w/w NaOH to oil as alkaline catalyst to produced bio-diesel at 65 °C.

The fuel properties of biodiesels so obtained were found to be comparable to those of diesel and confirming to the American, Germany and European standards. Conversion ratio in two step acid base catalyst method was more than 98% and conversion ratio in one step base catalyst was around 85% in above respective oils.