In the present study an attempt has been made to reduce the cost of biodiesel by selecting non edible oils such as neem, rice bran, pongamia pinnatta, cotton seed, rubber seed oils for the production of biodiesel. Scientific optimisation technique such as central composite design is used to minimise the number of experiments to find out best combination of transesterification process parameters to maximise the yield.

The thesis is divided into seven chapters each chapter contains several sections and subsections.

**Chapter I** presents the introduction about the status of fossil fuels, such as diesel oil consumption in India. It discusses the advantages and limitations of conventional diesel oil. It highlights the need for alternative automotive fuel. It presents the statements and objectives of the research work; it includes the scope of the research work.

**Chapter II** deals with background literature related to sources of biodiesel production. This chapter discusses critical technical aspects for biodiesel production. This chapter also discusses the fuel properties of biodiesel produced from both edible and non edible oils.

**Chapter III** deals with the study of techno economic aspects of biodiesel production. It includes the methods to reduce the viscosity of biodiesel. This chapter discusses the work that has been done by various researchers on homogeneous, heterogeneous, two stage, ultrasound assisted, super critical methanol method and non catalysed biox transesterification process.

**Chapter IV** presents the work carried out for the production of biodiesel from non edible oils such as unrefined neem, rice bran, pongamia pinnata, cotton seed and rubber seed oil. The chapter also included the optimisation of process parameters to maximise the biodiesel yield.
This chapter presents one factor at a time and central composite design for optimisation of process parameters for the production of biodiesel. This chapter also includes the statistical analysis used to generate regression coefficient and to generate 2D contour plots and 3D surface plots.

Chapter V presents the fuel properties of unrefined neem, rice bran oil, pongamia pinnata, cotton seed and rubber seed oil and their methyl esters. This chapter also includes the comparison of methyl esters of selected non edible oil methyl esters and their blends with conventional diesel oil.

Chapter VI deals with the study of fuel properties of unrefined neem, rice bran, pongamia pinnata, cotton seed and rubber seed oil methyl esters and their conventional diesel and kerosene blends.

Chapter VII deals with the study of economic feasibility of biodiesel production from non edible oils such as unrefined neem, rice bran, pongamia pinnata, cotton seed and rubber seed oil.

This chapter compares two stage and three stage transesterification process on economic basis. This chapter also involves the study of fixed capital cost, manufacturing cost and net present value for the production of biodiesel from selected non edible oils.