**TABLE OF CONTENTS**

**CHAPTER NO. TITLE PAGE NO.**

**ACKNOWLEDGEMENT i**

**ABSTRACT ii**

**LIST OF TABLES iii**

**LIST OF FIGURES v**

**1. INTRODUCTION 1**

1.1 Alternative of Diesel 1

1.2 Introduction to Biofuels 1

1.3 Types of Biofuels 2

1.4 Cashew Nut Shell Liquid (CNSL) 3

1.5 Composition of CNSL 4

1.6 Properties 7

1.7 Reactivity 7

1.8 Industrial Significance of CNSL 8

1.9 Advantages of CNSL based polymers 8

1.10 Applications of CNSL 9

1.11 Disadvantages of Biodiesel 9

1.12 Objectives 10

**2. LITERATURE REVIEW 11**

2.1 Manzoore Elahi M. Soudagar 11

2.2 Ashok Kumar 12

2.3 H. N. Dike 13

2.4 Michael G. Bidir 14

2.5 G. Jeevan Kumar 16

2.6 Prabhu A 17

2.7 V. Edwin Geo 18

2.8 W.M. Yang 19

2.9 I. Tankoan 21

2.10 Colin J. Barrow 22

**3. PROBLEM DEFINATION 24**

3.1 Generations to Biofuels 24

**4. METHODOLOGY USED 26**

4.1 Cracking of Oil 26

4.2 Thermal Cracking 27

4.3 Catalyst Analysis 30

4.4 Nano Additives 33

4.5 Types of Nano additives 33

4.6 Ultrasonic Method 38

4.7 Chemical Properties of CNSL 39

**5. EXPERIMENTAL WORK 40**

5.1 Experimental Investigation of the

Engine Parameters 40

5.2 Technical Specifications of the Engine 41

5.3 Eddy Current Dynamometer 41

5.4 AVL Exhaust Gas Analyzer 42

5.5 Experimental Procedure 44

**6. RESULTS & DISCUSSION 47**

6.1 Performance & Combustion

Characteristics 48

6.2 Emission Characteristics 49

**7. CONCLUSION 51**

**FUTURE SCOPE 52**

**REFERENCE 53**