CONTENTS

Chapter		Page
Title Page		i
Approval of the Viva-voce Board		ii
Certificate by the Supervisor		iii
Curriculum Vitae		iv
Acknowledgements		vi
Declaration		vii
Contents		viii
List of Figures		xiii
List of Symbols and Abbreviations		xvi
List of Tables		xix
Abstract		xxi
Chapter 1	**Introduction and Review of literature**	
	1.1 Enzymes	1
	1.2 Lipolytic enzymes	1
	1.3 Lipase specificity	3
	1.4 Sources of lipase	4
	1.5 Fungal lipase production through solid–state fermentation	6
	1.5.1 General aspects and advantages of solid-state fermentation	7
	1.6 Application of statistical and evolutionary approaches for modeling and optimization approaches	9
	1.7 Structure of lipases	11
	1.8 Catalytic mechanism of lipase	13
	1.9 1nterfacial activation of lipases	14
	1.10 Immobilization of lipases	17
	1.10.1 Adsorption	18
	1.10.2 Covalent binding	21
	1.10.3 Cross-linking	22
	1.10.4 Entrapment	23
	1.11 Industrial applications of Lipases	25
	1.11.1 Lipase mediated synthesis of fatty acid methyl esters	27
	1.11.2 Lipase mediated solvent-free synthesis of flavour esters	32

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Chapter 2 Materials and Methods

2.1 Materials 35
2.1.1 Microorganism 35
2.1.2 Raw material 35
2.1.3 Chemicals 35
2.1.4 Instruments and apparatus 36
2.2. Methods 37
2.2.1. Media 38
2.2.1.1 Potato Dextrose Agar medium 38
2.2.1.2 Medium for lipase production from *R. oryzae* NRRL 3562 38
2.2.2 Buffer 38
2.2.2.1 50 mM Tris – HCl buffer (pH 8.0 and 9.0) 38
2.2.2.2 50 mM sodium acetate buffer (pH 4.0–5.0) 38
2.2.2.3 50 mM potassium phosphate buffer (pH 6–7) 38
2.2.2.4 50 mM glycine–NaOH buffer (pH 10–11**)** 39
2.2.3 Reagents 39
2.2.3.1 For lipase assay 39
2.2.3.2 For protein estimation 39
2.2.4 Strain maintenance and inoculum preparation 39
2.2.5 Experimental set up for Solid state fermentation 40
2.2.6 Experimental setup for extraction of lipase from fermented biomass 40
2.2.7 Lipase assay 40
2.2.8 Estimation of protein content 41
2.2.9 Determination of specific activity 41
2.2.10 Determination of Biomass yield 41
2.2.11 Modeling and optimization methodology 42
2.2.11.1 Modeling and optimization through Response surface methodology (RSM) 42
2.2.11.1.1 Selection of variables 42
2.2.11.1.2 Design of experiments (DOE) 43
2.2.11.1.3 Central composite design (CCD) 43
2.2.11.1.4 Regression analysis 44
2.2.11.1.5 Model adequacy checking and optimization 45
2.2.11.2 Evolutionary intelligence based optimization approaches 45
2.2.11.2.1 Optimization through Genetic Algorithm (GA) 45
2.2.11.2.2 Optimization through Differential Evolution (DE) 50
2.2.11.2.3 Swarm intelligence based optimization approach. 51
2.2.12 Concentration of lipase through ammonium sulphate precipitation 54
2.2.13 Interfacial activation of lipase 55
2.2.14 Immobilization of lipase 55
2.2.14.1 Immobilization of lipase on chitosan and / chitin / agarose / casein through adsorption 55

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2.2.14.2 Immobilization on celite / eupergit C/ calcium carbonate / silica by covalent attachment 56
2.2.14.3 Immobilization by entrapment 56
2.2.15 Lipase mediated synthesis of fatty acid methyl esters 57
2.2.15.1 Lipase mediated transesterification of edible /non-edible/waste frying oils 57
2.2.15.2 GC analysis 57
2.2.15.3 Determination of fuel properties 58
2.2.15.3.1 Determination of pour point through pour point apparatus 58
2.2.15.3.2 Determination of kinematic viscosity 58
2.2.15.3.3 Determination of flash point 58
2.2.15.3.4 Determination of calorific value 59
2.2.16 Lipase mediated solvent free synthesis of flavour esters 60
2.2.16.1 Transesterification Reaction 60
2.2.16.1.1 Methyl butyrate synthesis 60
2.2.16.1.2 Octyl acetate synthesis 60
2.2.16.2 Analysis of flavour esters 60
2.2.16.2.1 GC analysis of methyl butyrate 60
2.216.2.2 GC analysis of octyl acetate 61

Chapter 3 **Modeling and optimization of lipase production by *R. oryzae* NRRL 3562 through SSF**
3.1 Introduction 62
3.2 Modeling and optimization methodology 63
3.2.1 Modeling and optimization by RSM 63
3.2.2 Evolutionary intelligence based GA optimization approach 64
3.2.3 Optimization by DE 65
3.2.4 Swarm intelligence based optimization approach 65
3.3 Results and Discussion 66
3.3.1 Model development, statistical analysis and validation 66
3.3.2 Evolutionary intelligence based GA optimization approach 69
3.3.3 Optimization by DE 72
3.3.4 Swarm intelligence based optimization approach 75
3.3.5 Comparison between GA, DE and PSO 76

Chapter 4 **Modeling of lipase extraction from fermented biomass**
4.1 Introduction 79
4.2. Modeling and optimization methodology 81
4.2.1 Modeling and optimization studies of lipase extraction using RSM 81
4.2.2 Optimization by Genetic Algorithm 82
4.2.3 Optimization of lipase extraction by DE 83

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	4.2.4 Optimization by PSO	83
	4.3 Results and Discussion	83
	4.3.1 Selection of extraction parameters for lipase recovery	83
	4.3.2 Modeling studies of lipase extraction using RSM	85
	4.3.2.1Validation of the RSM model and its optimization	89
	4.3.3 Optimization by evolutionary intelligence based GA approach	90
	4.3.4 Optimization of lipase extraction by DE	93
	4.3.5 Optimization by swarm intelligence based PSO approach	96
	4.3.6 Comparison between GA, DE and PSO	97
Chapter 5	**Immobilization of *Rhizopus oryzae* NRRL 3562 lipase**	
	5.1 Introduction	100
	5.2 Results and discussion	102
	5.2.1 Partial purification of lipase by ammonium sulphate precipitation	102
	5.2.2 Interfacial activation of *R. oryzae* NRRL 3562 lipase	102
	5.2.3 Immobilization of lipase	104
	5.2.3.1 Immobilization of lipase by adsorption	104
	5.2.3.2 Covalent immobilization of lipase	106
	5.2.3.3 Entrapment of lipase in calcium alginate	107
	5.2.3.4 pH stability of immobilized enzyme	108
	5.2.3.5 Thermal stability of immobilized enzyme	109
	5.2.3.6 Kinetic studies of immobilized lipase	110
	5.2.3.7 Operational stability of immobilized lipase	111
Chapter 6	**Industrial applications of lipase for the synthesis of FAME's and flavour esters**	
	6.1 Introduction	113
	6.2 Lipase mediated synthesis of fatty acid methyl esters	113
	6.2.1 Results and Discussion	115
	6.2.1.1 Effect of methanol to oil ratio on transesterification	115
	6.2.1.2 Effect of reaction time on transesterification	116
	6.2.1.3 Effect of volume of solvent on transesterification	117
	6.2.1.4 Effect of reaction temperature on tranesterification	118
	6.2.1.5 Effect of initial addition of water on transesterification	119
	6.2.1.6 Effect of agitation speed on tranesterification	120
	6.2.1.7Effect of immobilized enzyme amount on tranesesterification	121
	6.2.1.8 Reusability of immobilized lipase	122
	6.2.1.9 Determination of fuel properties	123
	6.3 Lipase mediated solvent –free synthesis of flavour esters	124
	6.3.1 Modeling and optimization approach	126
	6.3.1.1 Octyl acetate synthesis	126
	6.3.1.1.1 Modeling and optimization studies through RSM	126
	6.3.1.1.2 Evolutionary intelligence based GA approach	128
	6.3.1.1.3 DE based optimization approach	128

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	6.3.1.1.4 Swarm intelligence based PSO approach	128
	6.3.1.2 Methyl butyrate synthesis	128
	6.3.1.2.1 Modeling and optimization studies through RSM	128
	6.3.1.2.2 Evolutionary intelligence based GA approach	130
	6.3.1.2.3 DE based optimization approach	130
	6.3.1.2.4 Swarm intelligence based PSO approach	130
	6.3.2 Results and discussion	131
	6.3.2.1 Effect of alcohol molarity on transesterification reaction	131
	6.3.2.2 Effect of reaction time on transesterification reaction	132
	6.3.2.3 Effect of water addition on transesterification reaction	132
	6.3.2.4 Effect of temperature on tranesterification reaction	133
	6.3.2.5 Effect of agitation speed on transesterification reaction	134
	6.3.2.6 Effect of immobilized enzyme amount on transesterification reaction	135
	6.3.2.7 Reusability of immobilized lipase	136
	6.3.3 Modeling and optimization studies of flavour esters	137
	6.3.3.1 Octyl acetate	
	6.3.3.1.1 Modeling and optimization studies through RSM	137
	6.3.3.1.2 Evolutionary intelligence based GA approach	140
	6.3.3.1.3 DE based optimization approach	142
	6.3.3.1.4 Swarm intelligence based PSO optimization approach	144
	6.3.3.1.5 Comparison of evolutionary and swarm intelligence based optimization approaches	146
	6.3.3.2 Methyl butyrate	147
	6.3.3.2.1 Modeling and optimization studies through RSM	147
	6.3.3.2.2 Evolutionary intelligence based GA optimization approach	150
	6.3.3.2.3 DE based optimization approach	151
	6.3.3.2.4 Swarm intelligence based PSO optimization approach	153
	6.3.3.2.5 Comparison of evolutionary and swarm intelligence based optimization approaches	154
Conclusions	Conclusions	156
	New contributions	157
	Future prospectus	157
References	References	158
Appendices	Appendix A Data for figures of chapter 3	181
	Appendix B Data for figures of chapter 4	184
	Appendix C Data for figures of chapter 5	186
	Appendix D Data for figures of chapter 6	187

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List of Figures

Fig. No	Content	Page No
1.1	General enzymatic reaction of a lipase.	2
1.2	Different types of synthesis reactions catalyzed by lipases.	3
1.3	General folding pattern of α/β hydrolases.	11
1.4	Mechanism of action of lipase in hydrolysis reaction.	14
1.5	Interfacial activation of lipase.	15
1.6	Relationship between NCF and CF of an immobilized enzyme and its applications.	18
1.7	Enzyme immobilization techniques.	20
1.8	Transesterification reaction.	29
2.1	Flow chart of simple genetic algorithm.	46
2.2	Simplified flowchart of DE algorithm.	51
2.3	Sequence of events in Particle swarm optimization.	54
3.1	Surface plots of lipase activity with: (a) temperature and liquid to solid ratio; (b) temperature and pH; (c) temperature and incubation time; (d) liquid to solid ratio and pH; (e) liquid to solid ratio and incubation time; (f) pH and incubation time.	68
3.2	Results of parametric study of GA (a) Mutation probability (Pm) Vs Fitness (b) Population size Vs Fitness (c) Maximum number of generations Vs Fitness.	70
3.3	Population profile at different generations in the GA.	71
3.4	Variation of objective function value with the number of generations at (a) CR=0.6; (b) F=0.20.	74
3.5	Variation of objective function value with the number of generations in PSO.	76
3.6	Comparison of optimization approaches.	77
4.1	Surface plots of E.A(U/gds)) with (A) buffer molarity [BC] and DMSO (B) soaking time [ST] and DMSO (C) temperature [T] and DMSO (D) soaking time [ST] and buffer concentration [BC] (E) temperature [T] and buffer concentration [BC] (F) temperature [T] and soaking time [ST].	88
4.2	Results of parametric study of GA (a) Mutation probability (Pm) Vs Fitness (b) Population size Vs Fitness (c) Maximum number of generations Vs Fitness.	91
4.3	Population profile at different generations in the genetic algorithm	92
4.4	Variation of objection value with number of generations (a) CR=0.5 (b) F=0.25.	95
4.5	Variation of objective function value with the number of generations in PSO.	96
4.6	Comparison of different optimization approaches.	97
5.1	Interfacial activation of lipase.	103
5.2	Far UV-CD spectra of lipase	104
5.3	Comparison of immobilization techniques.	108

5.4	Effect of pH on enzyme activity.	109
5.5	Thermo stability of free and immobilized lipases.	109
5.6	Effect of substrate concentration on the activity of free and immobilized lipase.	110
5.7	The Lineweaver-Burk plot of free and immobilized lipase.	111
5.8	Operational stability of immobilized lipase in flavour ester synthesis.	112
6.1	Effect of methanol to oil ratio on transesterification.	116
6.2	Effect of reaction time on transesterification.	117
6.3	Effect of amount of solvent on transesterification.	118
6.4	Effect of temperature on transesterification.	119
6.5	Effect of addition of water on transesterification.	119
6.6	Effect of agitation speed on transesterification.	120
6.7	Effect of lipase amount on transesterification.	121
6.8	Reusability of immobilized lipase in transesterification of oils.	122
6.9	Enzyme catalyzed ester synthesis.	124
6.10	Effect of alcohol molarity on transesterification.	131
6.11	Effect of reaction time on transesterification.	132
6.12	Effect of water addition on molar conversion.	133
6.13	Effect of temperature on transesterification.	134
6.14	Effect of agitation speed on transesterification.	135
6.15	Effect of enzyme amount on transesterification.	136
6.16	Reusability of immobilized lipase in flavour ester synthesis	137
6.17	Surface plots of molar conversion (MC) (%) with: (a) molarity of alcohol and incubation time; (b) molarity of alcohol and temperature; (c) molarity of alcohol and enzyme amount; (d) incubation time and temperature; (e) incubation time and enzyme amount; (f) temperature and enzyme amount.	139
6.18	Results of parametric study of GA (a) Mutation probability (Pm) Vs Fitness (b) Population size Vs Fitness (c) Maximum number of generations Vs Fitness.	141
6.19	Variation of objection value with number of generations (a) CR=0.6; (b) F=0.25.	143
6.20	Variation of objective function value with the number of generations in PSO.	145
6.21	Surface plots of molar conversion (MC) (%) with: (a) molarity of alcohol and incubation time; (b) molarity of alcohol and temperature;	149

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(c) molarity of alcohol and enzyme amount; (d) incubation time and temperature; (e) incubation time and enzyme amount; (f) temperature and enzyme amount.

6.22 Results of parametric study of GA (a) Mutation probability (Pm) Vs Fitness (b) Population size Vs Fitness (c) Maximum number of generations Vs Fitness. 151

6.23 Variation of objection value with number of generations (a) CR=0.5; (b) F=0.3. 152

6.24 Variation of objective function value with the number of generations in PSO. 154

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List of abbreviations

%	Percentage
µM	Micro molar
a_{free}	: Specific activity of free lipase
a_{imm}	Specific activity of immobilized lipase
ANOVA	Analysis of variance
ASTM	: American standard testing and measurement
BSA	Bovine serum albumin
CCD	Central composite design
CF	Catalytic functions
CR	Crossover constant
CTAB	Cetyl trimethyl ammonium bromide
D	Dimensionality of the problem
DAG	Diacyl glycerol
DE	Differential evolution
DMSO	Dimethyl sulfoxide
DOE	Design of experiments
DV	Decoded value
E.A	Enzyme activity
EA	Evolutionary algorithm
Eqn	Equation
F	Mutation constant
FA	Fatty acid
FAME	Fatty acid methyl ester
FCR	Folin-Ciocalteau reagent
Fig	Figure
FO	Fried oil
g	Gram
GA	Genetic algorithm
GC	Gas chromatography

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gds	Gram dry substance
Gen	Number of generations
GRAS	Generally recognized as safe
h	Hour
IT	Incubation time
K_m	Michaelis constant
M	Molarity
MAG	Monoacyl glycerol
MAH	Mahwa oil
MB	Methyl butyrate
mg	Milli gram
min	Minute
ml	Milli liter
mM	Milli molar
MOPSO-CD	Multi-objective particle swarm optimization – crowding distance
NCF	Non-catalytic functions
nm	Nanometer
NP	Number of population
OA	Octyl acetate
^oC	Degree centigrade
OD	Optical density
Pc	Crossover probability
Pm	Mutation probability
p-NP	Para-nitro phenol
p-NPP	Para-nitro phenyl palmitate
PONG	Pongamia oil
PSO	Particle swarm optimization
Psi	Pascal per square inch
RB	Rice bran oil
rpm	Revolutions per minute
RSM	Response surface methodology

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SDS	Sodium dodecyl sulphate
SIMA	Simarouba oil
SmF	Submerged fermentation
SSF	Solid state fermentation
T	Temperature
TAG	Triacyl glycerol
U	Unit
V_{max}	Maximum velocity
v/v	Volume/Volume
w/v	Weight/Volume
W	Inertia weight

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List of Tables

Table No	Content	Page No
1.1	List of fungal species used for lipase production.	5
1.2	Criteria for robust immobilized enzymes.	19
2.1	Table showing the decoded and real values for the generated population.	48
3.1	SSF variables and their levels.	63
3.2	Central composite design with the experimental, predicted responses and its R-studentized residuals.	64
3.3	Results of significance test on the non-linear model – coefficients, standard errors, T statistics and P values for the lipase activity	67
3.4	Results of ANOVA – lipase activity.	67
3.5	Experimental and predicted lipase activity (U/gds) with optimal variable conditions of OVAT, GA, DE and PSO approaches.	77
3.6	Optimal parameters utilized in GA, DE and PSO approaches.	78
4.1	Extraction parameters and levels for central composite design.	81
4.2	Central composite design for lipase extraction with the experimental, predicted responses and its R-studentized residuals.	82
4.3	Results of significance test on the non-linear model – coefficients, standard errors, T statistics and P-values for lipase activity	86
4.4	Results of ANOVA – enzyme activity (E.A) (U/gds).	87
4.5	Experimental and predicted lipase activity (U/gds) with optimal variable conditions of one variable at a time, GA, DE and PSO approaches.	98
4.6	Optimal parameters utilized in GA, DE and PSO approaches.	98
5.1	Partial purification of lipase.	102
5.2	The percentage of secondary structure, calculated by the Jasco software.	104
5.3	Immobilization of lipase through adsorption.	105
5.4	Covalent immobilization of lipase.	106
5.5	Values of K_m , V_{max} of free and immobilized lipase.	111
6.1	Fuel properties of lipase mediated synthesis of methyl esters.	123
6.2	Transesterification variables and their levels- For octyl acetate synthesis.	127
6.3	Central composite design with the experimental, predicted responses and its R-studentized residuals-for octyl acetate synthesis.	127
6.4	Transesterification variables and their levels-For methyl butyrate synthesis.	129
6.5	Central composite design with the experimental, predicted responses and its R-studentized residuals-for methyl butyrate synthesis.	129
6.6	Results of significance test on the non-linear model – coefficients, standard errors, T statistics and P values for the Molar conversion	138
6.7	Results of ANOVA– Molar conversion (%).	138
6.8	Optimization results of lipase mediated synthesis of octyl acetate.	146

6.9	Results of significance test on the non-linear model – coefficients, standard errors, T statistics and P values for molar conversion	147
6.10	Results of ANOVA – molar conversion (%).	148
6.11	Optimization results of lipase mediated synthesis of methyl butyrate.	155

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