

C O N T E N T S

I INTRODUCTION, OBJECT AND SCOPE OF THE STUDY	1
1.1 Lube oil manufacturing process	3
1.2 Old dewaxing methods	4
1.2.1 Chilling process	4
1.2.2 Solvent dewaxing process	5
1.3 Modern dewaxing process	7
1.3.1 Propane dewaxing	9
1.3.2 M E K dewaxing process	11
1.3.3 Other dewaxing methods	20
II LITERATURE SURVEY	
2.1 Microbial growth on hydrocarbons	27
2.1.1 Microorganism	29
2.1.2 Petroleum fraction as substrates	32
2.1.3 Microbial selectivity for hydrocarbons	35
2.1.4 Mechanism of hydrocarbon uptake	36
2.1.5 Bioemulsifier as mediator in hydrocarbon uptake	37
2.1.6 Oxidation of alkanes	38
2.1.6 Metabolic pathway	39
2.2 SCP production and dewaxing	41
2.2.1 Process parameters	45
2.2.2 State of art	49
2.2.3 Aeration aspects	50
2.2.4 Heat removal in SCP process	52
2.2.5 Nutritional aspects of SCP	54

2.2.6 Toxicological and safety aspects of SCP	58
2.2.7 SCP as animal feed	60
III MATERIALS AND METHODS	
3.1 Materials	62
3.1.1 Microorganism	62
3.1.2 Petroleum fraction	62
3.1.3 Medium	63
3.1.4 Experimental set up	64
3.2 Methods	71
IV RESULTS AND DISCUSSION	
4.1 Screening of the yeast strains	83
4.2 Optimisation of growth parameters	
4.2.1 Effect of temperature	93
4.2.2 Effect of pH	103
4.2.3 Effect of substrate concentration	107
4.3 Growth studies	
4.3.1 Batch operation	115
4.3.2 Semicontinuous operation	121
4.4 Scale up studies	
4.4.1 Rheological properties of the broth	127
4.4.2 Oxygen transfer rates	132
4.4.3 Impellers Reynolds number	137
4.4.4 Power per unit volume	140
4.4.5 Selection of scale up criteria	144

4.5 Recovery of dewaxed oil	155
4.5.1 Composition of emulsion	156
4.5.2 Choice of solvent	157
4.5.3 Optimum solvent to emulsion ratio	158
4.5.4 Determination of stages	159
4.6 Analysis of dewaxed oil and SCP	
4.6.1 Analysis of dewaxed oil	167
4.6.2 Analysis of Biomass	169
V SUMMARY AND CONCLUSIONS	171
REFERENCES	178