## List of Figures

1.1 Structure of alkyl polyglucosides (APGs) 9  
1.2 General synthetic route for alkyl polyglucoside synthesis [Holmberg (2003)] 13  
1.3 Mass balance of the glycosidation process [Hill (2000)] 14  
1.4 Raw materials for the synthesis of APGs [Hill (2000)] 15  
1.5 Dimensions and interactions of a micelle 21  
3.1 Assembly used for the preparation of alkyl polyglucosides surfactants 57  
3.2 Flow chart for batch washing process 65  
4.1 Emulsion stability of the synthesized APGs 84  
4.2 Wetting time of the synthesized APGs 84  
4.3 Foam stability of the synthesized APGs 85  
4.4 Primary biodegradation of alkyl polyglucosides 87  
5.1 Molecular structure of (a) Cetyl trimethylammonium bromide and (b) Dodecyl trimethylammonium chloride 92  
5.2 Emulsification degree for the various mixtures of DTAC + APG_{12}/ APG_{14}/APG_{16} at different mole fractions of DTAC at 298 K 107  
6.1 Various mass fractions of the soil under study 112  
6.2 Molecular structure of the surfactants under study (a) Tween-20 (b) Brij-58 (c) APG_{12} 115  
6.3 Dispersion of soil in aqueous surfactant solutions 120  
6.4 Dispersion of petroleum oil in aqueous surfactant solutions 120  
6.5 Amount of fluid removed by the surfactants at 0.5% volume concentration 123  
6.6 Freundlich isotherms for adsorption of surfactants onto the soil 128  
6.7 Langmuir isotherms for adsorption of surfactants onto the soil 128  
A 4.1 FT-IR spectrum of dodecyl polyglucoside (APG_{12}) 135  
A 4.2 IR spectrum of tetradecyl polyglucoside (APG_{14}) 136
A 4.3 FT-IR spectrum of hexadecyl polyglucoside (APG$_{16}$) 137

A 4.4 1H-NMR spectrum of dodecyl polyglucoside (APG$_{12}$) 138

A 4.5 1H-NMR spectrum of tetradecyl polyglucoside (APG$_{14}$) 139

A 4.6 1H-NMR spectrum of hexadecyl polyglucoside (APG$_{16}$) 140

A 4.7 13C-NMR spectrum of dodecyl polyglucoside (APG$_{12}$) 141

A 4.8 13C-NMR spectrum of tetradecyl polyglucoside (APG$_{14}$) 142

A 4.9 13C-NMR spectrum of hexadecyl polyglucoside (APG$_{16}$) 143

A 4.10 Plot of surface tension vs. surfactant concentration of dodecyl polyglucosides (APG$_{12}$) in the aqueous solution 144

A 4.11 Plot of surface tension vs. surfactant concentration of tetradecyl polyglucosides (APG$_{14}$) in the aqueous solution 145

A 4.12 Plot of surface tension vs. surfactant concentration of hexadecyl polyglucosides (APG$_{16}$) in the aqueous solution 146

A 4.13 Turbidity vs concentration of decanol in APG$_{12}$ in different mole ratios 147

A 4.14 Turbidity vs concentration of decanol in APG$_{14}$ in different mole ratios 147

A 5.1 Surface tension vs. concentration for surfactant mixtures of CTAB with APG$_{12}$ (a), APG$_{14}$ (b) and APG$_{16}$ (c) at various mole fraction of CTAB at 298K 149

A 5.2 Surface tension vs. concentration for surfactant mixtures of DTAC with APG$_{12}$ (a), APG$_{14}$ (b) and APG$_{16}$ (c) at various mole fraction of DTAC at 303K 151