

**UNIVERSITI TEKNOLOGI MARA**

**DETERMINATION OF CRITICAL MICELLE  
CONCENTRATION (CMC) OF OLEYL MANNOSIDE**

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Thesis submitted in fulfilment of the requirements for the degree of

**Bachelor Eng. (Hons)**

**Faculty of Chemical Engineering**

July 2019

## ABSTRACT

The critical micelle concentration (CMC) of nonionic surfactant, oleyl mannoside, ManC18:1 was determined by surface tension method. This surfactant with oleyl alkyl chains and sugar-based head groups was prepared in various concentration. The result is then compared with the series of nonionic surfactants n-alkyl  $\alpha$ -D-mannopyranosides ( $C_n$ Man) with different alkyl chain length ( $n = 6, 7, 8, 9, 10, 12, 14$ ) have been prepared by the Zhang et. al. The hydrophobic alkyl chain length affects their HLB number, water solubility and surface tension. The results showed that the increasing in alkyl chain length will decrease the surface tension, HLB number as well as the solubility in water. In addition, their emulsifying properties depended on the alkyl chain length and the corresponding oil/water system.

## **ACKNOWLEDGEMENT**

Firstly, I wish to thank God for giving me the opportunity to embark on my Degree and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor Dr. Nurul Fadhilah Kamalul Aripin. Thank you for the support, patience and ideas in assisting me with this project. I also would like to express my gratitude to the Universiti Malaya in providing me the facilities to conduct my experiment. Finally, this thesis is dedicated to my parents for the vision and determination to educate me.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Research Background

Surfactants, sometimes called surface-active agents are one of the most versatile chemicals available that widely used in many areas such as chemistry, biology, pharmaceutical and many more (Dominguez, Fernández, González, Iglesias, & Montenegro, 1997). The demand of the surfactant increases as people see the importance of it in human lives as well as industrial purposes. Surfactant has its own unique monomer that contains hydrophilic part or “head” and hydrophobic “tail” and this structure make the surfactant as amphiphilic molecules. In other word they exhibit double affinity which can be defined as polar and non-polar duality. The polar part or known as polar head is favourable to polar solvents especially water, and it is often called as hydrophilic part or hydrophile. The non-polar tail is called hydrophobic or lipophilic has less affinity towards water but great affinity towards grease or oil (Salager, 2002).

The surfactants can be classified into four major types which are anionic, cationic, nonionic and zwitterionic or amphoteric surfactant based on their charges of their polar head groups. The hydrophobic groups can be different with one another due to their length, containing at least eight carbon atoms and can have unsaturated double or triple bonds (Swarup & Schoff, 1993). A fundamental property of surfactants is they can form self-aggregation micelles. The hydrophilic part or polar head of the micelle form an outer shell in contact with water, while hydrophobic part or non-polar tail forms the core of the micelle (Dominguez et al., 1997) as illustrated in the figure 1 below.

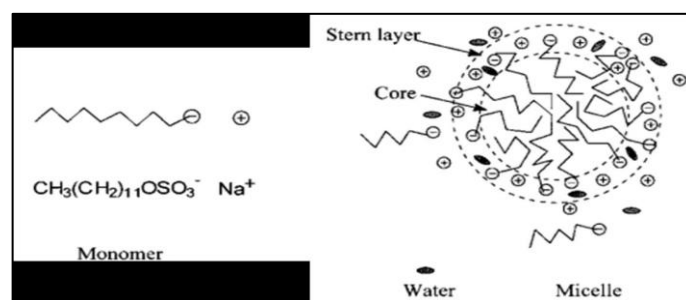


Figure 1 An idealization formation of spherical micelle  
(Domínguez, Fernández, González, Iglesias, & Montenegro, 1997)