

**FOAMING PROPERTIES OF ANIONIC SURFACTANT IN THE  
PRESENCE OF CALCIUM SOAP PRECIPITATES**

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**ABSTRACT**

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Calcium soaps are believed to act as an antifoamer for other surfactants. They were the first compounds to be used as the antifoamer in low foaming detergent products. However, despite the importance of calcium soaps, there have not been many studies on the antifoaming behaviors and the mechanism by which calcium soaps reduce foam is still unclear. In previous work, calcium soaps with alkyl chain  $C_8$ - $C_{18}$  were found to give an antifoaming effect on SDS solution only at the concentration below CMC and only when calcium soaps are present in the form of insoluble precipitates. In this work, the effect of calcium soaps with alkyl chain  $C_{12}$ - $C_{22}$  on the foamability and foam stability of SDS solution was studied and the contact angles of SDS solution on the calcium soap surfaces were measured to verify the antifoaming mechanism for this system. The results of foam stability of SDS solution were in agreement with the results of contact angle measurement. Only calcium soap with alkyl chain  $C_{22}$  which has a contact angle  $> 90^\circ$  gives the antifoaming effect on SDS solution and the bridging-dewetting antifoaming mechanism is proposed for this system.

## บทคัดย่อ

จาวรธรรม เหมือนทองจีน : การเกิดฟองของสารลดแรงตึงผิวประจุลบที่มีเกลือแคลเซียมของกรดไขมัน (Foaming Properties of Anionic Surfactant in the Presence of Calcium Soap Precipitates) อ. ที่ปรึกษา : ศ.ดร.จอห์น เอฟ สเคมีฮอร์น และ ผศ.ดร.นันทยา ยานุมศ 65 หน้า ISBN 974-13-0700-4

เกลือแคลเซียมของกรดไขมันเป็นสารประกอบชนิดแรกๆที่เชื่อว่าทำหน้าที่ลดฟองในผลิตภัณฑ์ผงซักฟอก ถึงแม้ว่าสารดังกล่าวจะมีความสำคัญ ปัจจุบันความรู้และความเข้าใจในพฤติกรรมและกลไกการลดของโฟมก็ยังไม่ชัดเจน จากผลงานก่อนหน้าพบว่า เกลือแคลเซียมของกรดไขมันอิมิตัวที่ประกอบด้วยคาร์บอนอะตอม 8-18 ตัว มีผลในการลดฟองของสารละลายโซเดียมโคเคซิลซัลเฟตซึ่งเป็นสารลดแรงตึงผิวประจุลบที่ความเข้มข้นต่ำกว่าซีเอ็มซีเท่านั้น และเมื่อมีตะกอนของเกลือแคลเซียมเหลืออยู่ในสารละลาย

สำหรับงานวิจัยนี้ ได้มีการศึกษาผลของเกลือแคลเซียมของกรดไขมันอิมิตัวที่ประกอบด้วยคาร์บอนอะตอม 12-22 ตัว ต่อความสูงเริ่มต้นและเสถียรภาพของฟองของสารละลายโซเดียมโคเคซิลซัลเฟต และนอกจากนี้มุมสัมผัสของสารละลายโซเดียมโคเคซิลซัลเฟตบนพื้นผิวของเกลือแคลเซียมก็ได้มีการศึกษาในงานวิจัยนี้ด้วยเพื่อพิสูจน์กลไกการลดของโฟม จากผลการทดลองพบว่ามีความสอดคล้องกันระหว่างผลของการวัดมุมสัมผัสและการทดสอบคุณสมบัติของฟอง เกลือแคลเซียมของกรดไขมันที่ประกอบด้วยอะตอมคาร์บอน 22 ตัว ที่มีมุมสัมผัสมากกว่า  $90^\circ$  เท่านั้นที่ทำหน้าที่ในการลดฟอง และผลการทดลองยังเป็นการยืนยันว่าตะกอนของเกลือแคลเซียมของกรดไขมันอิมิตัวดังกล่าวสามารถลดฟองของสารละลายโซเดียมโคเคซิลซัลเฟตโดยกลไกบริจจิง-ดีเวด

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## TABLE OF CONTENTS

	<b>PAGE</b>
Title Page	i
Abstract (in English)	iii
Abstract (in Thai)	iv
Acknowledgements	v
Table of Contents	vi
List of Tables	viii
List of Figures	ix
<b>CHAPTER</b>	
<b>I INTRODUCTION</b>	<b>1</b>
<b>II BACKGROUND AND LITERATURE SURVEY</b>	<b>3</b>
2.1 Surfactant	3
2.2 Foam	4
2.3 The Drainage and Thinning of Foams	5
2.4 Foaming Properties	7
2.5 Antifoaming	8
2.6 Antifoaming Mechanism	9
2.7 Measurement of the Contact Angle	12
2.8 Precipitate Phase Boundaries	13
<b>III EXPERIMENTAL</b>	<b>16</b>
3.1 Materials	16
3.2 Experimental Equipment	17
3.2.1 Ross-Miles Method Equipment	17

<b>CHAPTER</b>	<b>PAGE</b>
3.3 Experimental Methods	19
3.3.1 Preparation of Calcium Soap Precipitate	19
3.3.2 Contact Angle Measurement	20
3.3.3 Foam measurement by Ross-Miles Method	21
<b>IV RESULTS AND DISCUSSION</b>	<b>23</b>
4.1 Contact Angle Measurement	23
4.2 Foaming Properties of SDS Solution in the Presence of Calcium Soap	24
4.3 The Effect of Particle Size of Calcium Soap on the Foaming Properties of SDS Solution	26
4.4 The Effect of Concentration of Calcium Soap on the Foaming Properties of SDS Solution	28
4.5 The Effect Hardness Tolerance on the Foaming Properties of SDS Solution in the Presence of Calcium Soaps	29
4.6 The Effect of NaHCO <sub>3</sub> on the Foaming Properties of SDS Solution in the Presence of Calcium Soaps	33
<b>V CONCLUSIONS</b>	<b>36</b>
<b>REFERENCES</b>	<b>37</b>
<b>APPENDICES</b>	<b>40</b>
<b>CURRICULUM VITAE</b>	<b>65</b>

## LIST OF TABLES

TABLE	PAGE
4.1 The number of carbon atom per molecule of calcium soap	22
A-1 The contact angle of SDS solution of varying concentration on calcium soap surface	40
B-1 The change in foam height with time using the Ross-Miles foam test	41
C-1 The change in foam height with time of sodium dodecyl sulfate solution in the presence of calcium soap which has the particle size in the range of $< 212 \mu\text{m}$	44
C-2 The change in foam height with time of sodium dodecyl sulfate solution in the presence of calcium soap which has the particle size in the range of $212\text{-}425 \mu\text{m}$	46
D-1 The change in foam height with time of SDS solution in the presence of varying concentration of $\text{CaC}_{14}$ and $\text{CaC}_{22}$	49
E-1 The effect of hardness tolerance on the foaming properties of pure SDS solution	52
E-2 The effect of hardness tolerance on the foaming properties of SDS solution in the presence of $\text{CaC}_{14}$	54
E-3 The effect of hardness tolerance on the foaming properties of SDS solution in the presence of $\text{CaC}_{22}$	56
F-1 The effect of $\text{NaHCO}_3$ on the foaming properties of SDS in the presence of $\text{CaC}_{14}$	59
F-2 The effect of $\text{NaHCO}_3$ on the foaming properties of SDS in the presence of $\text{CaC}_{22}$	62



**LIST OF FIGURES**

<b>FIGURE</b>	<b>PAGE</b>
2.1 Foam structure of a surfactant solution in a cylindrical vessel generated by shaking method	4
2.2 Plateau border at point of meeting of three bubbles	5
2.3 An increase in surface viscosity can be achieved by the presence of a high packing density of certain types of surfactant species which can cause strong cohesive interactions	6
2.4 Replacement-destabilization antifoaming mechanism	9
2.5 Bridging-dewetting antifoaming mechanism	10
2.6 Micelle-monomer-precipitate equilibrium diagram for sodium dodecyl sulfate (SDS) in the presence of calcium ions	15
2.7 Precipitation phase boundaries (hardness tolerance) for SDS	15
3.1 The Ross-Miles pipette	18
3.2 The Ross-Miles receiver	18
3.3 Schematic of equipment for Ross-Miles foam test	19
3.4 The contact angle of water on the calcium soap C <sub>12</sub> pellet	20
4.1 The contact angle of SDS solution on varying concentration on calcium soap surface	24
4.2 The change in foam height with time using the Ross-Miles foam Test	25
4.3 The change in foam height with time of sodium dodecyl sulfate solution in the presence of calcium soap which has the particle size in the range of < 212 μm	27

<b>FIGURE</b>	<b>PAGE</b>
4.4 The change in foam height with time of sodium dodecyl sulfate solution in the presence of calcium soap which has the particle size in the range of 212-425 $\mu\text{m}$	27
4.5 The change in foam height with time of SDS solution in the presence of varying concentration of $\text{CaC}_{14}$	28
4.6 The change in foam height with time of SDS solution in the presence of varying concentration of $\text{CaC}_{22}$	29
4.7 The effect of hardness tolerance on the foaming properties of pure SDS solution	31
4.8 The effect of hardness tolerance on the foaming properties of SDS solution in the presence of $\text{CaC}_{14}$	32
4.9 The effect of hardness tolerance on the foaming properties of SDS solution in the presence of $\text{CaC}_{22}$	33
4.10 The effect of $\text{NaHCO}_3$ on the foaming properties of SDS solution in the presence of $\text{CaC}_{14}$	34
4.11 The effect of $\text{NaHCO}_3$ on the foaming properties of SDS solution in the presence of $\text{CaC}_{22}$	35