

**A REVIEW ON THE SELECTIVITY OF THE
SURFACTANT AS COLLECTOR FOR THE REMOVAL
OF MICROPLASTICS USING FROTH FLOTATION**

MOHAMAD IZARUL BIN ABDUL AZIZ

**BACHELOR OF SCIENCE (Hons.) CHEMISTRY WITH
MANAGEMENT
FACULTY OF APPLIED SCIENCE
UNIVERSITY TECHNOLOGY MARA**

FEBRUARY 2024

**A REVIEW ON THE SELECTIVITY OF THE SURFACTANT AS
COLLECTOR FOR REMOVAL OF MICROPLASTICS USING FROTH
FLOTATION**

MOHAMAD IZARUL BIN ABDUL AZIZ

**Final Year Project Report Submitted in
Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science (Hons.) Chemistry with Management
in the Faculty of Applied Sciences
University Technology MARA**

FEBRUARY 2024

This Final Year Project Report entitled “**A Review on the Selectivity of the Surfactant as Collector for the Removal of Microplastics using Froth Flotation**” was submitted by Mohamad Izarul bin Abdul Aziz in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry with Management, in the Faculty of Applied Science, and was approved by

Dr. Sharizal bin Hassan
Supervisor
B. Sc (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Dr. Siti Nurlia binti Ali
Project Coordinator
B.Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Dr. Nur Nasulhah binti Kasim
Head of Programme
B.Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Date: _____

ABSTRACT

A REVIEW ON THE SELECTIVITY OF THE SURFACTANT AS COLLECTOR FOR REMOVAL OF MICROPLASTICS USING FROTH FLOTATION

Currently, microplastics (MPs) are considered as emerging pollutants that widespread presence in the hydrosphere, particularly aquatic life, by obstructing light from penetrating the water and impeding the development of aquatic species. Owing to this issue, many efforts have been done to remove this MPs including filtration, enhanced oxidation, biodegradation, magnetic extraction, and adsorption. However, most of this method cause less efficiency toward the removal of MPs in the sediments condition. Consequently, the froth flotation was employed in current research work for the removal of the MPs, where this treatment method used separation of plastic waste based on the on the difference hydrophilicity. The hydrophilicity basically based on the presence of the surfactant knows as a collector in the froth flotation. In this review, regarding by comparing with others method, this method is considered as a new approach for the removal MPs, in depth discussion on the mechanistic of the froth flotation with the presence of the several types of the surfactant was particularly comprehensive described in this work. The previous conventional method also been discussed in detail in order to identified the benefits and drawbacks in the removal of MPs. Lastly, current study using surfactant in the froth flotation for the removal of the MPs was also review in this works. Based on the outcome from the previous research works, the anionic surfactant was chosen to be an excellent surfactant for the removal of MPs using froth flotation as it can be related with the longer chain lengths of anionic surfactant may contribute to a greater hydrophobic interaction between MPs and surfactants.

TABLE OF CONTENTS

	Page
ABSTRACT	iii
ABSTRAK	iv
ACKNOWLEDGEMENTS	v
TABLE OF CONTENTS	vi
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	x
CHAPTER 1 INTRODUCTION	
1.1 Background of study	1
1.2 Problem statement	4
1.3 Research question	6
1.4 Significance of study	6
1.5 Objective of study	7
1.6 Scope and limitation of study	7
CHAPTER 2 LITERATURE REVIEW	
2.1 Microplastics	
2.1.1 Microplastics in environment	8
2.1.2 Removals of microplastics	13
2.1.2.1 Physical technique	13
2.1.2.2 Chemical technique	17
2.1.2.3 Biological technique	23
2.2 Froth flotation	
2.2.1 Principle and mechanism	26
2.2.2 Hydrophobicity and hydrophilicity	29
2.2.3 Contact of particle and bubble	31
2.2.4 Collection of the froth layer	32
2.2.5 Reagents	33
2.2.5.1 Collectors	33
2.2.5.2 Frothers	37
2.2.5.3 Modifiers	39
2.3 Floatability of microplastics (MPs)	39
CHAPTER 3 CONCLUSION AND RECOMMENDATIONS	
3.1 Conclusion	44
3.2 Recommendation	46