

**DEVELOPMENT OF ABSORBENT FOR MATERIALS FOR OPEN SEA SPILLAGE
OIL**

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DEVELOPMENT OF ABSORBENT MATERIALS FOR OPEN
SEA SPILLAGE OIL

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*To my beloved
Mother, Ramlah Mat Diah
Father, Mansor Ngah
Husband, CMA Fikri
And
Son, CMA Hadif*

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ABSTRACT

There are many incidents involving the ship at the sea area causing the oil pollution because of the oil spill. As we know, the oil pollution will give huge impact to the maritime especially to an aquatic live. Since, the issues of oil pollution increasing with time, and the waste of palm oil tree not even use for any usable activity; this research is carried out to investigate the ability of palm oil tree fibers as an absorbent material to recover the oil spill problem and replacing the current commercial absorbent. From the result of surface morphology by OM and SEM, it is observed that these pores on the fiber surface can make it easily to absorb the oil. The XRD analysis is mainly used in crystalline materials for structural identification, but the result showed that the oil palm tree fibre is an amorphous. Besides that, the result from the experimental setup, where oil sorption capacity is design with certain parameter set up, a conclusion can be made that by increasing the volume of oil, fiber weight and the time consume, the sorption capacity will be increase until a certain limit. From the cyclic sorption or desorption characteristic test, it is prove that the fiber can be use for one time only. However, if it is use for many times, the result will not very efficient. Lastly, from the selectivity test, we can see that the fiber absorb the oil more than the sea water present. As a conclusion, it is possible to use the fibre as an oil spill absorbent material in our country because of its ability in absorbing the oil and easily to be find.

ABSTRAK

Terdapat banyak kemalangan melibatkan kapal di perairan laut yang menyebabkan pencemaran disebabkan oleh pertumpahan minyak. Seperti yang diketahui, pencemaran minyak akan member impak yang besar kepada maritime terutama hidupan laut. Disebabkan isu pencemaran meningkat saban hari, dan hasil buangan pokok kelapa sawit tidak digunakan, maka kajian ini dibuat bertujuan untuk mengkaji kebolehan sabut pokok kelapa sawit sebagai bahan penyerap untuk merawat permasalahan tumpahan minyak dan menggantikan penyerap sedia ada dipasaran. Daripada keputusan permukaan menggunakan mikroskop optik dan SEM, kita dapat lihat kehadiran liang-liang di atas permukaan sabut yang membolehkan penyerapan minyak berlaku. Keputusan analisa XRD yang digunakan untuk penentuan struktur bagi bahan berbentuk kristal, akan tetapi keputusan menunjukkan sabut kelapa sawit ini adalah amorphous (tiada bentuk kristal). Selain itu, daripada kajian kebolehan menyerap minyak oleh sabut kelapa sawit, kesimpulan dapat dibuat bahawa dengan peningkatan isipadu minyak, berat sabut dan masa yang diperuntukkan untuk penyerapan minyak berlaku, penyerapan minyak meningkat sehingga sampai had tertentu. Daripada ujian putaran penyerapan dan penyahserapan, didapati bahawa sabut kelapa sawit dapat digunakan sekali sahaja. Akan tetapi, jika diguna beberapa kali hasil yang diperolehi tidak memuaskan. Akhirnya, daripada ujian pemilihan terbukti bahawa sabut menyerap minyak lebih banyak berbanding air laut. Kesimpulannya, sabut kelapa sawit mampu menjadi penyerap minyak tumpah yang baik di Negara kita dengan kebolehan menyerap minyak selain senang didapati.

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LIST OF SYMBOLS

%	percent
g	gram
°C	degree Celsius
+	plus
-	minus
/	divide
=	equal
L	litre
ml	millilitre
:	ratio

CHAPTER 1

INTRODUCTION

Recently, economies in Asian countries focus on the manufacturing products. There are lots of agricultural bases that are producing new products. Due to this phenomenon, it grows the transportation activities which involving the ship. Statistics show that, the manufactured product mostly delivered by the ship.

Consequently, there are many incidents involving the ship at the sea area causing the water pollution because of the oil spillage. As we know, the oil pollution will give huge impact to the maritime especially to the aquatic live.

Besides that, Malaysia is very rich with the palm oil trees which become the main agricultural resources for the economy. Waste from the palm oil can be disposed directly without giving any problem to the environment because of its ability as a biodegradable. For the record, the water pollution cause by the oil spill keep increasing time by time, and the waste of palm oil tree not even been use for

any usable activities; the main idea of this research is to investigate the ability of palm oil tree fibres as an absorbent to recover the oil spill problem and replacing the current commercial absorbent.

1.1 Research Background

Malaysia is one of the most developing countries in ASEAN and it is one of the countries that still take hold on the maritime source due to their geographical, which surrounded by the oceans. Furthermore, most of the Malaysian still makes a full use of the ocean in their daily activity for example transportation, food source and etc. In part of transportation, Malaysia did provided lots of facilities for the shipping and the ports take responsibilities to more than thousand ships in a day and the number keep rising every day. Due to that, we may want to take highlights that there are lots of cargo ships move in Malaysia's maritime area in a day.

By calculating the number of ships that use Malaysia's maritime area as their main highway, we may want to believe that there will be big possibilities for the ship to have any issues that will lead to the pollution. Although, this activity will give advantages to the maritime industry but towards the environmental issues, there should be a serious look for the consideration. As the oceans also provided food source to the citizen, it would affect the human health by eating the poisoned and harmful aquatic live besides it also reduce aquatic population.

1.2 Problem Statement

Currently, there are lots of oil absorbent in the market. However, only certain product can be use. Mostly, they are preferred to use the polypropylene and polystyrene as an absorbent. We already know that this type of materials cannot be dispose easily because it is not biodegradable. Also, it is quite expensive if we compared with the natural sources. This research is trying to overcome the problem that detected from the commercial absorbent and to make sure it would be safe and economic toward consumer. These problems with the current absorbents as follows;-

1. Not biodegradable.
2. Not absorb high capacity of oil spill.
3. Not environmental friendly.

1.3 Objective

The objective of this study is to explore the potential of palm oil waste products as an absorbent material for open sea spillage oil; is to study an absorbent material for trapping oil spillage in open sea.

1.4 Scope of Study

- i. Literature study on the present absorbent materials.
- ii. Selection of absorbent materials that can last longer (better life time) than present materials.
- iii. Preparing the chemical and mechanical test on the absorbent materials (life time).
- iv. Data collection and presentation.

1.5 Dissertation Structure

This thesis consists of six chapters; introduction, literature reviews, methodology, results, discussion and conclusion with recommendations.

Chapter one will propose about the general issues of the research. It is aimed to introduce the thesis's background, problems statement, objectives, scope of study and the structure of the thesis.

Chapter two will presents on the oil pollution, and the properties of previous researched of an absorbent. It was including the type of materials used, the process and the problem produce from that particular product.

Chapter three present the detail of experimental flow from the experiment. Here, there are many steps that should be considered in order to make sure this experiment would be success. The data collection and analyses process method also includes. The data collections cover all the articles and journals related.

Chapter four proposed the result produce from the experiment. Detailed result and data also presented.

Chapter five will discuss about the results that produce. Mostly, the data produce will be referred to the previous related journal or articles to make sure the data is accurate besides knowing the cause of the data if it is not like required.

In last chapter, all the process along the experiment will be concluded and from the problem or defects detected, the recommendation for improvement will be proposed.

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