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THE EFFECTIVENESS ABSORPTION TEST OF LUBRICATING OIL WASTE AND HSD FUEL WITH NATURAL FIBERS (DURIAN SKIN)

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ABSTRACT

Pollution of sea water due to oil spills often occurs. Among them are tanker accidents, explosions of offshore oil platforms, ship operation errors and waste from the petroleum and coal industries. Oil spills in the sea often cause pollution which leads to damage to biological resources and damage to the underwater ecosystem. The purpose of this study was to determine the process and processing, and to determine the ability of durian skin to adsorb lubricating oil waste and HSD fuel. This research was conducted by processing the waste with variations of time 2, 5, and 10 minutes. And with variations in durian skin size of 0.25 mm², 1 mm², and 9 mm². With drying of durian skin between 1-15 days with 1-30 days. Then the results were analyzed to determine the efficiency of absorbing durian skin. The results of STTAL laboratory studies showed an increase in durian skin mass after undergoing a process of adsorption of lubricating oil waste and HSD fuel. Thus, the optimal durian skin time and size obtained on lubricating oil waste is 10 minutes with a surface area of 1 mm², mass of 4 grams in drying for 1-30 days. With efficiency of 82.54%. Whereas the HSD fuel is 10 minutes with a surface area of 0.25 mm², mass 4 grams on drying for 1-15 days. With an efficiency of 86.03%.

Keywords*: Durian skin, adsorption of lubricating oil waste, HSD*

1. INTRODUCTION.

Pollution of sea water due to oil spills often occurs. Many things are the cause of this, triggering tanker accidents, exploding offshore oil platforms, faulty operation of tankers and waste from the petroleum and coal industries. Oil spill is one type of pollution that has a very large effect in the long term. Oil spills in the sea often cause pollution which leads to damage to biological resources and damage to the underwater ecosystem. Looking for many fishermen or surrounding communities not to go fishing to find fish.

Some cases of seawater pollution due to oil spills must be considered to prevent and overcome them in order to create a sustainable life for the organisms that live in them. One case study was the leakage of an oil pipe in the waters of Balikpapan Bay in April 2018. The pipeline leak resulted in environmental pollution on the coast. Crude oil spills and extends to the entire coastline. So the impact of environmental damage is very large.

Environmental damage should be dealt with immediately, if oil mixed with water can be immediately separated and cleaned. The same thing happened during HSD loading on ships. In the fuel loading process, oil seepage in the hose or refueling pipe has fallen to the surface of the sea. So that the fuel spill pollutes the surrounding environment. Not to mention the ship that is not equipped with Bilge tank and oil separator, which plays an important role in minimizing pollution, the disposal of waste oil is immediately mixed with sea water.

Various types of environmentally friendly technologies were found to overcome various issues of seawater pollution, including the use of oil booms, water filters, the use of water hyacinth to absorb industrial waste, etc. On the other hand durian, is a tropical plant that is widespread in Indonesia. Where in the durian part, durian skin can be used as a potential raw material in making activated carbon. Activated carbon can be in the form of powder and granules which is a carbon compound that has characteristics that are in the form of a broad pore surface and in large quantities.

Activated carbon in a large surface area can be used for a variety of applications, including color loss, flavoring, deodorizing and purifying agents in the food industry. In addition, it is also widely used in water purification processes both in the process of producing drinking water and in handling waste.

2. MATERIALS AND METHODS ;EXPERIMENTAL PROCEDURE.

2.1. Size of datasets

In this study the authors obtained the results of observation directly on the trial of durian skin with lubricating oil waste and HSD fuel, fuel characteristic data obtained from laboratory tests in Labinkimat, for analysis of effectiveness test data, from the data generated on Durian skin testing, then recorded and analyzed in accordance with the formulation of the problem of this study. besides, the author also looks for supporting data sourced from book literature and the internet, as well as interviews from parties related to previous research.

2.2. ORF in nucleotide sequences

a. Durian Skin Processing.

Durian skin that has been obtained is then carried out in the drying stage with different duration of drying time which is between 15 days and 30 days. After that, the next step is the pulverizing, durian skin pounded with the aim of expanding the pores of the surface of the durian skin. After that proceed to the screening stage. The durian skin that has been crushed is then filtered using a gauze measuring 0.25 mm², 1 mm² and 9 mm². The filtered durian skin is then weighed 4, 6 and 8 grams. So that the test specimen model is obtained.

b. Testing of Test Specimens with Lubricating Oil Waste and HSD Fuels.

The test specimen model was then carried out laboratory tests at the STTAL lab to determine the effectiveness of absorption of lubricants and HSD fuel with a duration of 2, 5 and 10 minutes in each test specimen.

c. Adsorption.

If there is no adsorption process, it will be reviewed at the beginning of the durian skin processing both drying, pulverizing, filtering and test specimen models. If an adsorption process occurs, then proceed at the next stage.

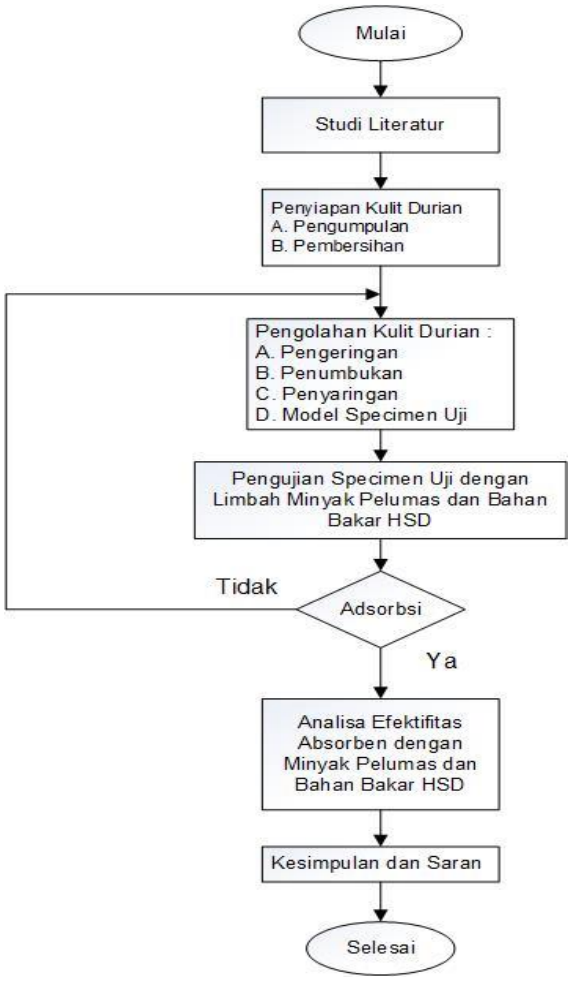

Fig 1. Diagram chart

d. Effectiveness Analysis of Adsorbents with Lubricating Oil and HSD Fuels.

After the writer can know the weight before and after the contact time of the pollutant with durian skin, then the data is then recorded, calculated the presentation of the effectiveness of its absorption power. Then analyzed based on contact time and the amount of absorption of durian skin.

e. Preparation of reports

The author will present all the results of observations, data retrieval, literature studies, test the adsorption of durian skin, opinions of experts, and other findings in the field in a report in the form of a thesis.

3. RESULT AND DISCUSSION.

Table 1 Day Durian Skin Absorption Efficiency Against Lubricating Oil Waste

Surface Area (mm²)	Concat time (minutet)	Durian Skin mass (gr)	Absorbed mass(gr)	Efficiency (%)
0,25	2	4	15,03	73,39
0,25	2	6	14,53	58,71
0,25	2	8	19,06	58,03
1	2	4	18,62	78,52
1	2	6	20,04	70,06
1	2	8	23,47	65,91
9	2	4	17,32	76,91
9	2	6	20,13	70,19
9	2	8	17,96	55,46
0,25	5	4	16,06	75,09
0,25	5	6	18,31	67,23
0,25	5	8	21,85	63,39
1	5	4	18,78	78,70
1	5	6	20,91	71,31
1	5	8	26,91	70,27
9	5	4	16,7	76,05
9	5	6	24,11	75,11
9	5	8	26,97	70,34
0,25	10	4	17,71	77,41
0,25	10	6	25,07	76,07
0,25	10	8	29,86	73,21
1	10	4	21,35	81,26
1	10	6	27,35	78,06
1	10	8	32,26	75,20
9	10	4	17,32	76,91
9	10	6	25,5	76,47
9	10	8	29,99	73,32

Tabel 2 Day Durian Skin Absorption Efficiency Against Lubricating Oil Waste

Surface Area (mm²)	Concat time (minutet)	Durian Skin mass (gr)	Absorbed mass(gr)	Efficiency (%)
0,25	2	4	15,03	73,39
0,25	2	6	20,33	70,49
0,25	2	8	22,14	63,87
1	2	4	15,85	74,76
1	2	6	24,02	75,02
1	2	8	18,98	57,85
9	2	4	11,11	64,00
9	2	6	14,03	57,23
9	2	8	17,32	53,81
0,25	5	4	14,64	72,68
0,25	5	6	20,02	70,03
0,25	5	8	25,48	68,60
1	5	4	15,1	73,51
1	5	6	20,93	71,33
1	5	8	27,42	70,82
9	5	4	13,1	69,47
9	5	6	15,02	60,05
9	5	8	20,39	60,77
0,25	10	4	16,74	76,11
0,25	10	6	18,42	67,43
0,25	10	8	27,49	70,90
1	10	4	22,91	82,54
1	10	6	23,52	74,49
1	10	8	28,1	71,53
9	10	4	12,07	66,86
9	10	6	15,84	62,12
9	10	8	30,62	73,87

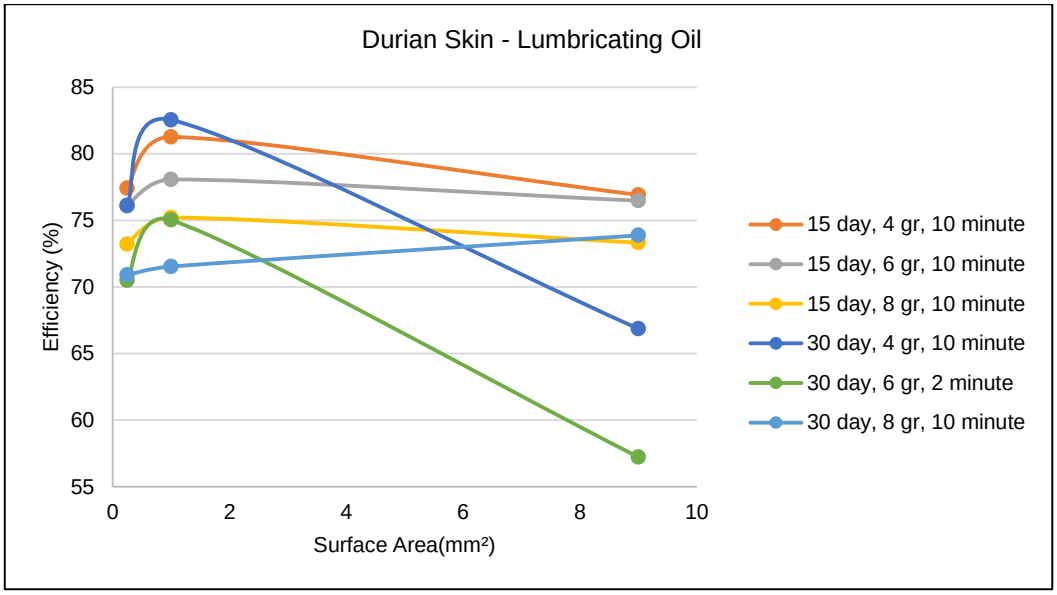

Fig 2. Durian Skin Absorption Efficiency of Lubricating Oil Waste

In Durian Skin with a variation of 15 days of drying, the optimal results obtained are durian skin with a surface area of 1 mm², mass of 4 grams, at 10 minutes contact time which is equal to 81.26%. Whereas in durian skin with drying variations for 1-30 days the results obtained include durian skin with a surface area of 1 mm², mass of 4 grams, at 10 minutes at 82.54%. durian skin with processing between 30 days is more optimal than durian skin with 15 days processing, where efficiency of absorption of durian skin is 82.54%, with mass of 4 grams, surface area of 1 mm², and contact time of 10 minutes

Table 3. Day Durian Skin Absorbency Efficiency Against HSD Fuel

Surface Area (mm²)	Concat time (minutet)	Durian Skin mass (gr)	Absorbed mass(gr)	Efficiency (%)
0,25	2	4	19,31	79,29
0,25	2	6	32,13	81,33
0,25	2	8	28,65	72,08
1	2	4	16,88	76,30
1	2	6	24,37	75,38
1	2	8	30,69	73,93

Surface Area (mm²)	Concat time (minutet)	Durian Skin mass (gr)	Absorbed mass(gr)	Efficiency (%)
9	2	4	13,88	71,18
9	2	6	17,52	65,75
9	2	8	21,83	63,35
0,25	5	4	22,78	82,44
0,25	5	6	23,02	73,94
0,25	5	8	38,23	79,07
1	5	4	21,47	81,37
1	5	6	26,01	76,93
1	5	8	33,23	75,93
9	5	4	14,75	72,88
9	5	6	21,8	72,48
9	5	8	23,32	65,69
0,25	10	4	28,64	86,03
0,25	10	6	35,37	83,04
0,25	10	8	43,16	81,46
1	10	4	25,05	84,03
1	10	6	32,38	81,47
1	10	8	43,9	81,78
9	10	4	15,05	73,42
9	10	6	20,96	71,37
9	10	8	26,36	69,65

Tabel 2 Day Durian Skin Absorbency Efficiency Against HSD Fuel

Surface Area (mm²)	Concat time (minutet)	Durian Skin mass (gr)	Absorbed mass(gr)	Efficiency (%)
0,25	2	4	15,18	73,65
0,25	2	6	22,28	73,07
0,25	2	8	30,73	73,97

Surface Area (mm²)	Concat time (minutet)	Durian Skin mass (gr)	Absorbed mass(gr)	Efficiency (%)
1	2	4	11,74	65,93
1	2	6	19,95	69,92
1	2	8	26,75	70,09
9	2	4	9,22	56,62
9	2	6	13,79	56,49
9	2	8	18,55	56,87
0,25	5	4	18,5	78,38
0,25	5	6	25,65	76,61
0,25	5	8	23,04	65,28
1	5	4	14,96	73,26
1	5	6	23,13	74,06
1	5	8	34,16	76,58
9	5	4	12,13	67,02
Surface Area (mm²)	Concat time (minutet)	Kuldur mass (gr)	Absorbed mass(gr)	Efficiency (%)
9	5	4	12,13	67,02
9	5	6	16,77	64,22
9	5	8	22,49	64,43
0,25	10	4	16,15	75,23
0,25	10	6	26,24	77,13
0,25	10	8	27,17	70,56
1	10	4	13,74	70,89
1	10	6	23,89	74,88
1	10	8	33,72	76,28
9	10	4	10,53	62,01
9	10	6	15,85	62,15
9	10	8	18,53	56,83

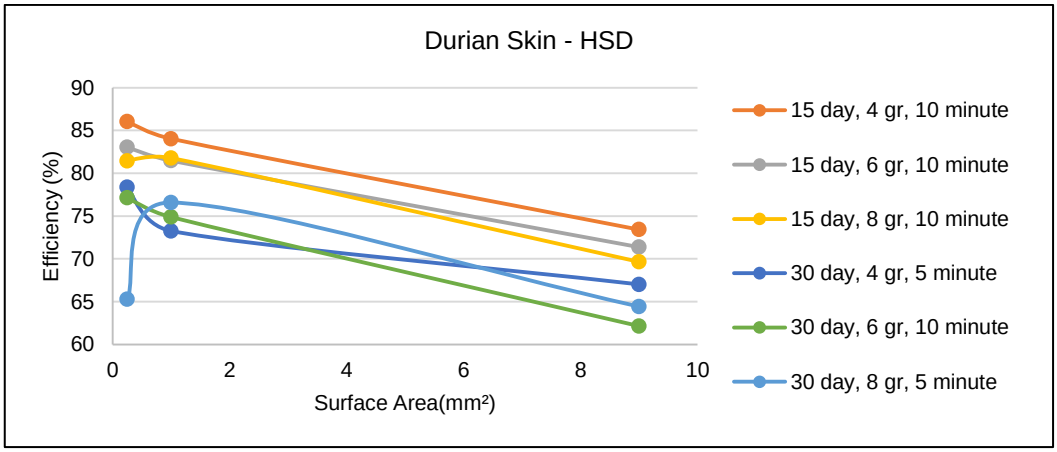

Fig 3. Durian Skin Absorption Efficiency Chart of HSD Fuels

In Durian Skin with a variation of 15 days drying, the best results are obtained from durian skin with a surface area of 0.25 mm², mass of 4 grams, at 10 minutes contact time which is equal to 86.03%. While for durian skin with drying variations for 30 days obtained results include durian skin with a surface area of 1 mm², mass of 4 grams, at 5 minutes at 78.38%. durian skin with processing between 15 days is more optimal than durian skin with 30 days processing, where the efficiency of durian skin absorption is 86.03%, with a mass of 4 grams, surface area of 0.25 mm², and contact time of 10 minutes

4. CONCLUSION.

a. Utilization of durian skin to adsorb lubricating oil waste and HSD fuel in the sea by processing durian skin by drying between 15 days and 30 days, then puree to filter on areas of 0.25, 1 and 9 mm² so that durian skin can be used as sorbent waste oil and HSD fuel.

b. From the results of the study it was found that the utilization of durian skin as an adsorbent of lubricating oil optimally is 30 days processing on a surface area of 1 mm², mass of 4 grams with a contact time of 10 minutes and absorbency efficiency of 82.54%. Whereas the optimal HSD fuel is 15 days of processing on a surface area of 0.25 mm², mass of 4 grams with a contact time of 10 minutes and absorption efficiency of 86.03%.

Acknowledgement.

Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

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