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Households awareness and practices on used cooking oil recycling in Felda Lepar Hilir 1, Pahang

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Abstract. Awareness on recycling used cooking oil still lacking in the communities. It can be seen by their improper disposal practices of used cooking oil. Environmental problem might happen and become worse if no further corrective action is taken towards the improper disposal method. Therefore, this research was conducted in order to evaluate the communities' awareness and their practices on the management of used cooking oil. A total of 214 respondents from Felda Lepar Hilir 1, Pahang community were chosen in this survey. Before the questionnaire were distributed to the respondent, the reliability test using Cronbach alpha was conducted to evaluate the consistency of the questionnaire. Based on the result, this study found that the average used cooking oil generated per household was 1.27kg/month. This study also revealed that there was no significant difference in awareness on recycling used cooking oil between male and female bases on the t-test analysis. Based on the correlation analysis, there were weak positive relationship between awareness and practices of the community on recycling used cooking oil. It means that the awareness of the community can affect their practices in recycling. Therefore, there is need to strengthen efforts in creating more awareness on appropriate management of used cooking oil.

1. Introduction

Globally, one of the most important goals is to raise awareness for individuals to value the use of natural resources, so that they can meet their needs without compromising the development of future generations. The United Nations (UN) 2030 Sustainable Development Goals states that the responsibility of goods and services production and consumption together with an innovative industry is to maintain safety and water availability of aquatic ecosystem. Therefore, the final disposal of household waste is very important, mainly due to the lack of community's culture and availability of responsible government agency and poor municipal waste management systems [1].

Used cooking oil (UCO) is part of the domestic waste that is usually generated as the result of frying and cooking purposes [2]. Generally, UCO refers to frying oil that was used at high temperatures, edible fat mixed in kitchen waste and oily wastewater which usually directly discharge into sewers system [3]. In Malaysia, about 50,000 tons of UCO produced from vegetable oils and animal fats were disposed of to the environment without proper treatments [4]. The uncontrolled disposal of UCO can cause negative environmental impacts such as contributing to water and soil contamination and causing disruption to aquatic life, as well as economic issues such as blockages sewer system and overflow, increase cost in water treatment and waste management [4, 5].

Used cooking oil management aims to prevent environmental impacts and health issues due to improper disposal. It involves legal and practical measures used in ensuring that UCO is managed in a



way that does not affect the environmental and human welfare [6]. In developed countries, UCO collection and recycling programs are among the most common practices that involved the collection and recycling of UCO to turn into some valuable products, such as soaps, thermal cracking process and biodiesel [7]. Therefore, this study was conducted to assess the households' awareness and practices toward UCO collection and recycling activities in Felda Lepar Hilir 1, Pahang.

2. Materials and Methods

2.1. Study area

The research site was located at Felda Lepar Hilir 1, Pahang in the eastern-west part of Peninsular Malaysia with the coordinate of 3.6509 N 103.0832 E. The sampling area was located 6km north in the suburban area of Gambang District. The main activity of sampling area is oil palm plantation cultivation. Figure 1 shows the map of Felda Lepar Hilir 1 in Pahang State.



Figure 1. Map of Felda Lepar Hilir 1, Pahang.

2.2. Sampling and data collection

From July to October 2021, the data randomly collected by using structured questionnaire among 214 households in the study area. The households of Felda Lepar Hilir were stratified and the sample sizes were selected based on the population size [8]. The questionnaires were completed by the households or family representatives with the researcher's assistance. The questionnaire used was designed in bilingual language, English and Bahasa Malaysia. The contents used for the questionnaire covered information on households' socio-demographics, awareness on the significance of UCO recycling, and practices associated with UCO recycling and reuse. The households' socio-demographics information included gender, age, education, working status, and income generation. Meanwhile information gained on UCO management issues included the quantity of cooking oil consumed and UCO recycling, reuse and method of disposal.

2.3. Data analysis

This study used Statistical Package for Social Science (SPSS). The analysis started with the reliability test by using the Cronbach alpha to assess the consistency of the questionnaire. Descriptive statistics were then used to explain the respondents' socio-demographics background, practices regarding reuse, recycling and disposal of UCO and awareness toward UCO recycling. Then, the skewness and kurtosis values was used to determine the distribution of data. The skewness and kurtosis values range between -2 and +2 showed that the data was normally distributed [9, 10]. A t-test analysis was conducted to determine whether there is significant difference in awareness between male and female. The Pearson's

correlation test was used to assess the relationship between awareness and households' practices toward UCO.

3. Results and Discussion

The results revealed that the surveyed respondents' average age was from 21 to 30 years old with majority of them were female (53.3%). The respondents who completed secondary school were higher 36.4, followed by college (35.5%), while the least percentage were for those finished primary school (6.5%). The surveyed households were mostly self-employed (48.6%), followed by unemployed (29.9%), working in private sector (13.6%), and only 7.9% were government's employee. The study also showed that the average household's monthly income was RM2000 with 31.8%, whereby 30.4% of them earned in the range from RM2001 to RM3000, and only 12.1% earned above RM4000.

The study indicated that the average monthly usage of cooking oil from the surveyed respondents was 5.8kg, whereby 83% of respondents consumed 1kg-5kg, 13.5% consumed 5.1kg -10kg, followed by 3.5% who consumed more than 10kg of cooking oil per month (Figure 2). The quantity of cooking oil consumption increased in direct proportional to the waste generated from cooking oil [11].

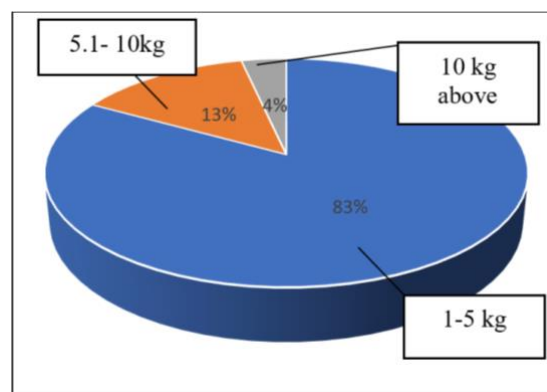


Figure 2. Quantity of UCO consumed per month (kg).

Among the households' four preferred disposal methods, more than half of them (65%) dispose of their UCO to house bin, while 25% disposed of to waste bin, 6.2% disposed of to drains and 3.8% disposed of directly through the soils and drainage systems (Figure 3). Furthermore, this study also revealed that only 8% of the respondents had recycled UCO, while the rest of them did not. This shows that most UCO generated among households in Felda Lepar Hilir 1 was wasted and disposed of to the environment. Therefore, more awareness campaign should be taken on the effects of improper disposal of UCO to the environmental.

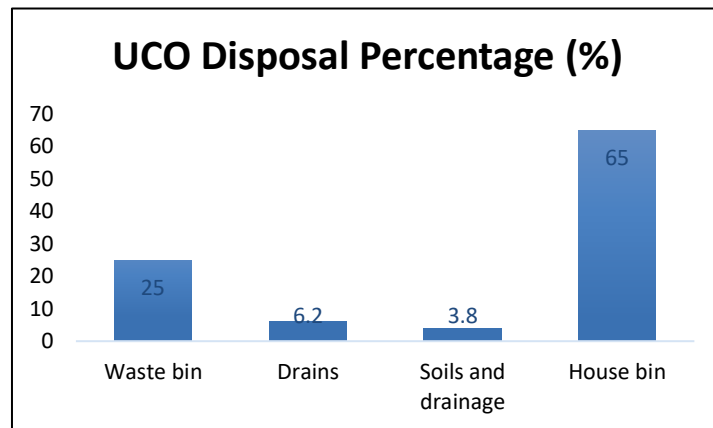


Figure 3. Used cooking oil disposal methods.

The skewness and kurtosis values between -2 and +2 are considered acceptable in order to prove normal distribution [9]. Based on the Table 1, the skewness and kurtosis indicated that the distribution of variable was normally distributed. Therefore, a parametric test can be used in this study.

Table 1 Skewness and Kurtosis descriptive statistics.

	Kurtosis		Skewness	
	Statistic	Std. Error	Statistic	Std. Error
Practices	-0.864	0.331	0.074	0.166
Awareness	1.472	0.331	-0.907	0.166

T-test analysis was conducted to determine whether there is significant different in the awareness between gender. Based on the output in Table 2, there was no significant difference between male and female in their level of awareness in managing used cooking oil.

Table 2 Independent t-test for awareness between genders.

		Levene's Test for Equality of Variances		t-test for Equality of means	
		F	Sig.	t	Sig. (2-tailed)
Awareness on used cooking oil recycling	Equal variances assumed	1.302	.255	-1.444	.150
	Equal variances not assumed			-1.455	.147

The correlation test was used to assess the influence of awareness and practices on the respondents toward UCO reuse and recycling activity. There was significant differences between households' practices toward awareness on UCO recycling activities ($p < 0.005$). The result of the correlation also revealed that practices and awareness were indicated as weak, and thus there is a need for strengthen efforts in creating awareness on appropriate management of used cooking oil (Table 3) in order to increase the practices level among the community. Therefore, practices and awareness are the significant factors which can expected the households' engagement toward UCO recycling activities. The level of awareness and attitude of households toward the environmental issues play an important role in their engagement into environmental conservation activities [12, 13].

Table 3 Correlations between Practices and Awareness.

		Practices	Awareness
Practices	Pearson Correlation	1	.137*
	Sig. (2-tailed)		.045
	N	214	214
Awareness	Pearson Correlation	.137*	1
	Sig. (2-tailed)	.045	
	N	214	214

*. Correlation is significant at the 0.05 level (2-tailed).

4. Conclusion

In order to raise awareness and generate information in improving the UCO management among households, a survey was done to identify the households' practices toward UCO, including UCO disposal methods and awareness on UCO recycling. Findings from this research revealed that the need for awareness campaign to encourage communities especially households to manage their UCO properly through recycling activities. The awareness campaign should be put in place more emphasis on the direct and indirect impacts of improper disposal of UCO. Meanwhile, the government should take appropriate action, such as to widen their awareness programs which cover every single house and individuals in this country. Therefore, a proper management of UCO need to look into by many parties, because improper UCO management can results in the release of UCO into the environment. There is a need to intensify efforts in creating more environmental awareness and a proper management of UCO that involving all parties.

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