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Potential of Recycling Waste Cooking Oil Management

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Abstract
Repeatedly used of cooking oil will dangerous human health and destruct environmental quality. Nevertheless, the waste cooking oil should undergo recycling purposes for other usage matter. This research study conducted to determine respondent's perception on potential of recycling waste cooking oil management in cafeteria operators. Quantitative approach with questionnaire method applied, with targeting 20 out of 32 cafeterias operators in sampling size due to willingly in cooperation. Two categorized are formatted in collecting the information, namely respondent's demographic profile and respondent's perception on potential of recycling waste cooking oil management in cafeteria operators. Results indicated method disposal of waste cooking oil are poured into sink are 10 cafeterias, thrown with normal waste are 7 cafeterias, and sell the waste are 3 cafeterias. Next, frequency of oil being used repeatedly in one day for only one time are 2 cafeterias, while using the oil for three times are 3 cafeterias, and others are stay for two time in repeating using cooking oil. Lastly, the level of knowledge of respondents towards human health indicate the answer for 'yes' are 5 cafeterias, while answering 'no' are 5 cafeterias, and others cafeterias operators stay for answer 'not sure'. Conclusions, every university will have the guidelines in manage with the waste cooking oil to cafeterias operators. Mostly the guideline will concern on environmental and human health perspective. Apart from these two categories, university also do highlighted on the usage of recycling of waste cooking oil and suggested to cafeterias operators to adapted the attitude of recycling waste cooking oil. Indirectly, these actions will not only protect the environmental quality, but also increase human health through providing good food quality.
Keywords: repeatedly cooking oil, human health, environmental quality, waste cooking oil

Introduction

In Malaysia, cooking oil consists of palm oil, corn oil, and sunflower oil, which is essential for during preparation food. Generally, cooking oil are used as a heat-transfer medium in frying to generate nicely cooked food, which normally existed in liquid form except for some oils are contain saturated fat such as coconut oil, palm oil and palm kernel oil that exist in solid form

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at room temperature. Malaysia become top three exporter in the world, which consists of 40% of palm oil that mostly existed in cooking oil, margarine, specialty fats and oleochemicals. The main used for cooking oil are palm oil. On the other hands, used cooking oil or recycled cooking oil can be no longer used in food production. As such, main producers of recycled cooking oil are the restaurants, food stalls, night market, as well as cafeterias. Normally, the recycled cooking oil that could not be used, or refer as waste cooking oil, are become major problem to environment especially from fried food like fried chicken, French fries and burgers are being produce as much as 15 liters per day excluding restaurants providing Malay food.

According to statistic, waste cooking oil is widely produced all over the world [6]. Improper waste management of cooking oil leads to discharge of waste cooking oil to environment and this will effect environment and danger to human health. The increasing production of waste cooking oil from household or food industrial source is become a major issues and problem in Malaysia. The waste cooking oil is regularly poured down directly into sink or drain and allows it to flow into wastewater treatment plants. Fat, oil and grease could cause blockage in the sinks or drain, which could results in major problems to drain and sewers. Certain issues are happen when the oils and grease are flow across the pipe would cause clogging towards the pipe because the wastes will stick to the inner walls and reduce the diameter of sewer pipes, which possible to cause sewage to spills due to the layer is thicker. Once the waste cooking oil is flow into the streams or rivers, this action will cause river water pollution. This situation will become worst when there are needed for wastewater treatment plant to undergo for treatment and the maintenance will be very costly to paid for the purification [7].

The people's eating habits are always changing, where people are frequently eating the outside food easier than having cooking by their own. Indirectly, the food business will increase drastically. This condition will increase more percentage of businesses to repeated cooking oil due to cutting the cost and compete with other businesses. Generally, according to literature review stated that the oil is discarded only when the oil becomes foamy, produce bad smell or when the color of the repeatedly used oil turns dark [1]. In addition, the consumption of repeated usage cooking oil is unhealthy and mallicious to consumers because cooking oil is heated to a temperature of 170-220 degrees Celsius during frying. Upon heating, cooking oil may undergo chemical reactions, hydrolysis, oxidation and polymerization. Degradation products such as free fatty acids, hydro peroxides and polymerized triglycerides may be formed. Besides, the viscosity of the cooking oil will increase; its color will go darker and rancidity will also develop, giving rise to unpleasant flavor as a result of oxidation. Recent study conducted showed that consumption of repeatedly heated cooking oil resulted increased blood pressure and necrosis of cardiac tissues in experimental rats. The increase in blood pressure due to consumption of repeatedly heated cooking oil might be due to quantitative changes in endothelium dependent and independent factors including enzymes directly involved in the regulation of blood pressure [1].

Using of repeatedly used oil can cause adverse effect to the human health. However, this practice becomes common

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among Malaysian without their aware that this type of oil can harm the human health [5]. Many local communities are not aware the issues due to lack of information and knowledge of waste cooking oil management especially for food outlet business operators, a step must be taken to overcome it. However, it has can be recycled and has potential as value-added products such as biodiesel, lubricants, biopolymers or soap. Therefore, this research study carried out to determine respondent's perception on potential of recycling waste cooking oil management in cafeteria operators.

Methodology

Research study area is concentrated in one of the government's university in Malaysia. There are 39 cafeterias operators in the university that running on the business. However, only 20 cafeterias operators are selected for sampling size due to the willingly cooperation in providing the information [2-4]. Since the research study applied quantitative approach, the questionnaire will be divided into two sections, namely (1) respondent's demographic profile, and (2) respondent's perception on potential of recycling waste cooking oil management in cafeteria operators [2-4].

Results and Discussions

Table 1 shows respondent's demographic profile. In gender, female are the highest rating with 55 respondents while male are 25 respondents. In age, 21 to 30 are the highest respondents with 29, continue by 31 to 40 with 28 respondents, 41 to 50 with 14 respondents, and lowest are more than 51 with 9 respondents. Next, majority respondents are working there are non-owner with 57 people while owner only 23 people. Lastly, most of the respondents are only having the education level until primary school with 48 respondents, continue with secondary school with 19 respondents, pra-university level are 8 respondents, and the least are university level with 5 respondents.

In respondent's perception on potential of recycling waste cooking oil management in cafeteria operators indicate methods disposal of waste cooking oil, frequency of oil being used repeatedly per day, and level of knowledge of respondents towards human health. In method disposal of waste cooking oil, majority cafeterias operators choose to thrown into sink without having any treatment, which involve with college 5 (1,2,3), college 12 (4), college 7, and food court (2,3,4,5); continue by thrown with normal waste which having primary treatment are college 12 (3,5), college 11 (1,2,3), food court 1, and Academy of Islamic Study. Lastly, only minority cafeterias operators like college 12 2, Faculty of Science, and Student Complex are choose to sell the waste cooking oil to the relevant parties for further action. Continuously, frequency of oil being used repeatedly in one day stated college 5 (1) and Faculty of Science are using the oil for one time, while college 12 (3), college 7, and Food Court 4 using the oil for three times, and others are stay for two time in repeating using cooking oil. Lastly, the level of knowledge of respondents towards human health indicate the answer for 'yes' are college 5 (1), college 12 (4), Faculty of Science, Academy of Islamic Study, and Student Complex; while answering 'no' are college 5 (2 and 3), college 11 (2), college 7, and Food Court 4; and others cafeterias operators stay for answer 'not sure'.

Based on respondent's perception stated that cooking oil should not repeatedly used for

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cooking purposes and it should be dump or recycle to perform other usage. According to experience of cafeterias operators, the collected used cooking oil should sell to recycling companies or wastewater treatment. The university should encourage the cafeteria operators to sell their used cooking oil to the recycler. The government also need to supports recycling of used cooking oil as it reduces the dependency on landfill sites and the use for biodiesel production. Usually, the recycler will collect the used cooking oil and sold it to biodiesel companies. Some of researcher also will purchased cooking oil from the cafeteria to use for their project. In Japan, waste oils and fats were discarded from various sites such as households, restaurant, and cafeteria including food manufacturing industry. In Malaysia, there are many recyclers of cooking oil, but mostly preferred in food commercial industry and not towards household. In 2011, Petaling Jaya, Selangor has initiated campaign to encourage the recycling of used cooking oil into biodiesel, and also having a campaign to "say no to polystyrene".

Some of the recycler of used cooking oil will sell the oil to a private company name Sime Darby Plantation. Sime Darby is one of the top companies in Malaysia, including global. Sime Darby is responsible leading for the production of palm biodiesel in Malaysia and exported to overseas. In the non-food sector, Sime Darby Plantation is involved in the manufacturing of oleochemicals and biodiesel. Sime Darby Plantations has two biodiesel plants located in Selangor, Malaysia. They are in Teluk Panglima Garang with annual capacity of 30,000 tonnes and also in Carey Island with capacity of 60,000 tonnes. Emery Oleochemicals is jointly –owned by Sime Darby Plantations Sdn Bhd and PTT Chemical International Pte. Ltd. Of Thailand.

Table 1: Respondent's demographic profile.

Category	**Frequency**
Gender	
Male	25
Female	55
Age	
21-30	29
31-40	28
41-50	14
>51	9
Occupations Types	
Owner	23
Non-Owner	57
Monthly Income (RM)	
0 – 500	13
501 – 1000	42
1001 – 1500	7
1501 – 2000	9
> 2001	9
Education Level	
Primary	48
Secondary	19
Pra-University	8
University	5

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Table 2: Respondent's perception on potential of recycling waste cooking oil management in cafeteria operators.

Cafeteria	Method Disposal of Waste Cooking Oil	Frequencies of oil being used repeatedly per day	Level of knowledge of respondents toward human health
College 5 (1)	Sink	1x	yes
College 5 (2)	Sink	2x	No
College 5 (3)	Sink	2x	No
College 12 (1)	Sink	2x	Not sure
College 12 (2)	Sell	2x	Not sure
College 12 (3)	Thrown with Normal Waste	3x (Deep frying)	Not sure
College 12 (4)	Sink	2x	yes
College 12 (5)	Thrown with Normal Waste	2x	Not sure
College 11 (1)	Thrown with Normal Waste	2x	Not sure
College 11 (2)	Thrown with Normal Waste	2x	No
College 11 (3)	Thrown with Normal Waste	2x	Not sure
College 7	Sink / Drain	3x	No
Food Court 1	Thrown with Normal Waste	2x	Not sure
Food Court 2	Sink / Drain	2x	Not sure
Food Court 3	Sink / Drain	2x	No
Food Court 4	Sink / Drain	3x	Not sure
Food Court 5	Sink / Drain	2x	Not sure
Faculty of Science	Sell	1x	yes
Academy of Islamic Study	Thrown with Normal Waste	2x	yes
Student Complex	Sell	2x	yes

Conclusion

As conclusion, every university will have the guidelines in manage with the waste cooking oil to cafeterias operators. Mostly the guideline will concern on environmental and human health perspective. Apart from these two categories, university also do highlighted on the usage of recycling of waste cooking oil and suggested to cafeterias operators to adapted the attitude of recycling waste cooking oil. Indirectly, these actions will not only protect the environmental quality, but also increase human health through providing good food quality.

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