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Oil to Earth: Raising Consciousness on Used Cooking Oil Recycling in Shah Alam

Ain Shamimi Arifin, Shufri Johari, Noraihan Mohamad

Management and Science University

Email of correspondence: ain_shamimi@msu.edu.my

Abstract

Cooking oil plays a pivotal role in Malaysian cuisine, particularly in the preparation of fried foods. Despite the financial potential of collecting and selling used cooking oil to recycling centers in Malaysia, public awareness regarding the recycling of such oil remains comparatively low among Malaysians in contrast to other ASEAN countries. This research addresses the existing gap by focusing on the Malaysia Oxygen (MyO2) program implemented at MSU Malaysia, aligning with Sustainable Development Goals (SDGs). The collected oil is then sold to the municipal authority, Majlis Perbandaran Shah Alam (MBSA) and the sale of cooking oil contribute to tree planting efforts at Kanching Eco Forest Park in collaboration with Tourism Selangor. This research employs face-to-face surveys and distributed questionnaires during the MyO2 program to gather data. Descriptive analysis were employed to elucidate key features of the data collection and research model. The study aims to explore awareness levels regarding the recycling of used cooking oil and disseminate information about the environmental benefits associated with such recycling efforts. The insights garnered from this research could potentially contribute to the refinement of existing models or the development of an advanced theoretical framework. Furthermore, the applicability of these models can be comprehensive in understanding of the adoption and practices associated with recycling behavior. This academic exploration aims to pave the way for a more robust comprehension of the factors shaping recycling intentions and behaviors in the specific context of Shah Alam and, by extension, contribute to broader discussions on sustainable practices.

Keywords: *Recycling used cooking oil, sustainability, environment, Malaysia, MyO2*

Introduction

In the Malaysian culinary landscape, cooking oil assumes a paramount role across various food categories, particularly in the preparation of fried dishes. Derived from sources such as palm oil, vegetable oil, coconut oil, or virgin oil, cooking oil serves as a fundamental component in the cooking practices of restaurants, food manufacturers, and households alike. The consumers of cooking oil ranging from commercial establishments to domestic kitchens (Mat Daud et al., 2020).

Waste cooking oil can be characterized as oil that has been contaminated by other elements, and its impact on the environment may vary (Orjuela & Clark, 2020). Consequently, owing to its potential toxicity, several nations, including the European Union, Canada, the United States of America (USA), and Japan, have implemented the environmental guidelines to ensure the safe disposal of oils.

Using too much cooking oil will lead to waste if improper management of waste cooking oil being practiced (Fujita et al., 2013). Wasted cooking oil produced from vegetable oils or animal fats are disposed to the environment without proper treatment yearly in Malaysia. This habit will give negative impact to the environment if it is being practiced continuously (Orjuela & Clark, 2020). Others than that, this situation also shows that there is low of awareness in disposing wasted cooking oil (Mat Daud et al., 2020)

Due to inadequate waste management practices, certain municipal bodies like Majlis Bandaraya Shah Alam (MBSA) and Majlis Perbandaran Putrajaya (MPJ), were responsible for the collection of waste cooking oil. These municipal bodies entities also facilitate designated drop-off points for individuals to dispose of the waste cooking oil and offering financial incentives as a means to encourage regular recycling.

However, public awareness of recycling among Malaysians still remains low compared to their developed neighbor, Singapore, and similar countries; although Malaysia has bravely targeted 22 percent recycling rate by the year 2020 (Mahmudah & Shofiah, 2023). It is perceived that a lack of synchronization between relevant agencies and residents in regards to waste management, underutilization of resources, unsustainable waste management programs, inadequate household participation, insufficient skilled manpower, a lack of waste collection equipment, irregular collection services, a lack of legal provisions and constraints of other necessary resources are the key factors behind the current waste recycling dilemma in Malaysia (Mat Daud et al., 2020).

Research conducted by Mat Daud et al., 2020 on used cooking oil found that used cooking oil being dumped into drain and sewer and creating pollution at Pasir Gudang. This is because majority of the respondents did not aware the used of cooking oil can be recycled, did not know that there are individuals or companies which collecting and buying used cooking oil and majority of the respondents

totally agreed that recycling of cooking oil is a hard task. In addition, study conducted in Kampung Nelayan, Penang (rural area) and Gurun, Kedah (suburban area) in 2015 found individuals are aware of environmental problems, develop positive environmental impacts, but do not reflect this awareness and attitude in their daily lives (Mahmudah & Shofiah, 2023).

Each country all around the world have their own initiatives for recycling waste cooking oil and it has depended on their government on how they manage that. There are some recycling cooking oils and the ongoing experience of a few countries. For example, there are a few countries that worth to be mention such as Canada and Germany (Ruiz et al., 2017).

In Canada, two types of practice of disposed cooking oil by Eco-station and by picked up by recycling companies (Ruiz et al., 2017). For small businesses in food and beverages the used cooking oil will be dumped into the garbage in the premises by using plastic bags. Meanwhile in Germany, Bent GMBH (Oberging/Munich) is the one that carried this initiative by collecting food waste in the kitchens, canteens and restaurants. This company is also a partner of Öli in municipal collecting and recycling used cooking oil for biodiesel process. In addition, hostels, canteens, hospitals and clinics, homes for the elderly, kindergartens, snacking among others, dispose of these used wastes in the nearest eco-points (named Sammelbox in German) where they get a new collection recipient in return.

In Malaysia, Management and Science University (MSU), organized an awareness campaign that called MyO2 stand for Malaysia Oxygen (O₂) a recycling used cooking oil campaign that was organized by students and staff. The campaign is a way to encourage students and staff to take good care of the environment by recycling used cooking oil. The collected used cooking oil were later sold to Majlis Perbandaran Shah Alam (MBSA) and financial incentives were then used for trees planting at Kanching Eco Forest Park in collaboration with Tourism Selangor.

Through this campaign, sustainable development goals (SDG) can be achieved. This campaign highlighted SDG 11: Sustainable cities and communities. Due to rapid urbanization is exerting pressure on fresh water supplies, sewage, the living environment, and public health. Through this campaign the collaboration with Tourism Selangor in preserving nature for next generation. SDG 14: Life below water because coastal waters are deteriorating due to pollution and eutrophication. Without concerted efforts, coastal eutrophication is expected to increase in 20 percent of large marine ecosystems by 2050. One liter of cooking oil pollutes 1 million liters of water. Lastly, SDG 17: Partnership for the goals that can support the achievement of the sustainable development goals where MSU will be the center of collecting and selling used cooking oil from staff, students and residents nearby and Majlis Perbandaran Shah Alam (MBSA) will buy the used cooking oil and finally Tourism Selangor support by providing space for trees planting.

This initiative serves as a means to attain the Sustainable Development Goals (SDGs), with a specific emphasis on SDG 11, which focuses on fostering sustainable cities and communities. The escalating pace of urbanization poses significant challenges to vital resources such as fresh water, sewage systems, the overall living environment, and public health. The campaign establishes a collaborative effort with Tourism Selangor to ensure the preservation of nature for future generations.

Furthermore, the campaign addresses SDG 14, concentrating on Life below Water, as coastal waters face deterioration due to pollution and eutrophication. Without concerted efforts, it is anticipated that coastal eutrophication will escalate in 20 percent of large marine ecosystems by the year 2050. Notably, the campaign underscores the environmental impact of a single liter of cooking oil, which can pollute one million liters of water.

Finally, the initiative aligns with SDG 17, emphasizing Partnership for the Goals. This collaborative endeavor involves MSU serving as a focal point for the collection and sale of used cooking oil from staff, students, and nearby residents. Majlis Perbandaran Shah Alam (MBSA) actively participates by purchasing the used cooking oil, while Tourism Selangor contributes by providing space for tree planting activities. Through these multifaceted partnerships, the campaign aims to support the overall achievement of the sustainable development goals.

Methods

MyO2 campaign at Management and Science University was conducted from October 2019 to December 2019.



Figure 1: Booth for collecting recycling used cooking oil from staff and students.



Figure 2: Collecting used cooking oil from restaurants around Shah Alam.



Figure 3: Oil selling to Majlis Perbandaran Shah Alam



Figure 4: From the money collection, the program buy trees and plant at Kanching Eco Forest Park

The specific scope is MyO2 donors, staff, students, residents, hotels and restaurant operators at Shah Alam. In 3 months, 341 respondents were participated in the survey. The questionnaire were completed by owner or person in charge at the premises and while for the household residences the link of the online questionnaire will be shared through WhatsApp and Facebook and also the barcode for them to scan with the assistance of the survey team. English language were design by the researchers for the questionnaire. The contents of the questionnaire include socio-demographic information, knowledge, awareness, attitude and practice of recycling used cooking oil.

This study used Statistical Package for Social Science (SPSS) version 2.0 for data analysis. The research started with a reliability test using the alpha model. Descriptive statistics were used to explain the socio-demographic, knowledge, awareness, attitude and practice of recycling used cooking oil.

Result and Discussion

This study involved 341 participants, with 177 of them being females, constituting 51.9%, while males accounted for 164 respondents, making up 48.1%. The majority of participants were female. Additionally, 207 respondents, equivalent to 60.7%, were from households, while 134 respondents, or 39.3%, were associated with the food and beverage sector, indicating that the majority of participants were from households.

Concerning consumer awareness, the findings indicate that a significant portion of respondents agree that using the same cooking oil repeatedly is detrimental to health. Respondents are also cognizant of the environmental harm caused by cooking oil, and most are aware of the potential for recycling used cooking oil. However, there is a lack of clarity regarding individuals or companies engaged in the collection and purchase of used cooking oil.

In terms of attitudes, respondents express a strong awareness of the need to address waste pollution issues, advocating for initiatives by authorities and NGOs, such as impactful recycling programs and campaigns. Respondents recognize their responsibility in appropriately disposing of waste cooking oil.

Regarding respondents' behavior toward recycling used cooking oil among Shah Alam citizens, there is a notable interest in safeguarding the environment from pollution. Many industry players collect cooking oil used in restaurants, selling it to recycling centers, contributing to environmental preservation. Respondents actively engage in conversations with friends, family, and colleagues about environmental issues, promoting environmentally friendly practices and raising awareness in the public.

This research reveals that all participants actively participated in the recycling program, supporting composting practices for cooking oil. They refrain from discarding used cooking oil into sinks or drains, instead opting to collect and either recycle or sell it to recycling centers, demonstrating a proactive approach to environmental conservation.

Conclusions

This research investigation centers on the recycling of cooking oil within restaurants and households in the Shah Alam residence, aiming to support SDG 11 (Sustainable Cities and Communities), SDG 14 (Life below Water), and SDG 17 (Partnership for Goals) research has indicated that individuals possess awareness of environmental issues and acknowledge positive environmental impacts. However, this awareness and attitude do not consistently translate into daily practices. Cooking oils are commonly used in both liquid and solid forms, finding applications in various industries such as feed, soap, paint, and chemicals. The improper disposal of waste cooking oil, including used frying oils and expired oils, poses environmental hazards, leading to pollution and potential risks for individuals. To mitigate these risks, it is recommended that households and restaurants replace their cooking oil every two to three uses, avoiding prolonged storage due to the polymerization process.

The researcher employed both face-to-face and online surveys, spanning a duration of 10 to 14 weeks, to gather data for analysis. Several limitations were encountered, including the challenges of conducting research during the COVID-19 pandemic. The distribution of questionnaires shifted to online platforms like WhatsApp groups and Facebook pages to reach residents around Shah Alam. Difficulties arose in engaging restaurant staff due to their busy schedules. The literature review revealed a limited number of studies on recycling cooking oil compared to other recyclable materials like bottles, papers, and plastics.

Hence, this research suggests that governmental intervention, such as awareness campaigns, is necessary to educate people on proper cooking oil disposal methods. This not only promotes recycling education but also contributes to environmental health. Challenges such as low social capital, distrust of local government and incomplete recycling programs need to be addressed. Environmental organizations and NGOs play a crucial role in fostering social capital and facilitating ecological preservation. They serve as advocates for environmental protection, working to educate the public and address environmental issues.

This research also proposes reporting and publicizing recycling projects, emphasizing the importance of community involvement. Municipal authorities, like Majlis Bandaraya Shah Alam (MBSA), can monitor and incentivize participants in cooking oil recycling programs. Periodic acknowledgment of

successful neighborhood communities could further encourage sustained participation. Therefore, this research concludes by suggesting that future researchers use this study to explore determinants of recycling cooking oil intentions and behaviors, specifically in the Shah Alam area. This could lead to an enhanced model or the application of existing models in diverse economic and socio-cultural contexts, contributing to a more comprehensive understanding of recycling behavior adoption and practices.

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