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Research Article

Waste Cooking Oil Disposal Practices of Selected Restaurants in Subic Bay, Olongapo and Zambales

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ABSTRACT

The main purpose of the study was to determine the waste cooking oil disposal practices of selected restaurants in Subic-Olongapo, Zambales. There were 78 respondents from selected restaurants in Subic- Olongapo, Zambales. This study made use of descriptive-survey method. The test of validly and reliability were done to ensure that questionnaire gathered the necessary data for study. Data were analyze using various statistical methods. Results of the study showed that it is very common to the restaurants to dispose below 3 liters with 60.0% on a daily basis and for weekly basis the highest percentage of average volume disposal is 1 to 3 gallons with 17.1% and the monthly basis disposed below 5 gallons with 54.3%. The restaurant waste cooking oil practices disposal is rated "sometimes" with an overall mean of 1.67, (SD=0.73). In terms of disposed to sink, (M=1.19, SD=0.62), disposed to the drainage (M=1.21, SD=0.51), disposed to the garbage bin (M=1.69, SD=0.61), and collected by subcontractor's agency (M=3.01, SD=1.00). The restaurant employees often attend orientation/seminar is organized by the restaurant/management staff (M=3.37, SD=0.75), followed by orientation/seminar organized by LGU (M=2.31, SD=1.00), orientation/seminar organized by NGO advocate Green House practices (M=1.76, SD=1.03), orientation/seminars organized by DENR for environmental protection (M=2.17, SD=1.17) and as rated "Sometimes". There is no significant difference in waste cooking oil disposal practices when grouped according with profile variables, except year in operation. The management can pay attention to skilled people who have the knowledge and work experience, especially in the work place not just a college graduate. The restaurants should have a specific average volume of cooking oil that they have to consume for the daily, weekly and monthly basis.

Keywords: *Disposal practices, Green practices, Philippines, Restaurants, Waste cooking oil*

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Introduction

Subic is evidently one of the fast growing municipalities in Zambales and expected to become a component city in the future as it goes with the increase of income. The livelihood system integrated as a powerful business like variety of restaurant in town. Restaurants has its prime role in preparing different kinds of foods for every diner. Cooking oil is a needful ingredient at the kitchen it is almost the foundation of any hot food preparation such as suiting, frying and the like. This testifies that kitchen is incomplete without the cooking oil. The oil is an important flavor carrier. It makes food taste better by bringing out flavors.

The contributors for any environmental pollution must be proficiently address to utmost concern, many incidents stated that although cooking oil are not as accurately toxic as many petroleum products, uncontrolled release can also result in significant environmental damage (Fitzpatrick, 2003). In the current situation of cleaning up Manila bay the Department of Environment and Natural Resources (DENR) served a closure order to Aristocrat Restaurants discharges known to be one of the oldest restaurant situated nearby Manila Bay for generating pollutive discharges to the bay (Reyes-Estrope & Enano, 2019). The improper disposal of used cooking oil such as pouring down the sink or drain may cause clot and even block public sewers. This can also then be spill to leaks and streams, waste cooking oil in the water causes oxygen level to drop harshly it creates sewage fungus form like blankets which covers the other means of living for animals that leave like fish around these water, it is also poisonous to birds and kill then if it sticks to their feathers which prevents them from flying and keeping their body warm. Restaurant management may also face high cost of drainage maintenance, if contamination may arise it may even fine from local water authority. It also invites rats and vermin which they feed themselves with solidified waste cooking oil facing another problem for pest control and very hazardous to health. Growth on waste cooking oil as the only carbon source enhanced the ability of both tested strains to breakdown PCL and mcl65 PHA, making them excellent candidates for the enhancement of compost cultures in the waste management of both waste cooking oils and biodegradable polymers. (Mandic et al., 2019).

Researchers observe that there are no proper facilities for the disposal of waste cooking oil in Zambales and no enforcement on the use of the guidelines of proper waste disposal. At present time our province also faces big threat to environment. To reduce the negative impact to the environment of several restaurant managements they have to come up the proper practices of environmental management system to provoke awareness including of proper disposal of cooking oil through properly train staff. The local government units must support and sustain government strong campaign in implementing proper practices by constant monitoring, includes requirements in renewal of business permits and meets standard in accordance with Green House Practices. Some foreign countries have offered their pickup service such as Waste Oil Recyclers and Tri - state biodiesel because used cooking oil of ant type can be repurposed into biodiesel fuel for use in converted car engines (MacKerron, 2015).

This situation must not be neglected, it demands a strong action because evidences such our rivers, reservoirs, lakes and seas are drowning in hazardous waste, chemical waste and other pollutants (Boelee et al., 2019). Therefore, the care for water and land in proper disposal of cooking oil should need strong activities to stop malpractice's in proper disposal of cooking oil furthermore, showing this little regard for environment is a good look.

In this current age of globalization, the world is confronted with several social challenges, including environmental challenges (Rogayan & Nebrida, 2019). The strong demand on handling waste cooking oil led the researchers to assess waste cooking oil disposal practices of selected restaurants in Subic, Zambales and Olongapo City.

Methods

Research Design

The study utilized the survey questionnaire, quantitative research with regards to waste cooking oil disposal practices in Subic-Olongapo, Zambales. Quantitative research is

positive scientific method which refers to a general set order by discipline procedures to acquire position.

Respondents and Location

A total of 78 respondents participated in the study comprised of 23 managers (32.9%) and 47 kitchen staff (67.1%) in Subic Bay Freeport Zone Olongapo City and Zambales.

Research Instrument

The survey questionnaire was the primary research instrument. It has three components. Section 1 offered information about the profile of the respondents and the organization. Section 2 offers information about the various restaurant disposal methods. The third section describes the impacts of the various methods for disposing of used cooking oil.

The tool was created by researchers. It was reviewed and approved by the consultant and two hotel industry specialists. Validity and reliability were assessed to verify that the questionnaire could collect the essential data for this investigation.

Data Gathering Procedure

The study followed the procedures below while collecting data. Obtaining the consent of the Business Owner. The researcher asked permission to perform the study from the Restaurant Manager, who granted the request. The researcher disseminated the questionnaire to the specified respondents and allowed them two days to complete it. Securing the Questionnaire. The researcher collected the questionnaires from the respondents three days after the distribution date. They ensured that the responders completed all sections of the questionnaire. Collecting information The quantitative information from the surveys was counted and sorted, while the quantitative information from the client's replies was encoded.

Data Analysis

The researchers used descriptive (mean, frequency, percent, standard deviation) and inferential statistics (analysis of variance) in analysing the data.

Results and Discussion

Profile of the Respondents

Table 1 presents the profile of the respondents in terms of sex; position; highest educational attainment.

Sex. There are more female (52.86%) than male respondents (47.14%) which indicates that the restaurants staff are dominated by females. According to Statista (2019), the number of restaurant employees in the United Kingdom from 2006 to 2017 by gender up until 2009, more women than men were working in British restaurants; afterwards, the number of responders started to increase. In June 2017, around 510,000 male workers worked in the restaurant business, compared to 479,000 female employees.

Position. The respondents who got the highest percentage are restaurant staff (47 or 67.1%) followed by the owners (23 or 32.9%). This shows that most employees involved are the restaurant staff as they are directly working in the restaurants. According to the U.S. Bureau of Labor Statistics (BLS, 2015), chefs and head cooks make an average yearly income of $45,920. The BLS added that innovative chefs and head cooks with expertise and business abilities would have the greatest job chances.

Table 1. Respondent's Profile

Profile		f	%
Sex	Male	33	47.14
	Female	37	52.86
	Total	70	100.0
Position	Owner	23	32.9
	Staff	47	67.1
	Total	70	100.0
Highest Educational Attainment	High School Graduate	8	11.43
	Vocational/Technical	12	17.14

Profile	f	%
College Undergraduate	16	22.86
College Graduate	32	45.71
With Master's Unit	2	2.86
Total	70	100.0

Highest educational attainment. In terms of the highest education, mostly the respondents are College graduate with 32 (45.71%) followed by College undergraduate with 16 (22.86%), Vocational (12 or 17.14%), High School graduate (8 or 11.43%) and with Master's unit (2 or 2.86%). This suggests that most of the restaurants employ College graduates and College undergraduates. Business establishments see college graduates as highly skilled and competent than other educational qualification. Most of the hotels and restaurants insist to employ a college degree in hotel management from a recognized university, which often entails an internship prior to receiving a degree, plus a high school diploma are required by the majority of restaurant companies for managers (Kwok, 2022; Magrizos et al., 2020; Papageorgiou et al., 2021; Putra et al., 2022). Several businesses need a bachelor's degree in either business administration or restaurant management for more established, high-end establishments (Farrer, 2021; Kuznetsova et al., 2019).

Profile of the Business

Table 2 shows the profile of the business in terms of years in operation, number of branches, days of operation.

Years in Operation. Most of the business respondents are operating for 1 to 3 years with 31 (44.3%), followed by 4 to 6 years with 21 (30.0%). Few respondents are operating for less than 1 year with 8 (11.4%), 7 to 9 years 7 (10.0%) and others 3 (4.3%). This means that the most restaurants are in operation 1 to 3 years and above. This suggests that these establishments are already operating for a longer time.

Number of Branches. The respondents who got the highest percentage in terms of the numbers of branches are 1 branch with 43 (61.4%) followed by 2 branches with 19 (27.1%) while others got 8 (11.4%).

Days of Operation. The respondents indicate that highest percentage in terms of days of operation are Monday to Sunday with the percentage of 57 (or 77.1%) and Monday to Friday with 16 (22.9%).

Hours of Operation. The majority percentage in terms of the hour's operation is 24 hours (37 or 52.9%), followed by 12 hours (23 or 32.9%) and the lowest is 8 hours (10 or 14.3%). According to Hicken (2012), "in urban hot spots like New York or Los Angeles residents have long been confronted with a host of late night food options. At Mcdonald's Corporation which reported another quarter of a strong earnings Tuesday the hours of midnight to 5 am are the fastest growing time segment in its us business. Burger King holdings incorporation which requires its US restaurant's to remain open until midnight on Fridays and Saturdays, and until 11 pm the rest of the week, now has several hundred restaurants along the country open 24 hours, and Dunkin donuts has doubled its number of 24 hour's restaurant in the past 10 years. Beyond adapting to the changing American schedule, increasing 24 hour operations could be a smart strategy for fast food chains and restaurants to beat the growing health food trend."

Table 2. Business' Profile

	Profile	**f**	**%**
Years in Operation	Less than 1 year	8	11.4
	1 to 3 years	31	44.3
	4 to 6 years	21	30.0
	7 to 9 years	7	10.0
	Others	3	4.3

Profile		f	%
	Total	**70**	**100.0**
Number of Branches	1 branch	43	61.4
	2 branches	19	27.1
	Others	8	11.4
	Total	**70**	**100.0**
Days of Operation	Monday to Friday	16	22.9
	Monday to Sunday	54	77.1
	Total	**70**	**100.0**
Hours of Operation	8 hours	10	14.3
	12 hours	23	32.9
	24 hours	37	53.9
	Total	**70**	**100.0**

Average Volume of Waste Cooking Oil Disposal

Shown in table 3 is the average disposal of waste cooking oil in Daily basis, Weekly basis and Monthly basis shown in table 4.

Daily Basis. The table shows that the highest percentage of daily basis are below 3 liters with 42 (60.0%) followed by 3 liters with 19 (27.1%), 4 liters with 5 (7.1%) and the lowest 5 liters with 4 (5.7%). This indicates that most of the restaurants disposed their waste cooking oil below 3 liters.

Weekly Basis. The result shows that the highest percentage of weekly basis are 1 to 3 gallons with 56 (80.0%) followed by 4 to 6 gallons with 12 (17.1%), while the others 2 (2.9%). It implies that most of the restaurants average disposal of waste cooking oil on weekly basis is 1 to 3 gallons.

Monthly Basis. Most of the respondents indicated the highest percentage of monthly basis. The table shows the highest percentage are below 5 gallons with 38 (54.3%) followed by 5 to 10 gallons with 29 (41.4%), 11 to 15 gallons with 2 (2.9%) and while others 1 (1.4%).%). It indicates that most of the restaurant average disposal of waste cooking oil on weekly basis is below 5 gallons

If correctly handled, waste cooking oil (WCO) may be a valuable secondary raw resource. Uncontrolled disposal, on the other hand, has significant environmental and economic consequences. As a result, enhancing WCO recovery rates via citizen engagement and effective collection operations is critical (De Feo et al., 2020).

Table 3. Average Volume Disposal of Waste Cooking Oil

Volume Disposed		f	%
Daily Basis	Below 3 liters	42	60.0
	3 liters	19	27.1
	4 liters	5	7.1
	Others	4	5.7
	Total	70	100.0
Weekly Basis	1 to 3 gallons	56	80.0
	4 to 6 gallons	12	17.1
	Others	2	2.9
	Total	70	100.0
Monthly Basis	Below 5 gallons	38	54.3
	5 to 10 gallons	29	41.4
	11 to 15 gallons	2	2.9
	Others	1	1.4
	Total	70	100.0

Practices on Waste Cooking Oil Disposal

Table 4 shows the practices on waste cooking oil in terms of sink, drainage, garbage bin, soil and collected by subcontractor's agency.

Although, they have the same process of practices in all the five indicators of waste cooking oil, The highest mean is noted for collected by subcontractor's agency (M=3.01; SD=1.00). It shows that most of the restaurants policies were collected waste cooking oil that followed by the garbage bin (M=1.69; SD=0.91) while other respondents rated "Never" disposed in the soil (M=1.27; SD=0.61).

Table 4. Practices on Waste Cooking Oil Disposal

Practices	Mean	SD	VD
1. The waste cooking oil is disposed to the sink.	1.19	0.62	N
2. The waste cooking oil is disposed to the drainage.	1.21	0.51	N
3. The waste cooking is disposed to the garbage bin.	1.69	0.91	SO
4. The waste cooking oil is disposed to the soil.	1.27	0.61	NE
5. The waste cooking oil collected by subcontractor's agency.	3.01	1.00	OF
Overall Mean	**1.67**	**0.73**	**SO**

Note: N-Never; SO-Sometimes; OF-Often

Tsai (2008) found that WCOs generated by small-scale commercial outlets (restaurants, snack bar, vendor, night market) may also be collected by municipal collection teams. However, in order to ensure efficient WCO collection and monitor its movement, local governments will now assess and grant permission applications. The reported collected volumes of WCO grew dramatically from 1,599 tons in 2015 to 12.591 tons in 2017, indicating the WCO recycling policy that has been in force since 2015.

Table 5. Frequency of Employee's Attendance in Orientation/Seminar on Disposal of Waste Cooking Oil

	Practices	Mean	SD	VD
1.	Attendance to the orientation/seminar or organized by local government unit.	2.31	1.00	SO
2.	Attendance to the orientation/seminar organized by NGO advocate of Greenhouse practices	1.76	1.03	SO
3.	Attendance to the orientation/seminar organized by DENR for environmental protection.	2.17	1.17	SO
4.	Attendance to the orientation/seminar organized by the restaurant management/staff.	3.37	0.75	OF
Overall Mean		**2.40**	**3.95**	**SO**

Note: N-Never; SO-Sometimes; OF-Often

Among the indicators, the respondents often attend seminar or orientation in terms of disposal of waste cooking oil was the orientation/seminar organized by the management (M=3.37; SD=0.75), followed by orientation/seminar organized by the local government unit (M=2.31; SD=1.00), orientation or seminar by DENR for environmental protection (M=2.17; SD=1.17), and the orientation/ seminar organized by NGO advocate of greenhouse practices (M=1.7; SD=1.03).

According to Mabaso and Hewson (2018)'s research, waste management training improves workers' capacity to comprehend and execute waste management methods. Employees should thus be educated to behave in accordance with a food waste reduction culture and to maintain appropriate waste management practices.

Difference of the Waste Cooking Oil Disposal Practices when Grouped According to Profile Variables

Sex. Based from the one-way analysis of variance, there is no significant difference in waste cooking oil disposal practices in terms of sex (F= 0.201, P= 0.655).

Highest Educational Attainment. Based from the one-way analysis of variance, there is no significant difference in terms of highest educational attainment (F=1.736, P= 0.153)

Position. Based from the one-way analysis of variance, there is no significant difference in waste terms of position (F=0.009, P= 0.925).

Years in Operation. Based from the one-way analysis of variance, there is a significant difference in years in operation (F= 5.014, P= 0.001).

Number of Branches. Based from the one-way analysis of variance, there is no significant difference in terms in number of branches (F=1.164, P=0.318).

Days of Operation. Based from the one-way analysis of variance, there is no significant difference in terms of days of operation (F=1.928, P=0.170).

Hours of Operation. Based from the one-way analysis of variance, there is no significant difference in terms of hours of operation (F= 0.953, P= 0.391).

Existing Policies on Waste Cooking Oil Disposal

Some of the respondents stated their existing policies that the restaurants implement.

Table 6 shows the existing policies that the restaurants implement.

Table 6. Existing Policies that Restaurants Implement

Theme	Significant statement	*f*
For Schedule Collection	"Collected by neighborhood." (R38, Female) "Set it out for curbside pick-up or drop it a locale agency for recycling" "No waste cooking oil should be dispose by giving to person who are collected by subcontractor agency" (R23, Male)	3
Sealed in container	"Our waste cooking oil put in a sealed container and sold it by buyers" (R48, Female) "Put in the designated container waste cooking oil should put it." (R40, Male)	2
Never Reuse Cooking Oil	"Use cooking oil should not stock or use again it can be sold." (R32, Female) "Company policy, when it comes to oil disposal do not reuse it for twice it depends or the food that being cooked to maximized budget for certain period of time." (R34, Female)	2

The researchers found out that there are existing policies that the restaurants implement based on the answers from the given instrument. The following policies are: first seal in the container or store in the container and dispose it followed by never reuse cooking oil and should not stock and reuse again because it can be sold. And lastly, the waste cooking oil should be disposed by giving it to the persons who collected it or collected subcontractor's agency, the respondent's feedback on selected restaurants in Subic-Olongapo, Zambales.

This research backs up the findings of Golja and Krstinic Nizic (2010), who said that policies and procedures are the recorded normal method of doing things in a company. Their objective is to direct workers toward the most efficient methods of performing jobs effectively. Additionally, it defines the relevant rules and procedures in order to tell the personnel engaged about what they believe they should or should not do in a business as "a matter of stipulated practices."

Conclusion and Recommendations

From the findings, the following conclusions were derived: First, the typical employee is female, a staff and is a college graduate. Second, most of the restaurants in the area are just 1 to 3 years in operation. With just single branch which mostly operates Monday to Sunday preferred to open 24 hours. Third, most of the restaurants disposed below 3 liters on a daily basis ,1 to 3 gallons for weekly basis and below 5 gallons for monthly basis. Fourth, most of the restaurants, the practices on waste cooking oil disposal is the waste cooking oil collected by subcontractor's agency. Fifth, the most attending seminar/orientation of the restaurants owners and employees is the orientation/seminar organized by the restaurant management/staff. Sixth, there are no significant difference in waste cooking oil disposal practices of restaurants when grouped according to profile variables. Seventh, there are existing policies that the restaurant implement in terms of waste cooking oil disposal practices of restaurants.

In view of the findings and conclusions the researchers offer the following recommendations: Management should also pay attention to skilled people who have the knowledge and work experience, especially in the work place not just a college graduates. In hiring kitchen staff restaurant management should give strong points to those applicants who have attended DENR orientation so employees will have strong environmental consideration on his/her work not just a graduate of a senior high school or as a qualified college graduate. Restaurant owners should have a future plan for having a business plan or linkage for them to be recognized because of their service of the business and be an example of a responsible handling of disposal of waste cooking oil.

The restaurant owner/management may also consider the type of kitchen items in frying such as non-stick pan that would reduce the consumption of cooking oil. The restaurants should have a specific average volume of cooking oil that they have to consume for the daily, weekly and monthly basis. In restaurant business, there should be at least one place to store the waste cooking oil in each town which can be created by the municipality that would help the subcontractor agencies for easiest collection of waste cooking oil. The restaurant management may often practice attendance on seminars organized by LGU's and NGO's advocated by greenhouse practices and the DENR. It will benefit the restaurant, employees and especially the environment

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