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RESEARCH ARTICLE

A case survey on the living habits and awareness of food waste composting in Layang-Layang, Johor, Malaysia

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ABSTRACT

Food waste management is a critical issue in modern living. Awareness of the need for purchase and meal planning is crucial for reducing food waste while converting the food waste into compost for agricultural uses is environmentally sound. Food waste composting can be challenging, especially on a household scale, because of the varied properties of the refuse. Having relevant knowledge and the application of affordable machines can promote food waste composting and reduce landfill burden. This case study investigated the living habits and awareness of household food waste composting in Kampung Jaya SC Sepakat community, Layang-Layang, Johor, Malaysia, in conjunction with a commercial food waste composting factory nearby. An analysis of information from 273 participants obtained through a purposive sampling revealed that the community had varied living habits and the rates of food waste composting ranged from 40% to 80%. In general, there was a correlation between the adoption of sustainable behaviors that minimized food waste and knowledge about composting within this community. Additionally, a significant number of participants (89%) demonstrated knowledge of household composting equipment and 91.2% of them stated a strong inclination to make use of it. The study has generated valuable insights for potential food waste management practices and environmental organizations in the efforts of food waste reduction and composting.

1. INTRODUCTION

Food waste composting reduces environmental impact and produces nutrient-rich organic fertilizers, enhancing soil health and supporting sustainable agriculture (Romero et al., 2013; Ren et al., 2018; Abdul Rahman et al., 2020; Guo et al., 2021; Ebrahimi et al., 2024; Supriatna et al., 2024; de Nijs et al., 2025). In contrast, unmanaged food waste often results in unnecessary exhaustion of landfill capacity (Detho et al., 2020; Haslina et al., 2021; Gonzalez-Victoriano et al., 2024; Mironov et al., 2024; Zhang et al., 2025).

Composting of food waste faces many challenges because of the heterogeneity of the leftovers. Food waste with high oil and fat contents may also be difficult to handle (Wang et al., 2024). Technically, effective composting requires precise control over temperature, moisture levels, composting technology selection, and specialized strategies to manage moisture and leachate (Chu et al., 2019; Filimonau and de Coteau, 2019; Costa et al., 2023; Zhu et al., 2025). Microbial activity depends on appropriate temperature regulation, particularly during thermophilic stages (Kou et al., 2024; Tahsini et al., 2024; Zhao et al., 2024; Ding and Wu, 2025; Ren et al., 2025). Moisture levels must be carefully maintained, as excess moisture can lead to anaerobic conditions, while insufficient moisture slows decomposition (Quan et al., 2024). Proper aeration is another essential element, as it prevents odor formation and enhances the breakdown of organic material (Castellani et al., 2024; Wang et al., 2025b). Additionally, maintaining an optimal carbon-to-nitrogen ratio supports microbial metabolism and ensures efficient decomposition (Awoh et al., 2023).

Lack of public awareness and reluctance toward food waste composting continue to be major obstacles (Kolawole et al., 2024). Understanding the unique characteristics and challenges of the local community can pave the way for successful and sustainable food waste management initiatives (Aryan et al., 2023). Awareness campaigns and community-led programs can increase participation and encourage behavioral change (Yusuf and Fajri, 2022). Engaging the local community in the process of food waste composting promotes a sense of ownership and responsibility, leading to increased involvement and support. This case survey evaluated the awareness and the challenges that were thought to affect the adoption of food waste composting within a local community. The population in this area was supposed

to have a stronger inclination in household food waste composting given a commercial food waste composting factory in the vicinity. Specifically, this case study explored two central aspects, i.e., the social and cultural aspects that shaped the community involvement in composting, and the opinions on the effective implementation of food waste composting in household settings.

2. MATERIALS AND METHODS

2.1. Study area

The case survey was carried out in January-February 2024 within the community of Kampung SC Jaya Sepakat in Layang-Layang, Johor, Malaysia (1.81ºN, 103.48ºE). The area was within an oil palm plantation, housing a commercial food waste composting company. The Mini Rural Transformation Centre (RTC) Layang-Layang was the lead stakeholder, offering volunteers in assisting the food waste composting project in the company.

2.2. Target group and sampling

The survey study included 273 respondents based on purposive sampling method. The respondents consisted of residents of the 20 households in Kampung SC Jaya Sepakat that supplied the food waste for the commercial composting company, the managers and staff of the company, 20 volunteers from Mini Rural Transformation Centre (RTC) Layang-Layang who were directly involved in the food waste composting project of the company, and the remaining respondents were other residents in the study area who could be in touch with by their availability during the study period.

2.3. Data collection

All respondents were met and interviewed based on a structured questionnaire. The respondents were first determined by demographic attributes of gender, age, ethnicity, religion, marital status, household size, educational level, occupation, and income group. Information about their living habits/practices and the variations of food waste were then gathered with close-ended questions. The respondents were also asked about their involvement period in food waste composting, and their awareness level of food waste composting technology using 5-point Likert scale questions ranging from strongly disagree (1) to strongly agree (5).

2.4. Statistical analysis

The demographic data were subjected to descriptive analysis. Cronbach's Alpha values were calculated to indicate the internal consistency and reliability of questions in terms of capturing the intended constructs of living habits/practices and awareness level in the context of food waste composting. Then, Kendall rank correlation analyses were carried out between living habit data and awareness levels of food waste reduction approaches and composting technology, respectively.

3. RESULT AND DISCUSSION

3.1 Demography of respondents

Table 1 shows that the respondents in this study were dominated by females with a frequency of 59% and the remaining 41% of respondents were male. By age, most respondents (34.1%) were from the group of 30 - 39 years old (Table 1). Those in the groups of 20 – 29, 40 – 49, and ≥ 50 years old were about 25 – 26% each. Only 6 respondents (2.2%) were below 20 years old. The predominant ethnicity (64.1% Malay) and religion (90.1% Muslim) in the sample reflected the specific population in this rural village while sourcing food waste may be restricted by these factors (Table 1). It is important to acknowledge this for future research efforts that aim to generalize the findings (Mao et al., 2025). This study involved a balanced distribution of unmarried and married respondents while most respondents lived in a household environment of 4 - 5 persons.

Table 1. Demography of respondents

Variable	Details	Frequency	Percentage
Gender	Male	112	41
	Female	161	59
Age (years old)	< 20	6	2.2
	20 - 29	69	25.3
	30 - 39	93	34.1
	40 - 49	70	25.6
	≥ 50	70	25.6
Race	Indian	97	35.5
	Others	1	0.4
	Malay	175	64.1
Religion	Non-muslim	27	9.9
	Muslim	246	90.1
Marital status	Married	147	53.8
	Single	126	46.2
Number of family members	2-3	70	25.6
	4-5	118	43.2
	6-7	80	29.3
	> 8	5	1.8
Level of education	No formal education	2	0.7
	Secondary school	84	30.8
	Diploma	78	28.6
	Degree	81	29.7
	Master & Ph.D.	28	10.3
Occupation	Self-employed	104	38.1
	Government	102	37.4
	Student	62	22.7
	Non-working / Housewife	5	1.9
Monthly salary (RM)	< 1,500	69	25.3
	1,500 - 3,000	39	14.3
	3,001 - 4,500	103	37.7
	≥ 4500	62	22.7

Most respondents had a good educational background with 29.7% having a bachelor's degree, while 28.6% were diploma holders (Table 1). Higher educational attainment is often linked with environmentally conscious behaviors (Yusuf and Fajri, 2022). Furthermore, the distribution of occupational roles (38.1% self-employed, 37.4% government employees) provided valuable insights into the socio-economic backgrounds of the participants (Table 1). Socio-economic factors can influence waste management practices, with some studies suggesting that higher income allows for greater investment in sustainable solutions (Saxena et al., 2025). The findings in this research aligned with studies suggesting that educated adults might be more receptive to sustainable initiatives due to factors like increased environmental awareness or financial stability (Rahman et al., 2025).

3.2 Living habits of respondents

The internal consistency and reliability of the measuring scales used in analyzing the living habits, thoughts, experiences, and observations concerning a variety of food waste composting issues were demonstrated by the Cronbach's Alpha values. These values were 0.947 for living habits/practices and 0.730 for awareness levels (Table 2). A high Cronbach's Alpha score of 0.947, being closer to 1, indicated a strong level of internal consistency among the items in the category of living habits/practices. It also suggested that the items assessing various behaviors and practices linked to food waste composting in this study were highly dependable and consistently measured the purpose of the research (Creswell and Creswell, 2018). On the other hand, Cronbach's Alpha value of 0.730 for awareness levels, while being slightly lower than that for living habits/practices, still indicated a good level of internal consistency among the items that assessed the participants' awareness, comprehension, and knowledge of food waste composting (Kolawole et al., 2024).

Table 2. Reliability statistics of items that described the living habits and food waste composting technology awareness levels of the respondents

Category	Cronbach's Alpha	Number of items
Living habits/practices	0.947	5
Food waste composting technology awareness / Knowledge levels	0.730	8

According to Table 3, the Kampung Jaya SC Sepakat community exhibited varied levels of participation and attitudes associated with composting activities. Interestingly, a significant portion of participants (35.9%) consistently conducted composting of food residues daily, reflecting a commendable dedication to implementing regular waste management practices. The existence of a commercial food waste processing company within the community could have influenced the food waste composting behaviour among the respondents. However, the presence of another sizeable group (37%) that did not compost their food waste suggested a knowledge gap or lack of prior engagement (Taouahria, 2024). This finding underscores the need for targeted educational initiatives and outreach programs to bridge this gap and encourage wider participation in composting practices (Rahman et al., 2025).

Table 3. Living habits of the respondents

Variable	Details	Frequency	Percent
The practice of composting food waste	Daily	98	35.9
	Weekly	2	0.7
	Monthly	38	13.9
	Once every 6 months	17	6.2
	Once a year	17	6.2
	Never	101	37
Grocery purchasing plan	Daily	52	19
	Several times per week	150	54.9
	Weekly	69	25.3
	Once per week	2	0.7
Preparation of a grocery list	Always	75	27.5
	Sometimes	119	43.6
	Rarely	77	28.2
	Never	2	0.7
Grocery purchase habit	Daily	38	13.9
	Several times per week	56	20.5
	Weekly	111	40.7
	Every 2 weeks or more	68	24.9
Home cooking habit	Daily	14	5.1
	Several times per week	168	61.5
	Weekly	53	19.4
	Less than once per week	38	13.9

Furthermore, the majority of participants (54.9%) showed a proactive approach through their plans to buy groceries as needed, i.e. many times each week (Table 3). This high percentage indicated that there was a great willingness to make efforts related to reduced food waste, especially for perishable food. Only a minority of participants (0.7%) said that they did not plan the activities of grocery purchases.

The collected data also revealed varied levels of dedication to grocery list creation, with a sizeable portion of participants (43.6%) engaging in this practice occasionally (Table 3). Consistently drafting a grocery list can significantly improve meal planning, thereby reducing food waste (Saxena et al., 2025). This suggests a potential area for intervention, as encouraging more frequent grocery list creation could have positive downstream effects on food waste reduction (Elimelech et al., 2024).

According to this study, a sizeable percentage of respondents (40.7%) went grocery shopping weekly (Table 3). The amount of food waste generated and thereafter

composted can be considerably impacted by the frequency with which individuals go grocery shopping. It is essential to have a thorough understanding of the buying behaviours of the participants to adjust composting awareness to correspond with their consumption patterns (Nguyen et al., 2022).

3.3 Food waste reduction / composting awareness among respondents

The survey on food waste reduction awareness in Kampung Jaya SC Sepakat suggested diverse consumer behaviors (Table 4). The data also revealed a spectrum of perspectives on food disposal practices. While some participants agreed with discarding food, others voiced disapproval, highlighting the existence of contrasting viewpoints on this issue. By leveraging this data, targeted educational initiatives can be planned to promote consistent and responsible food waste management practices (Sewak et al., 2021). The survey results highlighted several key parameters as below.

Purchasing behaviors: The strong tendency to purchase food on sale (89.7% agreeing or strongly agreeing) suggested price sensitivity, which could potentially lead to over-purchasing and waste when not managed carefully or consumed in time.

Food preparation and cooking: A significant fraction of respondents (57.5%) agreed or strongly agreed on the need to plan meals and cook to reduce food waste. However, a large neutral group (41%) was obtained from this study, suggesting room for further education on this topic.

Food expiration and consumption: The willingness to consume expired food that is still in good condition (85.4% agreeing or strongly agreeing) showed a readiness to reduce waste by using judgment on food quality rather than strictly adhering to expiry dates.

Waste reduction strategies: Common strategies included freezing food (37%) and proper storage of perishables (37%). This demonstrated practical knowledge of food preservation methods, although only 14.3% employed all listed strategies, indicating potential for comprehensive education on waste reduction approaches.

Food disposal practices: Frequent food disposal was common, with 60.5% agreeing or strongly agreeing on the need to dispose of excessive food daily, while 74.4% agreed on weekly disposal of over-purchased groceries. This highlighted an area for potential improvement.

Types of discarded food: Dairy products (36.6%), leftovers (30.4%), and fruits/vegetables (26%) were the most commonly discarded food. This information can guide targeted interventions for reducing waste of specific food types.

Table 4. Food waste reduction awareness levels of the respondents

Variable	Likert scales and details	Frequency	Percent
The need to plan grocery purchases to reduce food waste	1 - Strongly Disagree	2	0.7
	2 - Disagree	1	0.4
	3 - Neutral	28	10.3
	4 - Agree	185	67.8
	5 - Strongly Agree	57	20.9
Tendency to purchase goods on sale	1 - Strongly Disagree	0	0
	2 - Disagree	9	3.3
	3 - Neutral	19	7
	4 - Agree	130	47.6
	5 - Strongly Agree	115	42.1
The need for meal planning and cooking to decrease food waste	1 - Strongly Disagree	0	0
	2 - Disagree	4	1.5
	3 - Neutral	112	41
	4 - Agree	46	16.8
	5 - Strongly Agree	111	40.7
The need to consume expired food which is still in good condition	1 - Strongly Disagree	18	6.6
	2 - Disagree	6	2.2
	3 - Neutral	16	5.9
	4 - Agree	125	45.8
	5 - Strongly Agree	108	39.6
Way of reducing food waste	Have recipes that use leftover ingredients	26	9.5
	Add leftover food to a new dish	6	2.2
	Freeze part of food to prevent spoilage	101	37
	Store perishables properly to maintain their freshness.	101	37
	All Above	39	14.3
The need to dispose of excessive food daily	1 - Strongly Disagree	8	2.9
	2 - Disagree	10	3.7
	3 - Neutral	90	33
	4 - Agree	60	22
	5 - Strongly Agree	105	38.5
The need to dispose of over-purchased groceries weekly	1 - Strongly Disagree	10	3.7
	2 - Disagree	15	5.5
	3 - Neutral	45	16.5
	4 - Agree	175	64.1
	5 - Strongly Agree	28	10.3
Type of discarded food	Fruits and vegetables	71	26
	Chicken and meat	1	0.4
	Dairy Product	100	36.6
	Leftovers	83	30.4
	Others	3	1.1
	All above	14	5.1

By analyzing these parameters, it becomes evident that targeted educational initiatives and interventions are necessary to promote consistent and responsible food waste management practices in Kampung Jaya SC Sepakat community. Understanding the public's purchasing behaviors, cooking habits, and attitudes toward handling expired food can help design effective campaigns to reduce food waste (Suhardono et al., 2025). Additionally, identifying the types of commonly discarded food allows for more focused efforts in waste reduction (Li et al., 2024). This, in turn, can lead to

significant behavioral changes, reducing the environmental footprint of food waste and fostering a more sustainable and environmentally conscious society (Gastaldi et al., 2024).

3.4. Food waste composting technology awareness

The data presented in Table 5 offer valuable insights into behaviors and awareness regarding technology in food waste reduction, household composting machine acquisition, and perceptions of composting costs among the residents in Kampung Jaya SC Sepakat. A growing awareness of the importance of environmentally responsible waste management was evident in the generally favorable outlook toward composting in this study. This is reflected in the majority of participants (53.1%) agreeing or strongly agreeing to technological solutions to address food waste management challenges, for example, avoiding pests and reducing unpleasant odors during food waste composting, and addressing the lack of proper space and confidence in composting (Table 5). This positive perception reflected a willingness to adopt innovative approaches that can enhance efficiency in food waste composting. The high awareness level (89%) of household scale machines indicated a general familiarity with the household food waste management technology. The data also highlighted a strong interest with 91.2% of participants willing to purchase a household-type composting machine (Table 5). This proactive acquisition of equipment signified a willingness to engage in composting practices and reflected a favorable attitude toward environmental stewardship (Kunszabó et al., 2022; Farahdiba et al., 2023).

The participants in this study had a variety of perspectives on the financial elements of food waste management. A rather equal proportion of people believed that composting machine is more expensive than the traditional method and vice versa (35.2% and 36.6%, respectively) (Table 5). This disparity in cost perceptions highlighted the importance of providing unequivocal information regarding the long-term advantages and cost savings related to different composting systems. The understanding of the cost considerations of participants can also assist in the initiation of financial incentives or support systems to stimulate wider adoption of food waste composting.

The correlation analyses displayed in Tables 6 and 7 demonstrate good connections between different behaviours and attitudes on food waste reduction methods, composting equipment, and perceptions of composting cost. The relationships depicted in Table 6 highlighted the interdependence of various actions and behaviors linked to food waste reduction. Interestingly, individuals who did not conduct food waste composting exhibited positive associations with composting willingness, cooking to minimize waste, planning meals, grocery shopping, and creating grocery lists. This suggests a potential overlap in behaviors between those who did not conduct food residue composting frequently or consistently and those actively engaged in waste reduction practices. Perhaps individuals who did not compost food waste currently invested in waste reduction through alternative methods, or they could be interested in composting but have not yet adopted the practice.

Table 5. Composting technology awareness levels of the respondents

Variable	Likert Scales / Details	Frequency	Percent
The need to compost food waste	1 - Strongly Disagree	10	3.7
	2 - Disagree	12	4.4
	3 - Neutral	16	5.9
	4 - Agree	133	48.7
	5 - Strongly Agree	102	37.4
Current practice for handling food waste	Disposal of food waste in landfills (traditional method)	68	24.9
	Donating leftover edible food to a "food bank"	60	22
	Composting food waste (traditional or machine-assisted)	145	53.1
Concerns for food waste composting	It attracts pests or emits unpleasant odors.	71	26
	Do not have enough space for a composting bin/machine	50	18.3
	Not sure of the process and find it frightening	105	38.5
	I live in an apartment/condo with limited composting options	47	17.2
Technological contribution to reducing food waste	1 - Strongly Disagree	0	0
	2 - Disagree	1	0.4
	3 - Neutral	10	3.7
	4 - Agree	117	42.9
	5 - Strongly Agree	145	53.1
Aware of the existence of composting machine	No	30	11
	Yes	243	89
Willingness to acquire a food waste composting machine	Maybe	23	8.4
	No	1	0.4
	Yes	249	91.2
Opinion on composting cost	Composting machines are much more expensive	96	35.2
	Traditional composting is more expensive	100	36.6
	The cost is about the same	62	22.7
	Not sure	15	5.5

Furthermore, the observed positive associations between purchasing groceries on sale and engaging in activities like composting, cooking to minimize food waste, planning meals, grocery shopping, and creating grocery lists suggested a connection between value consciousness and sustainable consumption practices (Table 6). Individuals who

prioritized value might likely demand resource efficiency (Rashid et al., 2025; Wang et al., 2025a).

Table 6 also emphasizes the pivotal associations of home cooking for reducing food waste with many activities, including daily leftover food disposal, meal planning, grocery shopping, and list-making. There was also a significant connection between consuming expired food and the intention of reducing food waste. However, the different kinds of food being thrown away were generally not related to the mentioned activities.

On the other hand, Table 7 describes the intricate relationships between different activities, perceptions, and behaviours associated with food waste composting technology, composting equipment, and financial considerations in the context of minimizing food waste. There was an inverse relationship between the frequency of food waste composting and the perceived influence of technology on organic trash reduction (Table 7). Furthermore, there was also a negative association between the planning activities and the perceived impact of food waste reduction technology (Table 7). For example, people who cooked to minimize food waste showed a significant inverse relationship with the role of technology in reducing waste. This is a significant finding. According to Yusuf and Fajri's research in 2022, people who engaged in more frequent planning behaviours, such as drafting grocery lists, would regard technology as less crucial for reducing waste. In other words, a reduction in reliance on technical solutions for the management of food waste might be achieved through strategic planning. Nevertheless, there were favourable associations between the knowledge level about household composting machines, the interest in obtaining a composting machine, and the evaluation of the composting expenses. This implies that those who had a keen interest in composting equipment were also highly conscious of the financial implications involved. This collection of behaviours indicated a heightened level of involvement in waste management, wherein individuals actively pursued information, allocated resources, and made well-informed choices on composting techniques.

Table 6. Kendall rank correlation analysis between living habits and food waste reduction awareness

	The need to plan grocery purchases to reduce food waste	Tendency to purchase goods on sale	The need for meal planning and cooking to decrease food waste	The need to consume expired food which is still in good condition	Way of reducing food waste	The need to dispose of excessive food daily	The need to dispose of over-purchased groceries weekly	Type of discarded food
The practice of composting food waste	0.742***	0.669***	0.777***	0.605***	0.681***	-0.011ns	0.646***	0.057ns
Grocery purchasing plan	0.677***	0.788***	0.891***	0.663***	0.706***	0.018ns	0.573***	-0.025ns
Preparation of a grocery list	0.730***	0.751***	0.819***	0.725***	0.868***	0.069ns	0.755***	-0.047ns
Grocery purchase habit	0.769***	0.815***	0.851***	0.789***	0.857***	0.194**	0.770***	-0.102ns
Home cooking habit	0.784***	0.751***	0.747***	0.699***	.685***	0.120*	0.682***	0.034ns

Table 7. Kendall rank correlation analysis between living habits and food waste composting technology awareness

	The need to compost food waste	Current practice for handling food waste	Technological contribution to reducing food waste	Aware of the existence of composting machine	Willingness to acquire a food waste composting machine	Opinion on composting cost
The practice of composting food waste	0.529***	0.677***	-0.457***	0.301***	0.271***	0.811***
Grocery purchasing plan	0.636***	0.745***	-0.526**	0.287***	0.268***	0.858***
Preparation of a grocery list	0.397***	0.837***	-0.334***	0.447***	0.406***	0.870***
Grocery purchase habit	0.499***	0.805***	-0.477***	0.328***	0.429**	0.923***
Home cooking habit	0.538***	0.612***	-0.552***	0.202**	0.397***	0.772***

4. CONCLUSION

The study concluded positive relationships between the impact of living habits and awareness of the insights into food waste composting in the community of Kampung Jaya SC Sepakat, Layang-Layang. By examining the variety of societal variables that impact composting practices for food waste, the study also highlighted the awareness of composting technology and the implications they could have to stimulate favourable transformation in the realm of food waste management, aiming to reduce landfill waste and environmental repercussions.

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DECLARATION OF INTERESTS

The authors declare no conflict of interest

AUTHOR CONTRIBUTION

Mohamad Nadzrin Norisam and Fui Ying Tsan planned and drafted the case survey framework. Mohamad Nadzrin Norisam carried out the survey study. Mohamad Nadzrin Norisam and Fui Ying Tsan analyzed the data. Mohamad Nadzrin Norisam drafted the manuscript. Fui Ying Tsan edited and proofread the manuscript.

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