

## Food Date Labelling and the Consumer Knowledge

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### ABSTRACT

*The safety and quality aspects of food produced and sold to Malaysian consumers are governed by myriad legislation. At the forefront are Food Act 1983 and Food Regulations 1985. The regulations fortify food safety and quality assurance by mandating food date labelling. Food date labelling, part of consumer empowerment strategies, enables buyers to decide whether to purchase or when to consume the purchased food. While food date labelling is lauded as a proven legal strategy to overcome information asymmetry, international literature identifies food date labelling as the leading cause of edible food waste. Lack of knowledge, misunderstanding and confusion on the meanings of 'expired by', 'use by', 'consume by' and 'best before' labels on food packaging has prompted consumers to dispose of food that is still edible and fit for consumption. Malaysia is not spared from the global food waste phenomenon as it was reported that 3,000 tonnes of edible food, enough to feed 10 million people, are discarded each day either at the point of sale or point of consumption. This paper aims to investigate consumer knowledge of food date labelling in Malaysia. An online nationwide survey using a convenience sampling technique was conducted in April 2021. A survey questionnaire that gauges consumer knowledge of food date labelling was constructed for the study. A total of 460 respondents representing B40, M40 and T20 households participated in the survey. The survey findings indicate that Malaysian consumers' low knowledge of the meaning of the date formats marked on food packaging may lead to edible food waste.*

**Keywords:** consumer knowledge, edible food waste, food date labelling, food safety, food quality

### INTRODUCTION

Food safety regulations worldwide require food producers, manufacturers, and retailers to label their products with date labelling as an indicator of safety, fitness and quality. Date labelling is used as direct consumer information in purchasing and consuming food. Consumers have the right to receive correct information about the food they intend to buy and consume. This right is related to the consumers' right to information and will help them make an informed choice for the safety and quality of the goods. The date labelling approach is widely adopted in food safety regulations in most countries pursuant to the *caveat venditor* (let the seller beware) doctrine. Under this legal doctrine, food producers, manufacturers and retailers must exercise care not to produce, manufacture or sell foods of poor quality and not fit for

consumption. In Malaysia, this duty of care has been codified in the Food Act 1983, Food Regulations 1985, Consumer Protection Act 1999 and Sale of Goods Act 1957.

The Food Act 1983 prohibits the sale of food products that fail to meet the legal standard and are unfit for human consumption. Under Section 40(a) of the Consumer Protection Act 1999, food producers, manufacturers, and retailers adopt the date labelling approach as it could save them from product liability. It also exempts the manufacturer from liability in respect of an implied guarantee of acceptable quality where the manufacturer makes a representation of the goods on any packaging or label. Section 67 recognizes the use of any mark in relation to the products, which may include date labelling, as an indicator of safety and fitness. In addition, Section 16 of the Sale of Goods Act 1957 requires the seller and manufacturer to ensure that the goods sold are fit for purpose and have merchantable quality. These legal requirements place a legal duty on the food producers, manufacturers, and retailers to ensure that the foods supplied to the consumers do not fall below the required standard. They exercise this duty of care by marking the food or packaging with date labels. Date labelling indicates a shift of responsibility to the consumers to make an informed decision as to the quality and safety of the food. To the consumers, what amounts to be below the required standard is perceived by referring to date labelling marked on the food as referred to in the Food Regulations 1985. Regulation 14 of the Food Regulations 1985 imposes on food producers, manufacturers, and retailers an obligation to mark or label the food packaging with a date. The date is to inform the consumers of the date of the minimum durability of the food or the minimum storage life of the food. The regulated terms or terminologies that shall be observed to label the food are 'expiry date or exp date', 'use by', 'consume by or cons by', and 'best before or best bef'. Regulation 7 further imposes that food producers, manufacturers and retailers are prohibited from producing or selling any food such as foods listed in the Fifth Schedule such as biscuits, bread, fish cakes, milk, juice, canned foods, cereals, etc.) which does not bear a date marking on the food package.

Due to its worldwide adoption, food date labelling plays a pivotal role in consumers' purchasing and consuming food. The practice of food labelling, in general, is a manifestation of the Consumerism Theory that promotes the highest safety protection for consumers and as leverage to prevent food fraud by food manufacturers (Muhammad Iqram et al., 2022). Tampering, mislabeling, and deception are examples of food fraud that pose risks to economies and consumers' health. Food labelling can be effective in preventing food fraud. Thus, the mandatory date labelling as prescribed in the Food Act 1983 and Food Regulations 1985 creates a standard for food date labelling, ensuring the safety and opportunity of consumers to make rational choices. Outside the realm of food safety regulation, consumer protection law also offer protection against food fraud through the mandatory labelling requirement, as seen in the Consumer Protection Act 1999.

Food date labelling is known to significantly influence consumers' decisions on what/when to eat or dispose of the food. Food with labels that have passed, close or right on the due date is deemed as not safe and not fit for consumption. Literature on food safety and quality assurance report that most food that has passed or is close to the due date marked on food packaging is still safe and fit for consumption. Despite being edible, lack of knowledge of the meaning of food date labelling terminology and symbols has resulted in an abundance of edible food being abandoned by consumers, if not discarded, either at a point of sale or point of consumption.

The literature review indicates that there is yet a study that investigates Malaysian consumers' knowledge of food date labelling. Hence, a study was conducted to fill in the gaps to investigate Malaysian consumers' knowledge of food date labelling.

## **Problem Statement**

Edible food waste is a global problem, especially where food insecurity and starvation persist in many parts of the world. Malaysia is no exception. According to Ahmad Kushairi (2018), about 8,000 tonnes, or approximately 60 per cent of the daily food waste is edible. Nur Imani Abdullah (2016)

reports that a similar study conducted by the Malaysian Agricultural Research and Development Institute (MARDI) proved that Malaysians wasted about 3000 metric tonnes of edible food daily. Furthermore, Sundaram et al. (2019) report that the household was the primary root of municipal solid waste in Malaysia, where food waste comprised 50% of the total waste. These figures paint a picture of immense food waste. Examples of edible food waste are all food that is consumable and perishable such as milk, slices of bread, vegetables, fruits and others. Also wasted is non-perishable food such as canned food and packaged food. Whether food should be discarded when the date labelled has passed has become the most frequent topic among households at home (Farrell, 2017). One of the causes of edible food waste is the misleading food date labels and confusion that have led consumers to discard or throw away food once the food has passed the date marked (Aschemann-Witzel, et al., 2015, Versolatto, 2019; Kavanaugh & Quinlan, 2020; Patra, 2020). The variety of terms such as 'use by', 'best before', 'consume by', 'expiry date', 'sell by', and 'sell before' is supposed to help consumers understand better that those date labels indicate quality and not safety. It is not unusual that consumers would be confused about what the labels specifically mean with the numerous terms used. Though the rationale of the date labelling requirement is to protect the consumers and enable them to make an informed decision, the legal requirements for date labelling imposed on food producers, manufacturers and retailers have contributed mainly to edible food waste. When date label on food packages is seen as an indication of food safety, misunderstanding, misconception, and confusion among consumers are likely to result in food being discarded.

Furthermore, a food safety regulation using date labelling is problematic as various studies found that most food can last months or years past the marked date (Lancelot et al., 2016). The food can be kept from being thrown away, although it has passed the date label, provided it is stored properly. European Commission links a third of food waste created at the household level due to, amongst others, consumer misunderstanding of the meaning of the marked dates. While the foods may be safe and fit beyond the marked date, the foods were rated less favourably by the consumers when the date label suggests the food is close to, at or past the marked date over a fear of their safety (Wilson et al., 2018). Despite date labelling being influential in consumer choice, Milne (2012) finds that the date labelling practice of 'best before' and 'use by' dates confused consumers. He urges politicians, industry and waste activists to actively take measures to promote a better consumer knowledge and understanding of the food date labelling system. In Malaysia, in tandem with the food waste problem, it is necessary to have first-hand knowledge of the impact of food date labelling on consumers for appropriate measures to be adopted to reduce edible food waste and promote a better understanding of the meaning of the terminologies used.

## LITERATURE REVIEW

Research conducted by Kranert et al. (2012) in Germany found that incorrect labels and an expired 'best before' date led to food wastage. Newsome et al. (2014) find that variants of date labelling terms contribute to substantial misunderstanding by the food industry and consumers, leading to significant avoidable food loss and food waste. Toma et al. (2017) also find that consumers' lack of understanding of 'best before' and 'use by' date labelling on food products led to food waste. While the foods may be safe and fit beyond the marked date, the foods were rated less favourably by the consumers when the date label suggests the food is close to, at or past the marked date over a fear of their safety (Wilson et al., 2018). In the United States, 20 per cent of food waste by households is caused by uncertain consumers upon the meaning of date labels on packaged food due to the variety of terms used to indicate date labels (U.S. Food & Drug Administration, 2019). Several countries conducted a nationwide survey to investigate the knowledge and understanding of the consumers of the food date labels used in their countries, respectively. The findings of the surveys are summarized in Table 1.

**Table 1: Previous Studies on Consumers' Knowledge and Understanding of Food Date Labelling**

Author	Country of Study	No of respondents & Method	Date labels	Findings
Zielinska, D Biliska, B, et al (2020)	Poland	1115 respondents  Questionnaire  The data were collected in February and March 2019	'Best before'  'Use by'	1) 48.9% - almost half of the Polish respondents, regardless of age, said they never consume food after the expiry date. 2) Only 7% of the respondents said that they consume food after the expiration date, regardless of its type. 3) 42.8% of the Polish respondents believed that the expressions 'use by' and 'best before' signify the same thing, and 21.2% answered 'It is hard to say'. Almost 40% of the Polish respondents mistakenly believed that the term 'best before' refers to food health safety. 4) Almost half of the respondents did not see a difference between the phrases 'use by' and 'best before', and one in five respondents said they had difficulty commenting on the issue. 5) Most respondents (39.8%) indicated that the date of minimum durability 'best before' means the date after which the product becomes unsafe for the consumer. A slightly smaller percentage of Poles gave correct answers, indicating that this is the date the food product loses its quality and cannot be sold (37.4% and 34.5%, respectively).
Neff, R. A., Spiker, M., et al, (2019)	USA	1029 respondents  Online survey  Data were collected in April 2016	'best if used by'  'best by'  'freshest by'  'expires on'  'use by'  'sell by'	1) 'best if used by', 'best by' and 'freshest by' were perceived as quality labels by 70%, 67% and 62% of respondents respectively. 9% considered it a safety label, and 11% were not sure. 2) By contrast, 'expires on' and 'use by' were seen most commonly as safety labels (54% and 42%, respectively). 3) 'Sell by' was widely seen by 81% of respondents as a store information label, although 19% still saw it as a safety or quality indicator or were unsure.

Author	Country of Study	No of respondents & Method	Date labels	Findings
Kavanaugh, M, Quinlan, J (2020)	USA	1065 participants completed the questionnaire, and 23 were excluded based on an incorrect screener question, leaving 1042 participants in the analysis.  The survey was administered online from April 12 to 13, 2019, via SurveyMonkey	'best by, use by'  'sell by'  'expiration dates'	<ol style="list-style-type: none"> <li>1) Only 37.2% of respondents in the study knew the meaning of all three food date labels.</li> <li>2) 597 respondents correctly identified 'best by, use by' date.</li> <li>3) 830 respondents correctly identified 'sell by' date.</li> <li>4) 710 respondents correctly identified 'expiration date'.</li> </ol>
TNS European Behaviour Studies Consortium Final Report (2014)	8 European Union member states (Finland, UK, Italy, Spain, Germany, Poland, France and Romania)	8076 respondents  Interview and observation  Data were collected in Sept 2013	'best before'  'use by'	<ol style="list-style-type: none"> <li>1) A majority of 54% of European household shoppers could not identify the correct interpretation of 'best before' as a quality-related date.</li> <li>2) The most common misunderstanding (37%) confused the 'best before' date with the safety-related 'use by' date. It was highest among the Eastern European member states-Romania (77%) and Poland (52%).</li> <li>3) While 46% correctly interpreted the 'best before' date as the last day of the highest quality, 11% mistook 'best before' for 'sold by', and 6% had either no idea or another interpretation in mind.</li> <li>4) 72.1% correctly interpreted the 'use by' as the last day for safe eating, and only 16.2% mistook it as the last day of the highest quality.</li> </ol>

As illustrated in Table 1, research has consistently shown that consumers were confused, misunderstood, and had a low level of knowledge of the meaning of the food date labels used in their home country. For example, the consumers could not differentiate between 'use by', and 'expires on' with 'best before' date labels. The research's answer pattern indicates that most consumers were more inclined to the same interpretation when confronted with different date label versions, i.e., the date label portrays food safety. In summary, it is evident from these studies that there is a widespread misinterpretation of food date labels by consumers. In Malaysia, two studies were conducted to assess the significance of food date labels and reliance among consumers. Ambak et al. (2018), who investigated the prevalence of food label reading and understanding among Malaysians, found that the expiry date label was the most frequently read information compared to other labels like nutrient information and precautionary statement. In 2016, a study was conducted by Abdul Latiff, et al. to examine the attitude of consumers towards food labelling and its significant effect on consumer purchasing conduct. Among the 2014 consumers in Klang Valley surveyed, they found that the food label used, such as *the halal* logo, nutritive value and content of ingredients, were adequate and heavily relied on by Malaysian consumers in making their decisions to purchase and consume the food. The study also found that food labels play a vital role for consumers in their first-time purchase of a food product. These findings confirmed that food labels, particularly date labels, play a significant role for Malaysian consumers.

Nonetheless, the studies did not specifically investigate consumer knowledge and understanding regarding food date labels. Furthermore, there had yet to be any previous studies to investigate the consumer knowledge on the date label format of 'best before', 'use by', 'consume by' and 'expiry date' as regulated by Regulation 14 of the Food Regulations 1985. Ergo, this study was conducted to fill in this void.

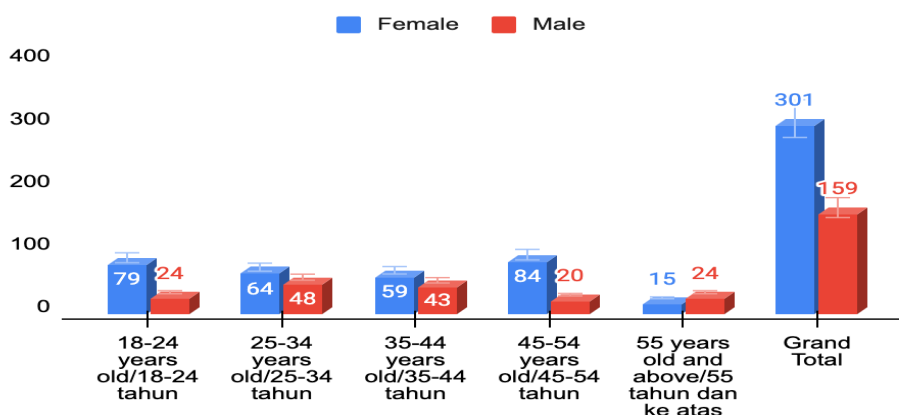
## METHODOLOGY

This research employed a fieldwork data collection method involving a survey to achieve the aim of the study. A survey questionnaire was prepared in English and Malay and divided into six sections. Part C of the questionnaire was designed to meet the objectives of this research. This part contained five statements based on a five-point Likert scale ranging from the lowest to the highest. The unit of analysis is Malaysian household consumers. The target population are adult members of Malaysian households. As of 2020, there were 8 million households in Malaysia (Department of Statistics Malaysia). The minimum required sample size based on the total population is 385 participants, calculated to have a 5% margin of error and 95% confidence level. The sample size was decided based on Krejcie & Morgan Table (1970). Upon receiving the ethics approval from the Research Ethics Committee of Universiti Teknologi MARA, a pilot study that involved 100 respondents was conducted and returned with a Cronbach alpha value  $>0.64$  indicating the reliability and consistency of all the statements contained in the survey questionnaire. Data collection was conducted in April 2021. To ensure consistency and reliability, this study only includes Malaysian household members that currently reside in Malaysia and used to do grocery shopping. This survey excludes minors, consumers on a holiday/business trip in Malaysia, and those unable to understand Bahasa Malaysia or English. To avoid sampling error, the demographic section of the survey questionnaire collects data on age, country of residence and frequency of grocery shopping. A convenience sampling technique was used for data collection. This sampling technique was used as the survey questionnaire will be distributed by hand and online via email or social media. However, the online data collection method was employed due to the Movement Control Order (MCO) enforced in Malaysia. IBM SPSS software was used as a tool for quantitative data analysis. Descriptive analysis was employed to ascertain the consumers' knowledge of food date labelling.

## RESULTS AND DISCUSSIONS

This section reports the findings of an online survey on Malaysian consumers' knowledge of food date labelling. The survey collected data from 460, which is 20 per cent higher than the sample size

recommended in the sampling schedule by Krejcie and Morgan (1970). The additional respondents were to cater for the non-responses and other constraints to fulfil the sample size assumptions for statistical analysis. The demographic of the respondents is portrayed in Figure 1 below.



**Figure 1 : Respondents' Demographics by Age and Gender**

Figure 1 reported that 460 respondents had answered the questionnaire, with 301 (65.4%) female and 159 (34.5%) male respondents. The distribution of the respondents' age was also shown in the table. The highest number of respondents was between 25 and 34 (112 respondents/24.3%). The lowest number of respondents came from the 55 years and above age category (39 respondents/8.4%). Other categories of age recorded were 103/22.3% of respondents aged between 18-24 years old, 102/22.1% of respondents aged between 35-44 years old and 104/22.6% of respondents aged 45-54 years old.

The following section reports the respondents' answers to a questionnaire that investigates consumers' knowledge of food date labels and the four different terminologies used as required by the Food Regulations Act 1985. The respondents' knowledge of food date labelling is depicted in Table 2 and Figure 2 below.

**Table 2: Consumers' interpretation of food date labelling**

Date Label	The last day on which the food is at its highest quality	The last day the food is safe for human consumption	The last day the food is edible	The last day the food can be sold	No knowledge
Best before	281	88	66	18	7
Use By	107	191	136	16	10
Consume By	105	155	161	16	23
Expiry Date	126	132	107	82	13

Table 2 informed the respondents' answers to the meaning of four date labels stipulated under Food Regulations 1985. The respondents were asked to choose the correct answer to the question, "What do you know about food date labels 'Best Before', 'Use By', 'Consume By' and 'Expiry Date'?". The choice of answers is: i) the last day on which the food is at its highest quality, ii) the last day the food is safe for human consumption, iii) the last day the food is edible, iv) the last day the food can be sold and v) no knowledge. The lowest number of correct answers was recorded for 'consume by', with only 105 (22.8%) respondents correctly identifying its meaning. This was followed by 'use by', of which only 107 (23%) respondents could identify the correct answers. The third lowest correct answers were for 'expiry date', with 126 (27.4%) respondents correctly identifying its meaning. The highest number of

correct answers was for the label 'best before', with the majority of the respondents, 281 (62%), successfully identifying its correct meaning.

Figure 2 also informed that the food date label 'use by' has the highest number of incorrect answers, with 191(41%) respondents interpreting it as 'the last day the food is safe for human consumption'. The food date label 'consume by' has the second-highest incorrect answers, with 161 (35%) of the respondents interpreting it as 'the last day the food is edible'. The third highest incorrect answer was the food date label 'expiry date', with 132 (28.6%) of the respondents interpreting it as 'the last day the food is safe for human consumption'. For the food date label 'best before', the highest number of the incorrect answer was for 'the last day the food is safe for human consumption' with 88 (19.1%) of the respondents. 53 (11.5%) respondents answered 'no knowledge' for one or more questions in this section.

C5. Food that has passed date label is still safe for consumption / Makanan yang tarikh ditandakan telah luput masih selamat untuk dimakan  
460 responses

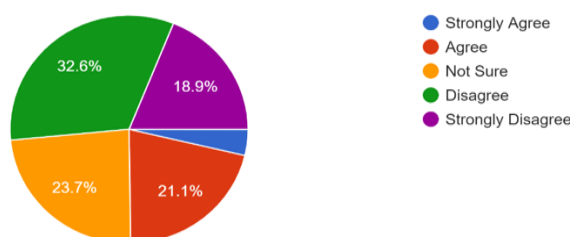


Figure 2: Consumers' knowledge of the safety of food that has passed date label

Figure 2 informed the respondents' answers to the safety of food that has passed the date label. The majority of the respondents (233/50.6%) gave incorrect answers when they disagreed/strongly disagreed that food that has passed the date label is unsafe for consumption. Less than 25% (114) of the respondents correctly answered the question by agreeing/strongly agreeing that food that has passed the date label is unsafe for consumption. Nearly a quarter of the respondents (109/23.7%) answered as 'not sure' for the question that food that has passed the date label is not safe for consumption.

Evidently, there is a low consumer knowledge of food date labelling. It was found that almost 70% of the respondents have no knowledge of the meaning of 'use by', 'consume by', and 'expiry date'. Except for the 'best before' label, most respondents wrongly believed the last day marked on the date labels ('use by', 'consume by' and 'expiry date') indicates food safety, rendering the food inedible. The truth is Regulation 14(a) of the Food Regulations Act 1985 states that the 'use by', 'consume by' and 'expiry date' means the date after which the food may not hold the quality aspect usually expected by a consumer, under recommended storage conditions. The 'best before' per Regulation 14(b) means the date until the food will retain any specific qualities for which tacit or express claim has been made, such as taste, size, nutrients and colours, under recommended storage conditions. In short, regardless of the date label formats or terminologies used, they are intended to inform consumers on the last day that the food is at its highest quality but still safe and edible, subject to proper storage as recommended on the food label. Thus, besides food date labels, adhering to the storage recommendation is also paramount to measuring the foods' safety and quality. As disclosed in this study, the respondents' low level of knowledge confirmed the findings of the international studies on consumers' knowledge of food date labelling under their respective laws, as seen in Table 1. Malaysian consumers share the same interpretation and knowledge as Polish, American and European consumers. They had misconstrued and needed clarification on the food quality and safety aspects based on the date labels. The findings also support Newsome et al. (2014), Toma (2017) and Wilson et al. (2018), who agree that various



forms of terminologies of food date labelling caused uncertainty for consumers and it led to edible food waste for fear of consuming unsafe food.

Figure 2 indicate widespread misinterpretation of the meaning of 'best before', 'use by', 'consume by', and 'expiry date', with only one out of four terminologies used in food date regulations in Malaysia having been correctly interpreted. Cumulatively, 67.4% of the respondents' interpretations of the terminologies used in the food date labels were incorrect. Despite the variety of terms or terminologies used, the Food Regulations 1985 assigned all these food date labels under the ordinary meaning 'the last day on which the food is at its highest quality'. This paper argues that four different terminologies in food date labelling regulation may contribute to the widespread misinterpretation among consumers. The consumers were overwhelmed by varieties of food date labels affixed on food packaging. Without proper instructions and guidance, the consumers were more inclined to form their perceptions of what the food date label means explicitly. Such has led consumers to assign different meanings for each terminology used in food date labels. The findings from Figure 2 also indicate a high degree of confusion about the purpose of the food date label. Food date labelling is aimed at facilitating the consumers to understand better that those date labels indicate quality and not safety. The food can be kept from being thrown away although it has passed the date label marked, provided it is stored properly. Still and all, it is common for consumers to be confused and perplexed with the functions of food date labelling. The confusion arose as the consumers could not differentiate the function of food date labels as quality assurance regulations from safety assurance regulations. The rationale of the date labelling requirement is to protect the quality aspect of the food, not the safety aspect of the same. The legal requirements for date labelling embedded in the food safety regulations (the Food Regulations 1985 and the Food Act 1983) further influenced the consumers' perception that the food date label is aimed at safety assurance. Equating the food date label as a safety assurance measure imposed on food producers, manufacturers and retailers largely contribute to edible food waste. When date labels on food packages are seen as an indication of food safety and not food quality, consumers are likely to discard food based on those marked dates, as seen in Figure 2. To the consumers, what amounts as food safe for consumption is perceived by referring to date labelling marked on the food packaging. In short, date labelling has caused edible food waste because of the confusion it creates among consumers regarding the actual functions of food date labels.

In summary, the study's findings demonstrated that Malaysian consumers have low knowledge of food date labelling, had misinterpreted their meaning and were confused as to the purpose of food date labelling as prescribed under the Food Regulations Act 1985 and Food Act 1983.

## **CONCLUSION**

The practice of food date labelling in Malaysia results from a legal requirement imposed in the Food Act 1983 and Food Regulations 1985. This legal obligation met the objective of the Consumer Protection Act 1999, which is to protect the consumers by ensuring the food sold is safe, has merchantable quality and is fit for purpose. Generally, food date labelling is one of the mechanisms to guarantee the consumers' right to information. However, the right to be informed must be presented in a clear presentation and format to avoid misconception and confusion. Consumers have the right to receive accurate information about the food they intend to buy and consume. Though this legislative framework ensures food safety and quality, ergo strengthening consumer protection, it leads to edible food waste due to the consumers' misunderstanding and confusion on the meaning of the date formats used. The food that has passed the optimal quality but is still safe ended up in the waste bin. The survey findings indicate the similarity of the problem with other countries, as shown in Table 1 above, regarding consumers' knowledge and understanding of food date labelling. Date labelling does influence the consumers' choice of food at the point of purchase and its subsequent consumption. It also significantly affects the consumers' decision to discard edible food. Consumers have become ignorant or lack knowledge of the characteristics of food safety and food quality. They relied heavily on the food date labels, but the misconception of their true meanings led to edible food waste.

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## AUTHORS' CONTRIBUTION

All authors carried out the data collection process. Mahmood, A. carried out data preparation and interpretation of the results. Mahmood, A. took the lead in writing the manuscript. All authors provided critical feedback and helped shape the research, analysis and manuscript.

## CONFLICT OF INTEREST DECLARATION

We certify that the article is the Authors' and Co-Authors' original work. The article has not received prior publication and is not under consideration for publication elsewhere. This research/manuscript has not been submitted for publication, nor has it been published in whole or in part elsewhere. We testify that all Authors have contributed significantly to the work, validity and legitimacy of the data and its interpretation for submission to Jurnal Intelek.

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