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CONSUMER UNDERSTANDING OF THE 'BEST BEFORE' AND 'USE BY' DATES

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Abstract: The aim of the study was to evaluate the consumers' knowledge of the concept of 'best before' and 'use by' dates, and to assess how it translates into safe and sustainable food-handling behavior in relation to a specific food and a given date type. The face-to-face interview method (N = 1145) was applied with the use of the interview questionnaire. The results showed that groups of 61.1% and 79.0% of Polish consumers who selected the correct meaning of the date had problems with food handling when they were asked about a specific food product. Consumer behavior in this regard depended on the type of product, not on the date type.

Keywords: use by, best before, date labelling, consumer awareness, food waste.

1. INTRODUCTION

Date labelling of food serves as one of the extrinsic cues which play an important role in the decision-making process at the stage of purchase and consumption [Szymkowiak et al. 2020; Song et al. 2021]. Over a several year period the significance of date labelling evolved from playing the role of a business-oriented tool for internal stock control to being a consumer-oriented tool for health protection and for better food management in households [Newsome et al. 2014]. The meaning of shelf-life dates helps in building environmentally conscious consumer citizenship and is nowadays a subject of discussion [Milne 2013; Shamim, Ahmad and Alam 2021]. Date labelling may play an important role in building 'information safety' – a novel criterion for food quality in market communications with consumers [Śmiechowska and Kłobukowski 2017].

The evolving role of date labelling of food is presented in Figure 1. The idea of building environmental awareness is related to environmental policy, which is implemented globally, including across the EU. According to target 12.3 of United Nations Sustainable Development Goals (UN SDGs), by 2030 the global food waste at the retail and consumer levels should be halved [United Nations 2015].

Food loss and waste prevention, together with striving to achieve sustainable food consumption, are considered to be vitally important goals of the European 'Farm to fork' strategy, a key pillar of the 'European green deal', which aims to make food systems fair, healthy and environmentally-friendly [European Commission 2019].

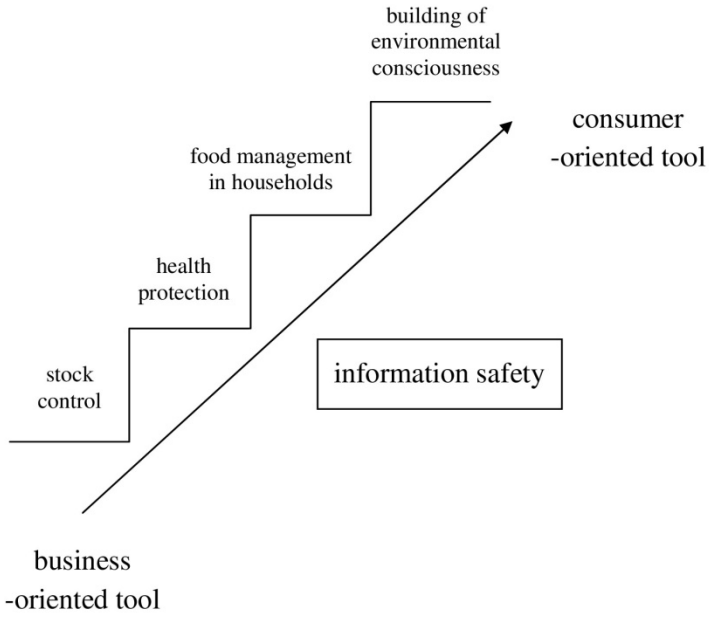

Fig. 1. Evolving role of the date labelling of food

Source: own elaboration.

Recent date labelling in the EU covers the dual system of the date of minimum durability ('best before') and the 'use by' date. The present scheme was intended to inform consumers about the status of the food, which is influenced by storage time. This system was constructed around the risk-based approach [EFSA 2020]. The 'best before' date should be the date until which the foodstuff retains its specific properties when properly stored. In the case of foods which, from a microbiological point of view, are highly perishable and are therefore after a short period likely to constitute an immediate danger to human health, the date of minimum durability shall be replaced by the 'use by' date [Regulation (EU) No. 1169/2011]. In the light of these provisions, the interpretation of the minimum durability date is that food can be safely consumed after passing this date although its quality may not be optimal.

The existing date labelling system is considered to confuse. The most significant reason for confusion is the dual concept of date labelling. Previous studies showed that consumers have problems with distinguishing between the two types of the date: minimum durability date and the 'use by' date [Moreira et al. 2019; Kavanaugh and Quinlan 2020; Toma, Costa Font and Thompson 2020]. It is estimated that the lack of proper understanding of the meaning of date marking contributes to the 10% of food that Europeans waste annually [European Commission 2018].

The problem arising around food waste caused be misunderstanding of the date labelling system has been addressed in literature from the consumer behavior perspective [Thompson et al. 2018; Wilson, Miao and Weis 2018; Dobernig and Schanes 2019; Toma, Costa Font and Thompson 2020]. The motivation of consumers not to waste food is affected by date information together with such mediating tools as safety and quality indicators, or their combination with sensory perception [Chu et al. 2020; Samotyja and Sielicka-Różyńska 2021]. Consumers tend to treat 'best before' and 'use by' date as if the message behind them was the same regarding all the date labels as food safety indicators [Lyndhurst 2011]. Consequently, they discard food that has passed the date, regardless of whether it was labelled with a 'use by' date or not, and of whether the foodstuff is edible or not [Leib et al. 2016]. The problem with the dates is due to consumers not recognizing the need for adverse food handling in accordance with the date type. As previous studies have shown, consumer assessment of fitness for consumption depends on the food category. Some consumers present an attitude towards not wasting food by ignoring the dates. Instead of reading the labels, they are interested in intrinsic cues solely as the safety indicators [Van Boxstael et al. 2014]. This approach is justified only in the case of 'best before' labelled products because not all types of harmful microbial changes occurring during storage of 'use by' labelled foods can be recognised by the human senses and possess a threat to consumer health [Ipsos MORI 2021].

The competing goals underlying the eating of a healthy diet and awareness of the consequences and attitudes towards food waste increase the confusion of consumers caused by the dates [Van Geffen et al. 2020]. Understanding the consumer perception of the meaning of label information in the context of food handling is a prerequisite for food labelling system improvement in order to reduce environmental burdens [Patra et al. 2020; Shamim, Ahmad and Alam 2021]. Previous studies have found that the percentage of correct answers depended on the way the question was asked – it was greater when the question was related to the definition of the issue without checking the understanding of the terms, and it decreased when consumers were asked to indicate how to proceed in a specific situation [Lyndhurst 2011]. In the literature, the issue of the dates is predominantly discussed in general, without referring to a specific food product. Sometimes the considerations relate to a specific food but there is no distinction between the types of date. Therefore, little is known about consumer attitudes towards similar expired

food products which have separate counterparts in the group of 'best before' or 'use by' labelled foods. To fill this gap the aim of the study was to evaluate the knowledge of the consumers in terms of the concept of 'best before' and 'use by' dates, and to assess how this translates into safe and sustainable food-handling behavior in relation to a specific food and a given date type.

2. MATERIAL AND METHODS

The research was conducted in Poland in the period from April to May 2019. Consumers for research were selected based on the quota method with the element of purposeful selection (selection criteria: sex, age and place of residence with the additional requirement regarding the declaration of systematic purchase of food products) (N=1145). The quota method (selection criteria: age, gender and place of residence) was used. The research sample met the demand for maintaining the relative representativeness of the research population.

Table 1 presents the structure of the research sample.

Table 1. Structure of the research sample

Variable	Characteristics	Percentage [%]
Gender	female	45.3
	male	54.7
Age	under 20	2.2
	20–29	17.3
	30–39	20.0
	40–49	13.4
	50–59	14.7
	60+	32.4
Education	vocational	18.2
	secondary	31.1
	bachelor degree	21.7
	master degree	29.0
Type of place of residence	traditional village	12.3
	village by a city	7.1
	city up to 20 000	5.2
	city up to 100 000	4.9
	city up to 500 000	12.4
	city over 500 000	58.1

Source: own study.

The face-to-face interview method was applied with the use of an interview questionnaire. It contained 20 questions regarding the perception and understanding of the date labelling system, the perception of health risks related to consumption of

food past the ‘use by’ or ‘best before’ dates and household food-waste behavior. This paper presents selected issues concerning the consumers’ understanding of the concept of the ‘best before’ and ‘use by’ dates. Consumers were primarily asked to interpret the meaning of the ‘best before’ and ‘use by’ dates by selecting one of the three statements. The option ‘I do not know’ was also allowed. Secondly, they were asked how they would handle an expired product. They were asked to comment on four different products labelled with a ‘best before’ date and their four counterparts labelled with a ‘use by’ date.

3. RESULTS

The results presented in Figure 2 show that barely more than 60% of respondents were able to correctly interpret the meaning of the ‘best before’ date (‘food product can be consumed but its quality may not be good’). Nearly 1/5 of respondents thought that one should not consume expired ‘best before’ food and probably they would throw this food out. Disposing of food products which are safe for consumption because of unreasonable health concerns or uncertainty about their safety is related to food waste behavior. Food wasters may also belong to the group which believes that ‘best before’ labelled food must be of good quality or was not able to match a proper meaning.

The 14% who expect a guarantee of good quality after passing a minimum durability date may feel disappointed and, for this reason, reject the food. Consumer awareness is unsatisfactory despite consumer interest in food labelling but, in the light of previous data by other authors, is growing. Research conducted in Greece showed that although almost 94% of adolescents aged 13–17 years declared an interest in date labelling, only 20% of them were able to demonstrate a knowledge of the ‘best before’ term in the selection test [Gialitakis and Chryssochoidis 2006]. The results obtained in this study show better understanding of the dates by Polish consumers than those shown in a survey conducted in the EU in 2015.

According to the European survey, only 47% of European and 24% of Polish respondents gave the correct interpretation of the ‘best before’ date [European Commission 2015]. The increasing awareness may be the result of launching educational campaigns and initiatives taken in the EU several years ago in order to explain the meaning of date labelling.

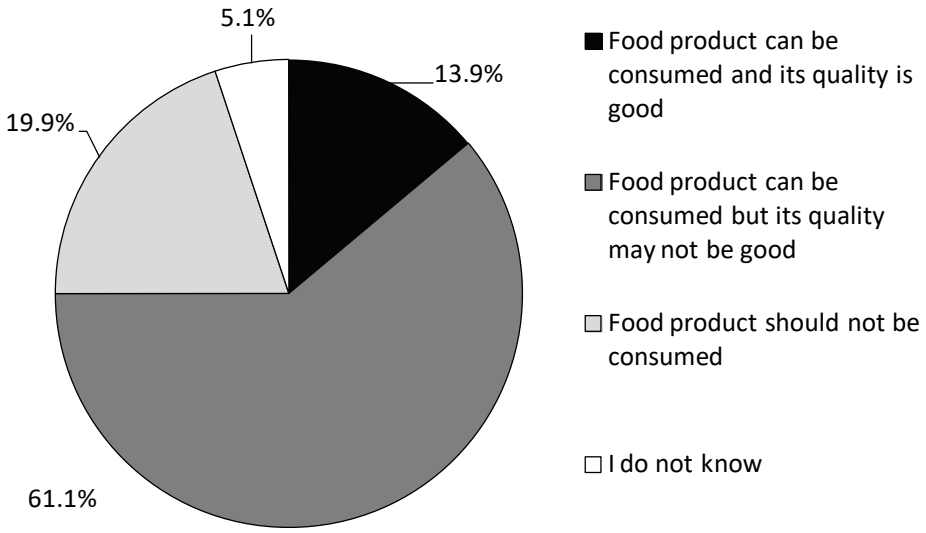

Fig. 2. Interpretation of the 'best before' date

Source: own study.

Despite the observed upward trend of consumer consciousness, deeper investigation shows that the results presented in Figure 2 are the proverbial 'tip of the iceberg'. The general consumers' interpretation of the meaning of 'best before' dates was compared with declarations about food product handling in relation to shelf-life information. It was found that consumers who were able to correctly interpret the meaning of the 'best before' date had serious problems with indicating the appropriate way of correct food handling after expiration.

The results (Tab. 2) show that knowledge of the meaning of the dates does not translate into sustainable food-handling behavior. Slightly over 70% of the respondents, who knew that food can be safely consumed after passing the 'best before' date, would throw away expired UHT milk.

Similar behavior was declared by nearly 60% of consumers of ready-to-eat food and nearly 44% of consumers of canned fruits, who correctly interpreted the meaning of the 'best before' date. The smallest percentage of respondents (one quarter) would throw away expired dry rice – which is a disquieting number.

Table 2. Declarations about expired food handling by consumers who correctly interpreted the meaning of the 'best before' date

Declaration	I would consume		I would discard		I would process		I would donate		I would taste and consume if it would not raise concerns	
Food product labelled with the 'best before' date	n	%	n	%	n	%	n	%	n	%
UHT milk	18	2.6	491	70.1	19	2.7	12	1.7	160	22.9
Rice	179	25.6	168	24.0	53	7.6	28	4.0	271	38.8
Ready-to-eat meal	20	2.9	408	58.4	19	2.7	29	4.1	223	31.9
Canned fruits	37	5.3	308	44.0	40	5.7	23	3.3	292	41.7

Source: own study.

Taking into consideration the consumers' understanding of the 'use by' date, it can be seen that nearly 80% of the respondents were able to correctly interpret the meaning of this date type (Fig. 3). Food should not be consumed after this date has passed because it can constitute a danger to human health. A dangerous microbiological growth may not be detectable by the human senses, therefore sensory quality should not be a criterion of the consumers' decision concerning food consumption. After the 'use by' date a food shall be deemed to be unsafe in the light of Regulation (EC) No. 178/2002 [Regulation (EU) No. 1169/2011].

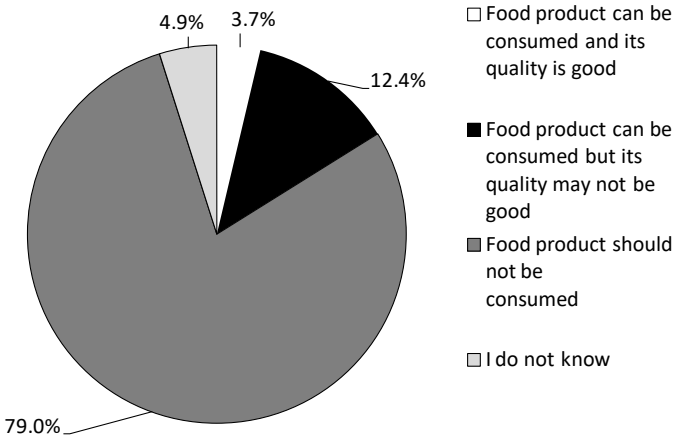

Fig. 3. Interpretation of the 'use by' date

Source: own study.

The relatively high percentage of respondents who selected the correct answer to the question about the meaning of the 'use by' date did not correspond with proper food-handling (Tab. 3).

Table 3. Declarations about expired food handling by consumers who correctly interpreted the meaning of the 'use by' date

Declaration	I would consume		I would discard		I would process		I would donate		I would taste and consume if it would not raise concerns	
Food product labelled with the 'use by' date	n	%	n	%	n	%	n	%	n	%
Pasteurized fresh milk	42	4.7	471	52.3	53	5.9	15	1.7	320	35.5
Rice milk dessert	73	8.1	407	45.2	8	0.9	19	2.1	393	43.7
Ready-to-heat meal	54	6.0	395	43.7	30	3.3	26	2.9	398	44.1
Fresh-cut fruit salad	40	4.4	464	51.5	36	4.0	17	1.9	344	38.2

Source: own study.

Only half of the consumers who indicated the correct interpretation of 'use by' date would not consume expired 'use by' labelled milk and fruit salad, somewhat less declared so in the case of ready-to-heat meal and rice-milk dessert. The rest admitted that they would either eat expired products, share or process them, but the highest percentage would taste them and decide on this basis whether to consume these foods or not. Such declarations were made by between 35.5 and 44.1% of the respondents who marked the correct understanding of the 'use by' date of food. Submitted declarations may be a result of a willingness not to throw away foods [Wilson, Miao and Weis 2017].

The results obtained in this study showed that consumers found it difficult to correctly associate 'best before' and 'use by' dates with the quality and safety of food products respectively. The findings are in agreement with the results presented by other authors. Research conducted among Belgian consumers has shown that although as many as 80% of people admitted that they know the 'best before' and 'use by' date, only 70% knew the difference between the two date types [Van Boxstael et al. 2014]. It can be noticed that the respondents' attitude depended on the food product. The highest percentage of consumers would be willing to dispose of UHT milk. This finding is in line with the results presented by other authors, who proved that the safety of milk is a matter of the highest health concern during the consideration of the fitness for consumption [Van Boxstael 2014; Visschers, Wickli and Siegrist 2016; Thompson et al. 2018]. Consumers believe that milk in general

may pose a greater health threat than dry foods, but they do not take into consideration the technological aspects of prolonging shelf life. Due to the ultra-high temperature process of sterilization, UHT milk is microbiologically stable and therefore it is safe for a long time. Shelf-stable products, such as canned fruits, may lose their sensory quality but their consumption shortly after expiration is not related to a health risk [Trząskowska et al. 2020]. Despite the fact that consumers feel that rice is a dry food which after expiration is more safe than other products, their answers are not satisfactory.

According to other authors, consumers feel guilty when they dispose of food [Visschers, Wickli and Siegrist 2016; Falasconi et al. 2019]. It may be assumed that giving food to other consumers partially reduce this guilt. It should be noted that while the sharing of expired food labeled with a date of minimum durability is desired, it should not take place in the case of the 'use by' labelled products.

4. CONCLUSIONS

The study highlighted the discrepancy between consumer understanding of the meaning of the 'best before' and 'use by' dates. Knowledge of the two types of the dates did not translate into proper food handling. Consumer behavior in this regard depended on the product type rather than the date, and was affected by their own interpretation of the meaning of the date or own beliefs. The study showed that it is important to refer to real situations and real products while conducting research or presenting the food products because the context influences the consumers' answers. The results are important for food business operators and policymakers in the light of the recent discussion on the role and efficiency of the date labelling system. The findings showed that the existing system did not support the policy of building environmentally conscious consumer citizenship as it may promote food waste behavior. The weaknesses of the recent date labelling system should be taken into account diligently. Urgent improvement is necessary, but one should be aware that introducing new or modified rules will require the need for the further education of consumers in this area. The results obtained in this study show that education solely focused on explaining the meaning of the date may not be efficient without showing the methods of sustainable food handling. Consumers should be educated on the properties of food products and how they are derived from processing, especially shelf-life extending technology. They should know that particular techniques of food preservation have specific consequences for length and conditions of storage. It is necessary to inform consumers how food is made and how to recognize the nature of changes in sensory quality to make a decision on a consumption on this basis and their acceptance of quality of expired 'best before' foods. Probably the use of pictograms or intelligent packaging would decrease consumer uncertainty about food handling. There is a need for conducting further investigation in this area.

5. ACKNOWLEDGEMENTS

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