

9. FOOD LABELLING SYSTEM—CONSUMERS’ PERSPECTIVE

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Abstract

The information placed on labels is intended to serve consumers by providing them with information about composition, nutritional quality and shelf life of food products as well as to promote waste-prevention behaviour and support sustainable food systems. Even though consumers declare interest in the information on labels, their knowledge of the composition and nutritional value of the products and understanding of this information (e.g., nutritional facts table, minimum durability date: “best before”, and “use by” date) is often insufficient. European and international health institutions and societies are now placing great emphasis on developing clear and comprehensive information to consumers about the properties of food products and their impact on health, using legislative instruments and recommendations. The aim of this chapter is to discuss the latest research showing how food labelling can support consumers in their healthy and sustainable purchasing decisions.

Keywords: consumer awareness, sustainable food choices, nutrition labelling, front-of-pack label, date labelling, food waste prevention.

JEL codes: D83, E2, F69, I12, I15, Q01, Q02.

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Introduction

A diagnosis of the current food system has revealed that the present models of food production and consumption do not support sustainable growth in terms of environmental and health concerns (Agyemang et al., 2022). From the environmental point of view, excessive use of natural resources, loss of biodiversity and climate change pose a threat to sustainability. The problem grows as the amount of wasted food increases. Production of food that is not consumed causes not only inefficient use of land, water, fertilisers, labour, energy, fuels and packaging but also generates unnecessary emission of greenhouse gases which contribute to global warming (Bunge et al., 2021). Evidence shows that the present model of food consumption affects human health. Over the last decades, unfavourable trends in food purchasing choices have been observed. The globalisation and industrialisation of the agri-food sector have strongly affected the diet composition in Western countries (Clodoveo et al., 2022). The shift towards an unbalanced diet has contributed to a growing number of people becoming overweight or obese. Increasing body mass indices (BMI) are associated with rising global incidences of chronic non-communicable diseases, especially type II diabetes, coronary heart disease and some cancers (Perdomo et al., 2023). It was estimated that in 2017 in the EU over 950,000 deaths (one out of five) and over 16 million lost healthy life years were attributable to unhealthy diets (European Commission, 2020). Considering the above facts, the transition of food consumption patterns towards sustainable and healthy diets is one of the greatest global challenges (FAO & WHO, 2019). Although it was found that diets representing the highest nutritional quality (e.g., pescatarian diet) are not those with the lowest carbon footprints such as plant-based diets, it was suggested that improvements in both diet quality and carbon footprint can be attained simultaneously in some cases (e.g., DASH or Mediterranean diets) (O'Malley et al., 2023).

Informing consumers via food labelling constitutes a valid entry point for policy intervention aiming at promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets (Carlsson et al., 2022; Potter et al., 2023). In the EU, relevant initiatives are going to be introduced, covering harmonisation of labelling on the nutritional, environmental, climate and social aspects of food products. Particular attention is paid to nutrition labelling (including the proposal for mandatory front-of-pack nutrition labelling and information about nutrient profiles) to enable consumers to make informed, conscious health choices and restrict the promotion of foods high in sugars, fats, salt and meat (European Commission, 2020). There is an ongoing discussion on the role of date marking (“best before” and “use by” dates) in shaping the food waste behaviour. Several studies have shown that the misunderstanding and misuse of the “use by” and minimum durability date (“best before”) lead to food waste (Gong et al., 2022; Kavanaugh

& Quinlan, 2020; Patra et al., 2022). According to the ongoing discussion, the extension of the list of foods for which the “best before” date would not be required, e.g. coffee, tea, pasta or rice, is considered (European Commission, 2020). The second discussed option is improving the expression and presentation of the date marking. Finally, keeping only one date related to safety issues is considered.

According to the latest studies, date labelling in some cases may promote waste behaviour, but in some others, it may favour waste-prevention behaviour. Hence, the date marking can be used as an intervention tool (Sielicka-Różyńska & Samotyja, 2023). Understanding consumer’s perception of food labelling is a prerequisite for future system improvement in order to use the potential of food labelling in promoting sustainable consumer choices and providing consumers’ health and safety (Holenweger et al., 2023; van Bussel et al., 2022). The aim of this chapter is to discuss the latest research showing how food labelling can support consumers in their healthy and sustainable purchasing decisions.

9.1. Front-of-pack nutrition labelling

The objectives of nutrition labelling policy are generally threefold: to provide interpretive information to consumers to make healthier food choices, to encourage the food industry to reformulate their products towards healthier options, and finally, to allow governments to influence public health in a non-enforcing, voluntary way (Van Kleef & Dagevos, 2015; Vandevijvere et al., 2020). Nutrition labelling informs consumers about the nutritional properties of food products through two components: a) nutrient declaration (i.e. detailed qualitative and quantitative information about the nutrient content) and b) supplementary nutrition information, which intends to assist consumers to understand the nutritional value of food products (Codex Alimentarius Commission, 2021).

Most countries require mandatory nutrition information to be displayed on food labels in the form of a nutrition facts table or panel located on the back or side of the package; however, consumers usually find it difficult to fully understand numerical information (Franco-Arellano et al., 2020). Simple graphical information has been reported to be more efficient in influencing healthfulness perception and food choice intention (Ares et al., 2018). For this reason, front-of-pack (FOP) nutrition labelling schemes have been developed to convey supplementary information through simple graphical information. FOP nutrition labels are usually well accepted by both consumers and the industry (Ares et al., 2018; Hau & Lange, 2023; Mhurchu et al., 2017). They vary in presentation including the shape, colour, size and type of public health nutrition message as well as nutrient focus (focus on positive and/or negative nutrients) (Kanter et al., 2018). FOP nutrition labelling has been implemented worldwide through government policies in a countless

The first FOP nutrition labelling systems to be implemented were health logo systems. The Keyhole logo was the first logo system introduced in 1989, mainly in the Nordic countries. The Choice logo is another positive front-of-pack logo for food and beverage products. It identifies healthier food products within a product group. Health logos are pictured health claims rather than interpretive FOP nutrition labelling (Kanter et al., 2018).

Another tagging system is the colour warning system, which is a nutrient-based scheme that highlights products which exceed the limits for nutrients associated with non-communicable diseases. The limited nutrients are calories, sugars, saturated fatty acids and sodium (Vandevijvere et al., 2020). It is presented as a graphic and lettering colour pictogram, which determines the overall nutritional value of foodstuffs.

Summary FOP nutrition labelling schemes that provide a global overview of the product nutritional quality, commonly called healthfulness, are such systems as the French Nutri-Score and the Australian Health Star Rating (HSR). The Nutri-Score classifies products into five categories of different nutritional quality, each associated with a different colour and letter: green for the highest nutritional quality (A) and red for the lowest nutritional quality (E). On the other hand, the HSR classifies products into 10 categories of nutritional quality, using the star rating exclusively, which ranges from 0.5 (least healthy) to 5 (most healthy) stars. The number of stars that are displayed is based on the nutrient profile of the food, typically incorporating both positive and negative nutrients (Franco-Arellano et al., 2020; Roodenburg, 2017). One of the best-known variants of interpretive nutrition labelling schemes is the United Kingdom multiple traffic light label scheme, in which total fat, saturated fat, sugar and sodium contents are colour coded as either high (red), medium (amber) or low (green). Colour coding is based on thresholds for nutrient amounts. Nonetheless, different representations of the labelling systems result in more or less detailed nutrition information conveyed to the consumer. In brief, a more graphic representation often results in significantly less detailed information for the consumer (Figure 9.1).

Since 2017, the Nutri-Score has been adopted for voluntary use in several European countries. Recently (since 2020) it has also been recommended in Poland, but it is not obligatory for all producers yet (Panczyk et al., 2023). The Nutri-Score classification is based on nutritional content and relies on the nutrient profiling system (NPS) of the British Food Standards Agency (FSA) to judge healthfulness (Hau & Lange, 2023). In this system, a food item receives positive and negative points based on its contents per 100 grams for solid food items or 100 millilitres for beverages. The value of the item is judged by its composition based on a limited number of nutrients and its energy density. There are several factors that the Nutri-Score ignores such as vitamins, caffeine, meat content, antibiotics, pesticides, artificial sweeteners, alcohol and preservatives. Examples of controversial

Nutri-Score ranks for various food items are described in detail, among others, by Roodenburg (2017). The author indicates that the composition of different foods differs and, for this reason, different foods need different sets of criteria to enhance improvement of healthfulness judgement. Panczyk et al. (2023) conducted a Poland-wide expert opinion study and expressed concerns about the Nutri-Score's ability to account for a product's degree of processing and full nutritional value. The authors concluded that Poland's current labelling system needs expansion, but the Nutri-Score requires significant changes and validation against national guidelines and expert expectations before implementation (Panczyk et al., 2023).

Front-of-pack nutrition labelling is voluntary and cannot be used instead of a nutrition declaration. Although there is general agreement on the need to provide simple and readable nutrition information to enable consumers to make more informed purchase decisions, consensus on which interpretational elements are the most appropriate to encourage consumers is still under investigation (Ares et al., 2018).

9.2. Influence of front-of-pack labelling on consumers' perceptions of product healthfulness and purchase intentions

FOP labelling applied parallel to nutrition labelling is the solution to make the health choice an easy one (Roodenburg, 2017). FOP labels are generally considered as more efficient tools for increasing consumers' awareness of the nutritional quality of food products. It has been shown that labels on the front of the package receive more attention than labels on the back of the package (Becker et al., 2015; Bialkova & van Trijp, 2010). Moreover, pictorial elements on a package are recognised better than words, particularly by low-literate consumers (Sielicka-Różyńska et al., 2021; Van Kleef & Dagevos, 2015). The effectiveness of the FOP nutrition labelling schemes is determined by their ability to encourage more healthy dietary patterns. First, the FOP nutrition labelling schemes need to catch consumers' attention (Grunert & Wills, 2007). Bialkova and Van Trijp (2010) indicated that the display size, colour scheme, familiarity with the label and its location on the front of the packaging are key determinants of consumers' attention to nutrition labels. Farther, FOP labels should facilitate understanding of the nutritional value of food and speed up the evaluation of the product (Jones et al., 2019). Consumers express a preference for simple and easy to understand labels (Van Kleef & Dagevos, 2015).

Numerous studies assessing the impact of nutrition labelling on consumers are available. The effect size found in these studies is largely dependent on the study

design. The adolescents' perception of monochrome Guideline Daily Amounts (GDA) in comparison with the multiple traffic light GDA was studied by Babio et al. (2013). It was observed that when participants had a choice between classic products (not signed as "light") and those marked with different GDA systems, they chose products with significantly less total energy, sugar, saturated fat and salt pictured by the multiple-traffic-light GDA system than when they used the monochrome GDA system. The front-of-pack multiple-traffic-light system helped adolescents to differentiate between healthier and less healthy food. Franco-Arellano et al. (2020) examined the influence of different FOP labelling symbols (warning labels, health star rating and traffic light labelling) and nutrition claims (nutrient content claims) and health claims (disease risk reduction claims) on consumers' perceptions of product healthfulness and purchase intentions of healthier and less healthy drinks, when presented together on a label.

The authors demonstrated that the FOP labelling had a significantly stronger influence than the nutrition claims. In the case of less healthy products, the three different FOP labelling systems reduced consumers' perception of product healthfulness and purchase intentions, whereas in the case of healthier products, health star rating and traffic light labelling created a "halo" effect (tendency for positive impressions based on an idea or suggestion, not real data). On the other hand, such effects were not observed with warning labels, both in terms of consumers' perception of healthfulness and their purchase intentions (Franco-Arellano et al., 2020). The results were in agreement with a study by Lawrence et al. (2018) demonstrating the positive orientation of the Health Star Rating system for all food products with a star-based system. The authors also explained the benefit as a possible "halo" effect.

In a recent study, Pettigrew et al. (2023) investigated the relative ability of five different interpretive front-of-pack food labels to alert consumers to both healthier and unhealthier options. The authors concluded that the Nutri-Score performed best in assisting respondents with identifying the healthiest and least healthy options, followed by the health star and multiple traffic lights systems. The results indicated that the spectrum of FOP labels has utility in steering consumers away from unhealthier options and guiding them towards the healthier ones.

Ares et al. (2018) compared three interpretative schemes (Nutri-Score, Health Star Rating and nutritional warnings) in terms of their attentional capture, processing time, influence on perceived healthfulness and purchase intentions of products with different nutritional profiles. The attention to FOP labels and processing time were evaluated using a visual search task in which participants were presented with food packages. The Health Star Rating was found to perform worse than the other two schemes in terms of capturing attention and altering perceived healthfulness and purchase intentions. The authors pointed out that the Nutri-Score, which uses the traffic-light-colour system, may have contributed to capturing consumers' attention better than the other two schemes (Ares et al., 2018).

Angelino et al. (2019) evaluated the nutritional quality of breakfast cereals based on their nutritional values as declared on the labels. The results support the importance of nutritional education towards a better understanding of food labels as a key point to help the consumer in making healthy food choices.

Evidence suggests that healthier foods tend to be more sustainable (Potter et al., 2023). Studies using an environmental label identical in format to the Nutri-Score label have suggested that including both nutrition and environmental labels improved the nutritional but not the environmental outcomes compared to unlabelled conditions (De Bauw et al., 2021).

The controversies of the consumers' perspective on FOP labelling were discussed by Van Kleef & Dagevos (2015). The authors noted that FOP labelling is frequently advocated for changing unhealthy food habits; however, little empirical and consistent evidence exists to support this argument. Traditional consumer research approaches, based on self-reporting, are valuable but limited as consumers tend to give socially desirable answers. A more realistic understanding could be obtained by field experiments with actual food choices or search behaviours as key dependent variables to study how real-life shopping behaviour interacts with various environmental cues as well as personality characteristics (Van Kleef & Dagevos, 2015). There is a further need for more research studying consumers' use of nutritional information on food labels in a real-world setting.

9.3. Date labelling

Expiry dates are often considered as one of the most important elements of the label (Djekic & Smigic, 2016; Zielińska et al., 2020). The majority of consumers claim to check them, but some of them admit to have problems with finding the date on the packaging or consider date labels as unreadable (Samotyja, 2021), despite the fact that the labelling guidelines state that obligatory information shall not be hidden, obscured, detracted or interrupted by any other written or pictorial matter or any material. Unfortunately, still many consumers present low level of knowledge concerning the types of date labelling, which, in turn, increases the amount of food wasted. Moreover, they cannot correctly indicate which date type is typical for certain food products (D'Amato et al., 2023). A survey conducted in Poland has shown that almost half of the respondents do not see a difference between the phrases “use by” and “best before”, and one in five respondents says that they have difficulty commenting on the issue (Zielińska et al., 2020). In the study led by Shamim et al. (2022) it was found that the “best before” date was the least understood one, as around 45% of Indian respondents either perceived its meaning wrongly as a “safety indicator” or were “not sure”. Similarly, in the study by Zielińska et al. (2020), almost 40% of respondents indicated that the date

of minimum durability (“best before”) means the date after which the product becomes unsafe for the consumer (e.g., may cause poisoning), while only 9.8% consider that date as the date after which the product can be consumed.

According to Regulation (EU) No 1169/2011, the “date of minimum durability of a food” means the date until which the food retains its specific properties when properly stored. The correct interpretation assumes that food can be consumed past this date, although its quality may not be optimal. Laboratory tests of milk, pasta, mayonnaise and jam confirmed the microbiological safety of the products even six months after the “best before” date (Zielińska et al., 2020). In the case of foods which, from a microbiological point of view, are highly perishable and are therefore likely after a short period to constitute an immediate danger to human health, the date of minimum durability shall be replaced by the “use by” date (Regulation 1169/2011).

Many studies show that consumers find food products that exceed their “best before” dates as unsuitable for consumption (Neff et al., 2019; Samotyja & Sielicka-Różyńska, 2021; Shamim et al., 2022; Zielińska et al., 2020). Only a low percentage of consumers admit that they consume expired durable products. In the work of Samotyja and Sielicka-Różyńska (2021), 41% of participants rejected the “best before” labelled samples of rice, canned fruits, UHT milk, ready-to-eat sterilised soup one day passed the expiry date. McCarthy and Liu (2017) noticed inconsistency between attitudes and behaviours, as green consumers, including those who value organic food and vegetarianism, waste quite a lot of edible food. Quested and Luzecka (2014) found that households with children are more likely to throw food out past the date on its label and suggest that food safety could be the reason. However, in the study of Marklinder and Eriksson (2015), consumers kept refrigerated expired “best before” products, and only a small percentage of them assessed the products as being inedible.

Furthermore, the number of days left to the “best-before” date has a significant effect on stated edibility (Li et al., 2021; Marklinder & Eriksson, 2015; Samotyja and Sielicka-Różyńska, 2021; Sielicka-Różyńska & Samotyja, 2023). Consumers seem to reject samples even before the expiry day triggered by quality concerns or safety doubts (Ankiel & Samotyja, 2020). Passing the expiry date increases the level of rejection. Knowing that the sample has expired causes a decrease in the perceived attractiveness of the product and, in turn, determines negative expected liking. It was found that if consumer’s perception of the food’s attributes is impacted by expectations based on the “best before” date, the expired food is perceived to be of poor quality, even though it is not, and it might thus be discarded only for that reason (Sielicka-Różyńska & Samotyja, 2023). According to earlier findings, the presence of competing goals may also have an impact on the consumer’s decision whether to consume or reject the food product. Food-handling practices might be influenced by motivational factors related to goals such as ensuring food safety.

In certain situations, these goals may conflict with the goal of reducing food waste, e.g., when consumers are faced with a decision whether to eat or throw away foods they are unsure of as to their edibility (van Geffen et al., 2020).

The decision whether or not to eat or discard a particular food item is greatly influenced by the food product category. In the study of Shamim et al. (2022), curd, pasteurised milk, bread and canned foods were the most frequently thrown away products. Slightly over 70% of the Polish respondents, who knew that the food could be safely consumed after passing the “best before” date, would discard the expired UHT milk, while canned fruit would be thrown away by 44% of the participants surveyed (Samotyja, 2022).

All the above-mentioned factors influence the decision concerning nearly or already expired “best before” products, and in turn impact the level of food waste (Figure 9.2).

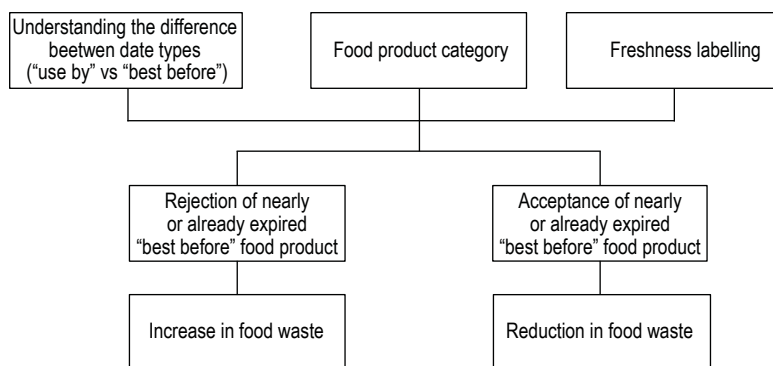


Figure 9.2. Date labelling factors influencing the decision concerning nearly or already expired “best before” food products

Source: own compilation.

9.4. Should the “best before” date go to the dustbin?

It has been proved that applicable legal regulations regarding date labelling are one of the factors affecting food waste during food turnover and in households. A European Commission study on date marking concluded that up to 10% of all food waste generated in the EU could be linked to date marking (European Commission, 2018). The main consequence of the present regulations is the need to withdraw from sale expired “use by” labelled foods, which is obviously justified (Regulation (EU) No 1169/2011). More controversy has arisen around the dates of minimum durability. Although the latest European regulation allows food business operators (FBOs) to redistribute expired “best before” food products, provided they are safe and properly handled (Commission Regulation (EU) 2021/382), in some

countries they are not normally sold and are withdrawn from the shop shelves on the basis of local regulations. This not only promotes food waste but also misleads the consumer about safe consumption and the meaning of the “best before” date. Another controversial issue is whether the date was assigned in a reliable manner based on the results of scientific research, and it was not excessively limited and shortened to make products appear fresher (Eriksson et al., 2020). There is evidence that similar food products may have completely different expiration dates in different countries according to the retailer’s requirements or manufacturer’s choice or perception (Eriksson et al., 2020). This situation proves that manufacturers use subjective criteria, and in certain situations the assigned date may be longer. The use of the methodological approach at the stage of date establishing as well as considering the consumers’ criteria and perception of food quality is an important factor affecting the level of food waste (Samotyja, 2016).

Opponents of giving up dates put forward an argument that the removal of the “best before” date from products might simply shift the responsibility for food waste from the retail to the household level. In Great Britain, where food can legally be sold after passing of the minimum durability date, some producers tend to shift from the “best before” date to the “use by” date in order to avoid a situation when a product of unsatisfactory quality falls into the hands of consumers as a result of being on the market for too long (FSA/DEFRA, 2011). The study by Sielicka-Różyńska and Samotyja (2023) exhibited that date labels may have an opposite contribution to consumers’ apprehension of foods. On the one hand, they play a role in rejecting expired food by consumers, leading to an unfounded belief that the food’s sensory attributes have been altered. On the other hand, it has been proved that “best before” dates maintain a consumer’s positive attitude towards fresh products and reduce consumer uncertainty regarding food edibility, which would be experienced in the absence of date labels. In the light of this data, the resignation from the “best before” date does not seem to be a rational solution. In fact, more effort should be put in designing a new solution that will overcome consumers’ lack of attention as well as in effective communication (D’Amato et al., 2023; Turvey et al., 2021). Consumers should also be educated in order to be able to recognise the sensory changes related to quality deterioration of safe products. Campaigns to familiarise customers with suboptimal food products should also be conducted. Suboptimal foods (SFs) encompass foods with the highest unfavourable sustainability-related impact that causes the largest amount of food waste. According to Aschemann-Witzel et al. (2015), SFs are food products with an abnormal appearance or other deviating product attributes (e.g., texture and smell) as well as products that are close to or have passed their expiration dates but are still unreservedly consumable. Retailers often discount these products to reduce in-store wastage, but research shows that proper, customised information to different consumers (focusing on savings or ethical reasons) might be more effective.

Conclusions

Globally, lack of education, ignorance and literacy result in poor and unsustainable treatment of food by consumers. Legal institutions such as the World Health Organization (WHO) and European Commission, together with scientists, try to define the principles of effective food policy actions in order to make smart food policies which would strategically target food preference formation, expression and reassessment in the broader context of environments and systems (Hawkes et al., 2015). Therefore, smart policies extend beyond making healthy choices the easy ones, aiming to make healthy choices the preferred ones. One of the elements of smart food policy is recommending the implementation of the front-of-pack (FOP) information and expiry dates to educate and guide consumers towards healthier and more sustainable food choices, as part of comprehensive strategies to prevent diet-related noncommunicable diseases and food waste. Nowadays, there are a few labelling systems around the world dedicated to give consumers specific information based on: endorsement logos (pictograms informing about the overall healthfulness of the product), nutrient specific warning labels (informing about the negative or positive influence of selected nutritional compounds), as well as interpretive nutrition rating systems (colour- or star-rating guides providing nutritional information about the product). It is a fact that different representations of the labelling systems result in more or less detailed nutrition information conveyed to the consumer. A more graphic representation often results in significantly less detailed information for the consumer. That is why one of the principles of effective food policy is educating consumers how to read the information on the packaging of the product (nutritional values, expiry dates—“use by” and “best before”) on order to support healthier and more sustainable choices. Front-of-package labelling could be one of the measures to achieve the consumers' goal to make healthy and easy food choices. It is not (and cannot be) the only solution to prevent unsustainable treatment of food and the epidemic of diet-related noncommunicable diseases. However, FOP labelling can be part of a food policy intervention.

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