

## HEALTH-PROMOTING FOOD LABELLING – BENEFITS AND DRAWBACKS

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**Abstract:** This work systematizes the knowledge on several food labelling systems, namely the Nutri-Score, the NutrInform, and the Mediterranean Index (Med Index). The Nutri-Score system assesses nutritional value of a product per 100 g or 100 ml with no consideration of usually consumed serving as well as vitamins, minerals, and bioactive compounds. The concept of NutrInform does not label food products as ‘good’ or ‘bad’. Instead, it indicates energy content in a serving (50 or 100 g) and contents of individual nutrients in a serving along with the percentage of their reference values of recommended daily intake. Thus, the NutrInform label placed on a product by a manufacturer participating in the system presents information in the following order: energy content in calories, contents of fatty acids, saturated fatty acids, sugars, and salt (everything expressed in grams). The Med Index covers three pillars of sustainability, taking into account nutritional, environmental, and social aspects. This labelling system assesses 27 criteria (9 for each pillar), the presence or absence of which is immediately visible to the consumer by a different colour of a label on the front of the pack (where blue reflects to the best score). A single graphic symbol allows consumers to simultaneously analyse various properties of the product and/or its production process in a few seconds. It forms a useful tool for comparing food products belonging to the same category and a useful system for ending the information asymmetry that characterizes the market of many food products. In our opinion, the concept of the Med Index would be the most useful considering health-promoting labelling of food products in Poland.

**Keywords:** food labelling management, Nutri-Score, NutrInform, Mediterranean index

### 1. INTRODUCTION

Human health is influenced by many factors. However, a healthy diet, i.e. consumption of sufficient amounts of foods positively influencing human health, including fruit and vegetables, and reduction of undesirable food products, e.g. sweets or fast foods, is one of the crucial ones. Experts in nutrition form recommendations on proper nutrition based on scientific data that are supposed to help consumers in buying healthy foods. Knowledge on how to properly label food products is crucial for all of the manufacturers of food industry. Rules on food labelling has been set in many national legal acts and acts

of the European Union. In order to simplify and standardize regulations on that matter in the entire EU, the European Commission proposed new solutions that would precisely regulate the appearance of food labels as well as their content. Labels of the majority of food products are legally required to include information on nutritional values of products, including energy content, content of fat, saturated fatty acids, carbohydrates, sugars, proteins, and salt. During shopping, consumers should be able to read and understand the information placed on food labels. Most of these information are placed at the back of the packaging, however, more and more often front labels contain the so-called repeated nutrition facts (the front-of-pack nutrition labelling – FOPNL). This can have different forms, i.e. it can directly repeat the nutrition facts placed at the back of the packaging; it can also be expressed using colours or symbols. The European Commission is currently working on establishing one such food labelling system that would be common for all the member states of the European Union. The labels cannot mislead buyers regarding qualities, action and/or properties of food products. This requirement also applies to advertisements and presentation of products, positioning them and setting in which they are presented (Regulation of the European Parliament and of the Council, 2011; European Commission Communication, 2020). Due to the above, many health-promoting food labelling systems have emerged, among which the Nutri-Score is the most commonly implemented system in the European Union (Hercberg et al., 2022). This labelling system is currently voluntary and it is used in some EU member states, such as France (Julia et al., 2018), Belgium (Vandevijvere, 2020), and Spain (Rodríguez Artalejo and García Solano, 2022). However, due to the method used to calculate the Nutri-Score algorithm, implementation of this system to common use raises serious reservations in some EU countries, including Poland (Temple, 2019; Panczyk et al., 2023).

**This paper aim** was to analyse benefits and drawbacks of common health-promoting front-of-pack labelling systems of food products, i.e. the Nutri-Score, the Mediterranean Index, and the NutrInform ‘battery’.

## 2. METHODOLOGY

This scientific paper analyzed available literature on the use of the labeling system known in Europe as the Nutri-Score. The qualitative analysis presented in the paper covered normative documents of the European Commission, scientific papers indexed in the Scopus, the WoS, and the Google Scholar databases.

## 3. RESULTS AND DISCUSSION

**Nutri-Score (5-Colour Nutrition Label, 5-CNL)** – the 5-Colour Nutrition Label comprising an attempt to simplify the system of assessing general nutritional value of a food product. The system was developed by French scientists from the Nutritional Epidemiology Research Team (L’Equipe de Recherche en Epidémiologie Nutritionnelle – EREN) under the direction of Serge Hercberg (Hercberg et al., 2018). The Nutri-Score labelling, although using different methodology, is based on similar assumptions to the Keyhole labelling system that is used in Norway, Sweden, Denmark, and Iceland as well as in Lativa (Bryngelsson et al., 2022) and the ‘healthy option’ used since 2016 in the Netherlands (Global Retail Brands, 2017). Currently, we have several available front-of-pack labelling options informing consumers on item’s nutritional value (Lorenzoni et al., 2021; Clodoveo et al., 2022; Hercberg et al., 2022) and the ongoing debate concerns the

selection of the most beneficial system that would be mandatory in all of the EU member states (Storcksdieck et al., 2020).

Nutri-Score uses the scale similar to the school grading scale in order to indicate which products are healthy, and which are less beneficial health-wise. The scale starts with dark green 'A', and ends with disturbingly red 'E'. In France, the system is additionally supported by a mobile app that can be downloaded from Google Play free of charge. Calculations of the Nutri-Score take into consideration components of the product – whether they have positive or negative influence on human body. These are based on the current state of knowledge. Among others, contents of sugar, saturated fatty acids, salt, and energy are highly significant. Contents of dietary fibre, proteins, fruit and vegetables are considered beneficial.

Although the idea behind the Nutri-Score seems legitimate, a group of opponents accuse it of simplifying reality too much. Besides a narrow scale based only on random factors, it is usually emphasized that it does not meet the needs of different groups of consumers (e.g. elderly, children, pregnant women). This can be a factor enabling to question the accuracy of a rank given to a product. Currently, some improvements are implemented to the system, i.e. the Nutri-Score 2.0 (Scientific Committee of the Nutri-Score, 2022). Nutri-Score 2.0 assigns a rank to a product according to an algorithm, ranks range from the letter 'A' (dark green – good) to the letter 'F' (dark red – bad). In practice, improvements included recognition of healthfulness of products depending on contents of salt and sugar. In addition, different quality of carbohydrates was taken into account, especially those occurring in processed and unprocessed foods. Corrections also concern fats (great deal of criticism has been voiced in that matter). Differentiation between sweetened and unsweetened dairy products has been improved as well. According to scientific reports, the Nutri-Score has the most positive impact on dietary choices (Julia et al., 2017). Unfortunately, so far in France the system has been adapted only by a small number of manufacturers what limits its real impact on the dietary choices. There is a high number of scientific reports on the effectiveness of the Nutri-Score system. Among other issues, researchers have been analysing if it can reduce the perception of products containing high amounts of sugar as 'healthy'. The paper published in 2022 in PLOS ONE (Jürkenbeck et al., 2022) confirmed that this mechanism is effective. It can be an alternative to other tools, such as the 'sugar tax' or public awareness campaigns. Other study on cardiovascular patients (Egnell, 2022) showed that adding the label helped them to choose products containing less energy and saturated fatty acids. Thus, in this study, the Nutri-Score label influenced consumers' behaviour.

**The NutriInform (battery) system** started to be implemented in Italy in 2018. The process of its implementation started with an online survey conducted on 1500 consumers. Next, in 2019 the Italian Council for Agricultural Research and Economics in agreement with the Italian National Health Institute conducted a panel discussion including 300 consumers divided into 3 groups in order to fill in a questionnaire concerning the level of knowledge on nutrition. The study showed that consumers were looking for a food labelling system that would inform and educate them at the same time, and not only showing a classification in a form characteristic for the French labels (DeAndreis, 2020).

In 2020, the European Commission authorised the 'battery' as the system of labelling food products in the European Union, acknowledging its compliance with the Regulation (EC) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on labelling food products. This way the system implemented in Italy became an official

harmonisation proposal of this country for the entire territory of the Community. In the current legislative and regulatory context, the whole regulation is voluntary in those EU member states that agreed to implement it – similarly to the Nutri-Score.

The idea of the 'battery' is based on the reference values of the recommended daily intake of individual nutrients. Now, in EU member states the reference values of the daily intake are basically a subject of harmonisation and are initially established by the European Food Safety Authority (EFSA) based on the previously mentioned Regulation (EC) No 1169/2011 of the European Parliament and of the Council of 25 October 2011. The member states may introduce more specific regulations concerning the reference values of the daily intake, e.g. for specific age groups, but they have to comply with the EU regulations. In Poland, the standard reference values for daily intake are set by the Polish Food and Nutrition Institute. Labelling a product with information on the relations of the nutrient contents and their reference values of the daily intake is voluntary here, except for the information on vitamins and minerals that has to be expressed also as a percentage of their recommended daily intake set in the Annex XIII, part A, point of the Regulation No 1169/2011.

In contrast to the Nutri-Score, the 'battery' does not rank individual food products, but it only informs the consumer on how the products covers their recommended daily intake of individual nutrients. The issue of the reference values of the daily intake can be considered arbitrary because the needs of every person are slightly different, depending on their gender, age, body mass, etc. That is why the NutrInform system has to be considered far from ideal because each person has to shape their diet plan individually, depending on their own conditions. In order to shape proper eating habits in a society, nutrition education at schools and outside of schools is necessary. This will increase consumers' awareness and knowledge on the consumed foods.

Nevertheless, issuing some kind of a 'certificate of healthiness' based on an algorithm developed by the French Public Health Agency (Sante Publique France) in the case of the 5-Colour Food Label seems even more arbitrary. It has to be noticed though that the Nutri-Score rank takes the product out of the context of an entire nutrition what makes this label a narrower and more limited system in comparison to the NutrInform model.

Aside from Italy, the coalition of countries preferring the 'battery' includes now the Czech Republic, Cyprus, Greece, Latvia, Romania, and Hungary (N. Foote, 2020). Among these countries it is possible to find other representatives of the Mediterranean diet but also countries from the Central Europe. This shows that the NutrInform system does not discriminate any diet and can be helpful for consumers regarding different types and kinds of food products. The Nutri-Score system has been already implemented in France and Germany despite protests of local farmers that object to any form of labelling food products using colours. This is a result of a justified concern that many products from their farms may be labelled with a negative Nutri-Score rank.

European Parliament representatives of the mentioned countries, except for Latvia, have signed an open letter to the European Commission. In their opinion, a food labelling system should be harmonised, but not discriminative, with the goal of improving consumers' situation. The signees claim that the Nutri-Score model is endorsed by large international food companies expecting their products to receive positive Nutri-Score ranks which would increase their sale levels and profits. The NutrInform system proposed by the members of the European Parliament is based on the recommended daily intake and not on the threshold of 100 g / 100 ml what is not beneficial for the manufacturers of

foods consumed in small amounts, such as olive oil. Moreover, the Protected Designation of Origin products and one-ingredient products should be excluded from the food labelling system (Fortuna, 2020).

Authors of the concept of the **Mediterranean Index – Med Index** (Clodoveo et al., 2022) designed this label as a holistic FOP label based on an assessment (presence or lack) of 27 well-defined measurable criteria (9 for each of the 3 pillars: nutritional, environmental, and social) depending on the availability of mandatory and/or facultative certificates held by manufacturers that are listed on the back of the package (e.g. blockchain, limited certification, renewable energy certification, ethical certification, health declarations etc.). The idea is that the value of the index resulting from the control list of the 27 assessed criteria has to be immediately visible for consumers thanks to FOP labels in different colours (with blue indicating the most beneficial index value). The aim is not to generate more work and complications for manufacturers that desire to use the new index, but to provide them with approved control list. That is why the Med Index does not replace, but “aggregates” and “summarises” a number of information that are often partial and not immediately visible to consumers in order to enable conscious, fast, and efficient selection of food products that would meet specific needs of different consumers that can be simply individuals interested in nutritional aspects of foodstuffs or individuals interested in information concerning all of the aspects of sustainable development.

Advantages of the Mediterranean diet include the fact that it involves sustainable model of production and consumption from the environmental and social point of view and that it is possible to adjust it to different geographical, socio-economical, and cultural contexts (Barros and Delgado, 2022). Health, longevity and welfare of individuals as well as condition of natural resources, socio-economical condition, cultural development, and social stability are also dependant on food production (Clodoveo et al., 2022). Ruini et al. (2015) reported a presence of a relationship between the efficiency of the Mediterranean diet and the development of the ‘environmental pyramid’ model. This analysis was developed based on the assessment of the influence of foods on natural environment and its elements were a part of the Mediterranean diet food pyramid. Values of relevant ecological footprint (i.e. ecologically productive area necessary to generate resources used for manufacturing) had been associated with foods. Similar results were obtained with the assessment based on the carbon footprint of foods (amount of the greenhouse gases emitted to the atmosphere). The obtained results, starting from the study on the international scientific literature, comprise an inverted pyramid, with foods with the biggest impact on the environment placed at the top of the pyramid and the ones with the lowest impact – at its bottom. Placing the two pyramids (the so-called Mediterranean and environmental pyramid) next to each other enables to favour the sustainable and healthy diet models and to encourage consumers to develop healthy nutritional habits and respect the planet, and lower the impact of the selection of foodstuffs negatively influencing the environment and climate changes. It is possible to notice that consumption of foods that are recommended in high amounts (fruit and vegetables) in the Mediterranean diet in general has the smallest influence on the environment. In contrast, foods that are recommended in the lowest amounts (meat) has the biggest influence on the environment. Med Index is based on scientific evidence indicating that the Mediterranean diet is a sustainable and efficient nutrition model, as mentioned previously. The aim of the Med Index is to lead the consumer towards choosing healthy foods that increase longevity and the quality of life through cutting the expenditure on health and following the

Mediterranean diet. Inspired by the need of reversing the foregoing trend in consumption, the new FOP labelling system – the Med Index, according to its authors (Clodoveo et al., 2022), enables better adjustment to the “farm to fork” strategy of the European Commission and to combine all the elements of sustainable development. The Med Index is a fast and immediate system of recognition of healthy foodstuffs and products, persuading the manufacturers to make better and more sustainable products. The Mediterranean diet is a lifestyle model rooted in tradition and it evolves dynamically, adjusting its rules to global changes. As a sustainable nutrition model, the Mediterranean diet has to integrate into inductive models that lower the impact on the environment also through assumption of an approach based on a circular economy. Shifting to the circular economy model not only creates new jobs, but also discovers benefits within the environmentally sustainable development resulting from more conscious and responsible utilisation of primary resources. However, shifting from the linear model to the circular one (Niero and Rivera, 2018) requires specific norms and certification of this process. The first standard regulating circular economy model to which businesses can refer is the BS 8001 and it was established in 2017 in Great Britain thanks to the British Standards Institution (BSI). The BS 8001 standard helps businesses to integrate the rule of the three Rs (reduction, reuse, recycle) of the circular economy into their business model.

#### **4. CONCLUSION**

Analysis of the information presented above allows to conclude that Nutri-Score is in fact a ranking system based on assigning a rank from A (the best – green) to E (the worst – red) to certain product or category of products. High contents of energy, saturated fatty acids, sugars and salt per 100 g or 100 ml of a product has negative influence on the rank. Whereas, contents of fruit and vegetables, legumes, nuts, rapeseed, walnuts, olive oil, fibre, and proteins impact the rank positively. Thus, in accordance with the developers of the 5-Colour Food Label the following are detrimental to human health: saturated fatty acids, sugars, and salt. While the following are beneficial for human health: proteins, dietary fibre, unsaturated fatty acids, vitamins and microelements, and content of fruit, vegetables and nuts. Content of undesirable components in a product results in assigning positive points, and of the desirable foods means assigning negative points. Then, the positive and negative points are summarised. The lower the number of points the better rank receives the product.

The classification described above comprises a simplification of many issues related to nutrition because dividing products into ‘good’ and ‘bad’ is only a general indication in relation to their beneficial or detrimental influence on the human health. In other words, saturated fatty acids, sugars, and salt hurt human health but only when consumed in excess. Consumption of proteins, dietary fibre, unsaturated fatty acids, and vitamins and microelements, is, obviously, more desirable than consumption of components previously listed. However, excessive consumption of these beneficial components can be also harmful, what was confirmed by scientific reports (Vasconcelos QDJS, Bachur TPR, Aragão GF, 2021). For instance, excessive consumption of fibre can lead to malnutrition and deficiencies, while excessive amounts of proteins can lead to nephrolithiasis. That is why assigning colour-coded labels to products according to their ranks, actually, defeats the purpose – a rank should be assigned only to an entire diet plan depending on how balanced and varied it is.

When comparing both systems, one needs to acknowledge that the main drawback of the Nutri-Score model is the fact that it strikes mainly manufacturers of the animal-based food products. Polish manufacturers are against implementation of the front-of-pack labels as well as defining nutrition profiles without in-depth analysis, expert evaluation, and holistic approach to all of the lifestyle elements influencing non-communicable diseases, including obesity. Introduction of additional front-of-pack label with nutritional values represented with colours (e.g. Nutri-Score) will only serve as a tool of competition between products and manufacturers, but it will not bring any real and beneficial educational elements for consumers that would improve their diet plans and nutrition. No next and additional label or marking is able to replace proper education of consumers regarding holistic approach to nutrition and lifestyle and understanding by them the benefits of consumption of products of high quality and nutrition value, low-processed, natural or with high content of a natural component. Moreover, the assessment systems mainly based only on selected components, e.g. sugar, fat, salt, will lead to depreciation of natural, low-processed and one-ingredient products that are frequently promoted within EU programmes involving local and regional products and products with the protected geographical indications (European Parliament Communication, 2020).

By contrast to other models, the Med Index does not employ an algorithm but simple YES or NO answers or a mechanism of detecting the presence of the 27 determined criteria which is verified thanks to the access to obligatory and voluntary certificates held by the manufacturers (Clodoveo et al., 2022). A singular graphical symbol requires only a few seconds to simultaneously analyse different properties of the product and/or the process of its production and is a useful tool to compare different food products of the same category and a useful system ending the information asymmetry that is characteristic for the market of many food products.

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