

Report of the Scientific Committee of the Spanish Agency for Food Safety and Nutrition (AESAN) on the review and update of Dietary Recommendations for the Spanish population

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Working group

José Alfredo Martínez Hernández (Coordinator), Montaña Cámara Hurtado (Coordinator), Rosa María Giner Pons, Elena González Fandos, Esther López García, Jordi Mañes Vinuesa, María del Puy Portillo Baquedano, Magdalena Rafecas Martínez, Enrique Gutiérrez González (AESAN), Marta García Solano (AESAN) and Laura Domínguez Díaz (External contributor)

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Technical Secretary Vicente Calderón Pascual	External contributor: Laura Domínguez Díaz Universidad Complutense de Madrid		

Abstract

Until now, the established dietary patterns have not demonstrated to achieve the goal of maintaining good health in the general population. In addition to the human health, the current dietary models, called “Sustainable Healthy Diets”, take into account the concept of sustainability in all its aspects. With this goal in mind the World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO) encourage the development of national food-based dietary recommendations within the specific context of the Sustainable Healthy Diets, taking into account the social, cultural, economic, ecological and environmental circumstances of each country. The objective of the present report is to establish food-based dietary recommendations for the Spanish population in accordance with the best available scientific evidence and supported by the FBDG (Food Based Dietary Guidelines) models that encompass both health and sustainability concepts

and serve as a basis for the elaboration of dietary guidelines. For this purpose, different national and international food-based dietary guidelines were reviewed, so they might be compared and adapted to the Spanish model. The AESAN Scientific Committee recommends the adoption of a healthy and sustainable diet characterized by the predominance of plant-based food and a moderate consumption of animal products. Specifically, it is recommended to consume 2-4 servings/day of vegetables (raw and cooked), 3-5 servings/day of fruit (occasionally replaced by juice), 4-6 servings/day of cereals (preferably whole grains), 2-4 servings/week of legumes, 2-4 servings/day of milk and dairy products, 2-4 servings/week of meat (preferably chicken or rabbit and no more than 2 servings/week of red meat), at least 2 servings/week of fish (1-2 servings/week of oily fish), and 2-4 eggs/week. In all cases, the consumption of seasonal and local produce must be promoted.

In addition, the daily consumption of water (1.5-2.5 liters) and virgin olive oil (preferably raw), as well as the weekly consumption of nuts without added salt are recommended. The caloric intake must be balanced with the caloric expenditure. Fats must not exceed 30 % of the total caloric intake, and the presence of saturated fats must be controlled. The consumption of free sugars must be less than 10 % of the total caloric intake and the consumption of salt below 5 grams per day (equivalent to less than 2 g of sodium/day). Food products with added sugars and salt must be avoided as much as possible. Finally, food waste must be reduced as an additional measure for preserving our planet and in order to contribute to a more sustainable environment for future generations.

Key words

Dietary recommendations, food guides, healthy diet, sustainable diet.

Suggested citation

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1. Introducción

A healthy diet must provide suitable quantities of nutrients through the consumption of different food items. Proteins, carbohydrates, fats, vitamins, minerals and water are nutrients with different energy, visible and/or regulatory functions, and their consumption must cover the requirements of the human body. Therefore, it is essential to adopt and follow a balanced and varied diet in order to maintain the health and well-being of individuals as well as to prevent disease.

Since their origins, the World Health Organisation (WHO) and the Food and Agriculture Organisation of the United Nations (FAO) have, from the very beginning, defined a healthy diet as “one which promotes growth and development, and prevents malnutrition”. Within the current scope of global nutrition policy, the term “malnutrition” no longer refers solely to undernutrition (emaciation, stunted growth, underweight, vitamin or mineral deficiencies) but it also includes obesity and dietary factors that increase the risk of noncommunicable diseases (cardiovascular disease, stroke, diabetes, certain types of cancer, etc.) as one of the main causes of disability and deaths worldwide. Obesity and undernourishment may co-exist within the same community and family (WHO, 1998) (FAO/WHO, 2019).

In this regard, the WHO (2018) considers unhealthy diets and lack of physical activity to be among the leading health risk factors, while a healthy diet provides protection against all forms of malnutrition as well as noncommunicable diseases, including diabetes, cardiovascular diseases, stroke and cancer. It makes the following recommendations:

- Healthy food habits begin in the early years of life. Therefore, breastfeeding promotes healthy growth and improves cognitive development. It also provides long-term benefits such as reducing the risk of obesity and noncommunicable diseases in later stages of life.
- Caloric intake must be balanced with caloric expenditure. In order to avoid an unhealthy increase in weight, fats must not exceed 30 % of the total caloric intake, and their quality must be taken into account.
- The consumption of free sugars must be less than 10 % of the total caloric intake in a healthy diet. For greater benefits, it is recommended to reduce sugar consumption to at least 5 % of the total caloric intake.
- Salt consumption must be less than 5 grams per day (equivalent to 2 g of sodium per day) to help prevent hypertension and reduce the risk of cardiovascular disease and stroke in adults.

These general recommendations must be adapted to the specific conditions of the population in each country.

Additionally, the current food system faces the challenge of covering the needs of all human beings on the planet. Until now, established dietary patterns have not been able to demonstrably achieve the goal of maintaining good health in the general population. It has also been demonstrated that they lead to environmental degradation (changes in soil composition and nature, deforestation and biodiversity loss) and the depletion of natural resources (FAO/FCRN, 2017) (FAO/WHO, 2019).

The EAT-Lancet Commission, consisting of experts from different fields of human health, agriculture, politics, sciences and environmental sustainability, has highlighted the need to establish

global scientific goals based on the most accurate scientific evidence available for the adoption of healthy and sustainable diets. It is estimated that more than 820 million people in the world do not have access to sufficient food and even more follow unhealthy diets that may cause micronutrient deficiency and contribute to a substantial increase in obesity and diet-related noncommunicable disease rates (coronary disease, stroke and diabetes). It is estimated that making changes to the current diet in order to adopt a more healthy diet could greatly benefit the health of the population as it would prevent between 10.8 and 11.6 million deaths per year, a reduction of 19.0-23.6 % (Willett et al., 2019).

Taking into consideration the predictions regarding world population expansion (9.7 billion persons in 2050), the adjustment and evolution of current dietary patterns to more sustainable food models are of the utmost priority. A clear example is the “UN Decade of Action on Nutrition” (UN, 2015a), a commitment by United Nations Member States to implement different policies and programmes that integrate, within the concept of diet, the two dimensions of health and sustainability.

In this way, it seeks to fulfil a part of the Sustainable Development Goals (SDG), as well as other international sustainability goals, emphasising SDG 2 and 3 with regard to food (UN, 2015b):

- SDG 2. To end hunger, to ensure food security and improved nutrition and promote sustainable agriculture.
- SDG 3. To ensure healthy lives and promote well-being at all ages.

In view of the clear differences between countries with regard to the concept of a sustainable healthy diet, the WHO and FAO held an international expert consultation in Rome in July 2019, with the goal of developing basic necessary principles to define and establish a sustainable healthy diet. As a result of this consultation, sustainable food models or “Sustainable Healthy Diets” were defined as “dietary patterns that promote all dimensions of individuals’ health and well-being; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable”. These new dietary patterns seek to achieve the optimal growth and development of all individuals, as well as physical, mental, and social well-being at all life stages for present and future generations. Additionally, they contribute to preventing all forms of malnutrition (undernutrition, micronutrient deficiency, overweight and obesity); reduce the risk of diet-related noncommunicable diseases; and support the preservation of biodiversity and planetary health (FAO/WHO, 2019).

The basic and general principles required to establish these sustainable dietary models are based on current nutritional recommendations and take into account the concept of sustainability in all its aspects: environmental, socio-cultural and economic. Together, they constitute a total of 16 Guiding Principles, classified into three groups (FAO/WHO, 2019):

- Health. The Sustainable Healthy Diets:
 - Start with the early initiation of breastfeeding, which is exclusive until 6 months of age, and is combined with an appropriate complementary feeding until 2 years and beyond.
 - Are based on a great variety of unprocessed or minimally processed foods, balanced in all food groups, while restricting highly processed food and beverages.

- Include whole grains, legumes, nuts and an abundance and variety of fruits and vegetables.
- Can include moderate amounts of eggs, dairy, fish and poultry; and small amounts of red meat.
- Include safe and clean drinking water as the primary beverage.
- Are adequate i.e. reaching (but not exceeding) needs in energy and nutrients for growth and development, and to meet the needs for an active and healthy life throughout the life-cycle.
- Are consistent with WHO guidelines to reduce the risk of diet-related noncommunicable diseases, and ensure health and well-being for the general population.
- Contain minimal levels, or none if possible, of pathogens, toxins and other agents that can cause foodborne diseases.
- Environmental impact. The Sustainable Healthy Diets:
 - Maintain greenhouse gas emissions, water and land use, nitrogen and phosphorus application and chemical pollution within the objectives set forth.
 - Preserve biodiversity, (including that of crops), livestock, forest-derived foods and aquatic genetic resources, and avoid overfishing and overhunting.
 - Minimise the use of antibiotics and hormones in food production.
 - Minimise the use of plastics and derivatives in food packaging.
 - Reduce food loss and waste.
- Socio-cultural aspects. The Sustainable Healthy Diets:
 - Are based on and respect local culture, culinary practices, knowledge and consumption patterns, and values on the way food is sourced, produced and consumed.
 - Are accessible and desirable.
 - Avoid adverse gender-related impacts, especially with regard to time allocation (for example, for buying and preparing food, water and fuel acquisition).

Scientific evidence confirms that a dietary pattern characterised by a predominance of plant-based foods (fruit, vegetables, legumes, nuts, seeds, whole grains), a moderate consumption of animal-based foods (limiting the consumption of red meats and processed meats) and with a lower caloric intake is healthier and has a lower environmental impact. It is possible to improve dietary habits and the environment if we promote an evolution of the current Western diet towards a more sustainable model. It is not enough to focus exclusively on human health, as bad eating habits damage the environment and undermine survival and well-being of present and future generations (Bechthold et al., 2018).

In order to ensure the fulfilment of the guiding principles and to make it possible to implement and follow up sustainable dietary models, the WHO and FAO urge the undertaking of nine actions, where the ninth is closely linked to the goals of this report, namely, to develop national food-based dietary guidelines within the context of Sustainable Healthy Diets, taking into account the social, cultural, economic, ecological and environmental circumstances of each country (FAO/WHO, 2019).

All these social, cultural, economic, ecological and environmental circumstances of our country must be taken into account when establishing national food-based dietary guidelines within the specific context of the Sustainable Healthy Diets.

As highlighted by Law 17/2011 on Food Safety and Nutrition (BOE, 2011), it is necessary to have Dietary Guidelines for the Spanish population. Thus, Article 36 on “Strategy for nutrition, physical activity and prevention of obesity (NAOS in Spanish)” states in Section 2 that: “The Strategy shall include the goals for nutrition and physical activity for the population and the goals for reducing the prevalence of obesity, the general principles that must guide specific actions, measures and interventions, that shall be carried out during the corresponding period and shall establish the indicators and tools that permit the monitoring of progress and assess the capacity of the Strategy to achieve the objectives set forth”.

Drawing up these Dietary Guidelines within the framework of the NAOS Strategy (Nutrition, Physical Activity, Prevention of Obesity, and Health) can contribute to:

- Following healthy eating guidelines.
- Preventing chronic noncommunicable diseases prevalent in the Spanish population such as obesity, diabetes, cardiovascular disease, cancer, etc.
- Assessing the caloric density, the whole and variety of nutrients. Limiting certain nutrients such as sodium.
- Limiting calories derived from added sugars, saturated fats.
- Providing an important tool as part of a complex and multifactorial solution to promote health and reduce diet-based risks.

Additionally, in 2010, the European Food Safety Authority (EFSA, 2010) urged public authorities in Member States to establish principles for transforming nutrient-based recommendation into practical food-based dietary guidelines, and published a Scientific Opinion on Food-Based Dietary Guidelines, providing counsel to policy makers on how to translate the nutritional guidelines into dietary messages for consumers. Thus, different European countries (Sweden, 2015; Netherlands, 2015; France, 2019) have published food guides in recent years, adding relevant aspects such as risk-benefit assessments in food consumption, sustainability and the importance of citizens’ behaviour with regard to diet (Swedish National Food Agency, 2015) (Health Council of the Netherlands, 2015) (Santé Publique France, 2019).

In Spain, food-based dietary guidelines have also been drafted by national organisations (Spanish Agency for Food Safety and Nutrition (AESAN, 2005, 2008)), regional organisations (Public Health Agency of Catalunya (GENCAT, 2019)) and scientific societies such as the Spanish Society for Community Nutrition (SENC, 2019).

Currently, the AESAN website hosts several easily accessible documents with dietary guidelines for the general population, sub-groups and consumer environments (children, the elderly, families, school canteens, etc.), that take into account aspects such as our dietary and culinary habits, our culture and environment.

In its plenary session held on 22 May 2019, the AESAN Scientific Committee approved a report that updated the Dietary Reference Intake of 15 minerals and 13 vitamins for the Spanish population. This report provides a thorough and solid basis for establishing dietary guidelines according to food groups, adapted to the general Spanish population (AESAN, 2019).

The end-goal of this report is to establish food-based dietary guidelines for the Spanish population, in accordance with the available evidence and based on FBDG (Food Based Dietary Guidelines) models, encompassing the twin goals of health and sustainability and serving as a basis for the creation of food guides, and updating the current AESAN documents when appropriate.

It is important to point out that eating must be a satisfactory and pleasant experience for people, as well as indulge the senses. Eating also constitutes an element of cultural identification that represents the tradition and history of each region, which is why it is essential to respect the distinctiveness of dietary habits in each region and adapt them to a healthier and more sustainable dietary model (GENCAT, 2019). That is to say, it must adopt the principles of the Spanish “5S nutrition” model: social, salubrious, safe, satisfactory and sustainable; as well as the 4P epidemiological model: participatory, personalised, predictive and preventive.

2. Dietary guidelines: concepts and methodology

2.1 Concepts

The first premise is to draw a distinction between Nutritional Guidelines (based on nutrients) and Dietary Guidelines (based on food items), as consumers often conflate these concepts.

Nutritional guidelines have evolved in accordance with scientific knowledge regarding the physiological and biochemical aspects of human nutritional needs in situations of health and illness. The definition of essential nutrients and nutritional requirements provides the scientific basis for nutrient-based guidelines.

The Dietary Reference Intake (DRI) for the Spanish population has been recently updated by the AESAN Scientific Committee (2019). It refers to specific nutrients and their quantities for each population group, in order to prevent deficiencies that may compromise their health. These guidelines are related to the following international guidelines:

- Dietary Reference Values (DRV) in Europe, EFSA.
- Recommended Nutrient Intake (RNI) in the United Kingdom.
- Recommended Dietary Allowances (RDAs) in the United States and Canada.

The Dietary Reference Intake is expressed in terms of nutrients and constitutes the basis for drafting the Dietary Guidelines and Food Guides. However, these guidelines must refer to food items, in order to propose a varied and balanced diet that helps to maintain a good state of health and good quality of life in the long term, by preventing or controlling diet-related diseases (AESAN, 2019).

The Food Based Dietary Guidelines (FBDG) have been described as short messages expressed as food-based guidelines, based on scientific evidence and generally accepted principles of nutrition, to achieve a healthy diet and lifestyle. The goal of these guidelines is to prevent malnutrition in all its forms and to ensure an adequate state of health of the population (Bechthold et al., 2018).

These guidelines are primarily meant to provide information to the consumer and as such must be consistent and easy to understand in order to enable their compliance and follow-up by the population. Additionally, they must include easily accessible, available and affordable food items, and they must take into consideration the dietary habits and socio-cultural and religious preferences

of each region or country, in order to be culturally acceptable and practical to implement (EFSA, 2010) (Bechthold et al., 2018). They are also greatly useful when implementing or drafting public policies in healthcare, and they can be used by healthcare and nutrition professionals to issue messages that are common and consistent with scientific evidence, and avoid fashionable trends.

Current FBDG-based models include the concept of sustainability within the definition of a healthy diet (FAO/FCRN, 2017). However, few countries have introduced sustainability criteria in their FBDG to date, alongside health criteria, as there are few concrete international guidelines on the ecological impacts of diets, and perspectives that consider sustainability, socio-cultural factors and economic inequalities (Blackstone et al., 2018) (Tuomisto, 2018).

2.2 Methodology

The establishment of the Food-Based Dietary Guidelines for the Spanish population is based on the study of the nutrient composition of food items. On the basis of the Dietary Reference Intake, expressed in nutrients, it is recommended to consume different food items in different proportions to ensure the intake of these nutrients through food. These general guidelines do not specify population groups based on age, although in some cases, some guidelines may be qualified for certain population groups such as pregnant women, adolescents, the elderly, etc. They are also based on the review of existing guidelines published by other countries, for their comparison and adaptation to Spanish models.

Therefore, the following methodology has been used in this report:

1. Browsing the most recent food guides and/or ones that are closest to the traditional and cultural preferences of Spain with regard to Food-Based Dietary Guidelines and published by national and international bodies and organisations on their websites or in scientific publications.
2. Classifying dietary guidelines according to country, food groups and portions established for each one of them.
3. Compiling all available data for food groups, defining their average composition and examples of portions.
4. Establishing food-based guidelines for the Spanish population.

The food classification and description system, FoodEx2 (EFSA, 2015) was considered when establishing the food groups, in addition to the information available in different food composition tables used in Spain.

The graphic and simplified interpretation of the Food-Based Dietary Guidelines shall be made by means of Food Guides (meant for the general population) which shall be as specific and easy to understand as possible. They may be supported by illustrations.

3. Reviewing the dietary guidelines established by different national and international bodies

Different countries have established Food-Based Dietary Guidelines. On its website, the Food and Agriculture Organisation of the United Nations (FAO, 2020) offers a general description of all food guides that include guidelines by approved food groups in each country.

As shown in Table 1 of this report, the international food guides of the United States, China, the Nordic countries (Finland, Norway and Sweden), the United Kingdom, Germany, the Netherlands, France and Portugal, as well as the official documents previously published by AESAN and the Generalitat of Catalunya have been selected as references.

Table 1. Food guides, publications and/or official international documents for the creation of food-based dietary guidelines meant for the general Spanish population

Region/country	Year of publication/ last updated	Official bodies and reference publications
North America		
United States	2016	U.S. Department of Health and Human Services (USDHHS); U.S. Department of Agriculture (USDA)
Asia		
China	2016	Chinese Nutrition Society
Europe		
Nordic Countries: Finland	2014	Nordic Council of Ministers
Nordic Countries: Norway	2014	Nordic Council of Ministers
Nordic Countries: Sweden	2015	Nordic Council of Ministers; Swedish Food Agency (<i>Livsmedelsverket</i>)
United Kingdom	2016	Ferguson et al. (2004, 2006) Buttriss et al. (2014, 2016)
Germany	2013	German Nutrition Society (<i>Deutsche Gesellschaft für Ernährung, DGE</i>)
Netherlands	2015	Health Council of the Netherlands (<i>Gezondheidsraad</i>)
France	2011/2016	French Agency for Food, Environmental and Occupational Health & Safety (<i>Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail, ANSES</i>)
Portugal	2016	University of Porto (<i>Universidade do Porto</i>) and the Directorate-General of Health (<i>Direção-Geral do Saúde</i>)
Spain	2005, 2008	Spanish Agency for Food Safety and Nutrition (AESAN)
	2019	Public Health Agency of Catalunya (<i>Agència de Salut Pública de Catalunya, GENCAT</i>)

4. Description of the selected national and international dietary guidelines

4.1 North America: United States

The U.S. Department of Health and Human Services (USDHHS) and the U.S. Department of Agriculture (USDA) update their Dietary Guidelines for the American population every 5 years. They are developed and updated by a process that is increasingly robust and transparent. In 2015, the US Department of Agriculture published the “Dietary Guidelines 2015-2020” (USDHHS-USDA, 2015), based on current scientific and medical knowledge, and designed to be used by the relevant authorities, health and nutrition professionals. These Guidelines include the idea that a healthy dietary pattern is flexible rather than rigid, where people can enjoy the foods that are suited to their personal, traditional and cultural preferences, as well as their budget. In January 2016, the eighth edition (the most recent version) of these Dietary Guidelines was published.

4.1.1 Description

The American food guides use a plate graphic called “My Plate”, an icon aimed at helping American consumers to adopt a healthier diet and follow the dietary guidelines. “MyPlate” encourages consumers to “build” a healthier plate at mealtimes, as it includes a total of five food groups that are considered primary and healthier for each meal: fruits, vegetables, cereals, proteins and dairy products (Figure 1). The food guides include recommendations on the daily quantities of each food group and sub-group to be consumed.

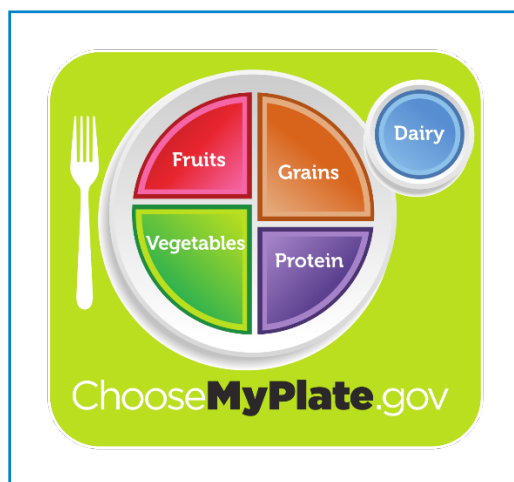


Figure 1. Plate graphic “MyPlate” used in food guides in the United States. **Source:** (USDHHS/USDA, 2015).

The American food guides describe the characteristics of a healthy eating pattern:

- A large variety of vegetables from all of the subgroups.
- Fruits, especially whole fruits.
- Cereals, at least half of which are whole grains.

- Fat-free or low-fat dairy products, including milk, yoghurt, cheese, and/or fortified soy beverages.
- A variety of protein foods, including seafood, lean meats and poultry, eggs, legumes (beans and peas), nuts, seeds and soy products.
- Oils.
- The intake of saturated fats and *trans* fats, added sugars, and sodium must be limited.

Additionally, American food guides provide key quantitative guidelines focused on several components of the diet that should be limited. These components are especially concerning for public health in the United States, and the specified limits can help consumers to achieve healthy eating patterns within sufficient calorie limits:

- Consume less than 10 percent of calories per day from added sugars.
- Consume less than 10 percent of calories per day from saturated fats.
- Consume less than 2.3 g of sodium per day (5.75 g of salt).
- If alcohol is consumed, it should be in moderation (up to one drink per day for women and up to two drinks per day for men and only for adults of legal drinking age).

Along with the aforementioned recommendations, Americans of all ages should meet the *Physical Activity Guidelines for Americans* to help promote health and reduce the risk of chronic disease.

4.1.2 Messages

- Choose a healthy eating pattern with an appropriate caloric intake. Follow this pattern across the lifespan, in order to maintain a healthy body weight, provide sufficient nutrients to the body, and reduce the risk of chronic disease. All choices of food and drink are important.
- Choose a varied diet that provides all necessary nutrients in recommended amounts. Consume foods from all groups.
- Choose an eating pattern low in added sugars, saturated fats and sodium. Limit calories from the intake of foods with high quantities of added sugars, saturated fats and salt.
- Replace less healthy food habits by opting for foods and beverages across all food groups (variety). Consider socio-cultural and personal preferences to make these shifts easier and to maintain them over time.
- Motivate the overall population to adopt healthy dietary patterns. All consumers have an important role in developing and maintaining healthy eating habits in different environments throughout the country: at home, at school, at work and in the community.
- Drink water and other liquids such as coffee, tea and infused waters.

4.1.3 Guidelines

Table 2. Dietary guidelines in the United States	
Food group	Amount in 2,000 Calorie-Level Pattern/day or week cup-(c) or ounce-(oz) equivalents (eq)
Vegetables	2½ c-eq/day
Dark Green Broccoli, Spinach, Leafy Salad Greens (Including Romaine Lettuce), Collards, Bok Choy, Kale, Turnip Greens, Mustard Greens, Green Herbs (Parsley, Cilantro)	1½ c-eq/week
Red & Orange Tomatoes, Carrots, Tomato Juice, Sweet Potatoes, Red Peppers (Hot and Sweet), Winter Squash, Pumpkin	5½ c-eq/week
Legumes (Beans & Peas) Pinto, White, Kidney, and Black Beans; Lentils; Chickpeas; Limas (Mature, Dried); Split Peas; Edamame (Green Soybeans)	1½ c-eq/week
Starchy Potatoes, Corn, Green Peas, Limas (Green, Immature), Plantains, Cassava	5 c-eq/week
Other Lettuce (Iceberg), Onions, Green Beans, Cucumbers, Celery, Green Peppers, Cabbage, Mushrooms, Avocado, Summer Squash (Includes Zucchini), Cauliflower, Eggplant, Garlic, Bean Sprouts, Olives, Asparagus, Peapods (Snowpeas), Beets	4 c-eq/week
Fruits Whole fruits and 100 % fruit juice. Whole fruits include fresh, canned, frozen, and dried forms	2 c-eq/day
Grains Whole Grains Refined Grains	6 oz-eq/day 3 oz-eq/day 3 oz-eq/day
Dairy Free and low-fat (1 %) dairy, including milk, yogurt, cheese, or fortified soy beverages ("soymilk")	3 c-eq/day
Protein Foods Seafood Meats, Poultry, Eggs Nuts, Seeds, Soy Products	5½ oz-eq/day 8 oz-eq/week 26 oz-eq/week 5 oz-eq/week
Oils from plants include canola, corn, olive, peanut, safflower, soybean, and sunflower oils. Oils also are naturally present in nuts, seeds, seafood, olives, and avocados	27 g/day
Limit on Calories for Other Uses (% of Calories)	270 kcal/day (14 %)

Source: Dietary Guidelines for Americans, 2015-2020 (USDHHS/USDA, 2015).

4.2 Asia: China

The first Chinese dietary recommendations to be included in Chinese food guides were published in 1989 by the Chinese Nutrition Society (中国居民膳食指南) (Chinese Nutrition Society, 2016). They were revised in 1997, 2007 and 2015. The latest revised version was published in 2016 and is currently used by the relevant authorities. Chinese food guides are aimed at the general population,

specifically, healthy people over 2 years of age and include some recommendations for specific population groups.

4.2.1 Description

Chinese food guides use the graphic of a pagoda to embody the core recommendations and key dietary guidelines, in order to promote the adoption of a healthy, varied and balanced diet by the Chinese population (Figure 2). This graphic has five levels that represent the major food groups that must be included in the daily diet: 1) cereals, tubers and legumes, 2) fruits and vegetables, 3) poultry, lean meats, fish and eggs, 4) dairy products, soybeans and nuts, and 5) salt and cooking oil. The size of each level is different and refers to the recommended daily quantities of each food group to be consumed. Chinese food guides also include recommendations to drink plenty of water and to engage in physical activity.



Figure 2. Pagoda graphic used in food guides in China. **Source:** (Chinese Nutrition Society, 2016).

For a better understanding of the dietary guidelines included in the Pagoda, two additional graphics; an abacus and a plate have been developed.

The “plate model” is divided into four sections that represent the first three levels of the Pagoda: 1) cereals, tubers and legumes, 2) fruits and vegetables, 3) poultry, lean meats, fish and eggs. Next to the plate is a cup indicating the importance of consuming dairy products. This model provides dietary recommendations for a single meal (Figure 3).



Figure 3. Plate graphic used to supplement the Chinese Pagoda graphic. **Source:** (Chinese Nutrition Society, 2016).

The “abacus model” is designed specifically for children aged 8-11 and consists of six rows with beads in different quantities and colours. Each row represents a different food group and the number of beads in each row refers to the daily recommended quantities to be consumed for each food group. The multi-coloured beads are a simple way to attract children’s attention which helps them to learn and remember. A child holding a bottle of water is running around the abacus, this reminds them of the importance of consuming water and leading an active life (Figure 4).



Figure 4. Abacus graphic used to supplement the Chinese Pagoda graphic. **Source:** (Chinese Nutrition Society, 2016).

4.2.2 Messages

- Consume:
 - A large variety of foods, with cereals as one of the most important food groups. It is recommended to consume 12 different types of food items each day and at least 25 each week.
 - A large quantity of vegetables, milk and soybeans.
 - Appropriate amounts of fish, chicken, eggs and lean meat.
 - Water and tea instead of sugary drinks.
- To establish a proper balance between the amount of energy derived from the consumption of food and the amount that is really required to perform daily tasks. This is key to maintaining a healthy body weight.
 - At least 50 % of all energy derived from eating must come from carbohydrates.
 - Moderate physical exercise is recommended at least 5 days/week or for 150 minutes/week. Any daily activity that is equal to 6000 steps is also recommended. It is recommended to avoid sitting still for more than 1 hour at a stretch.
- Reduce the intake of salt, cooking oil, sugar and alcohol.
 - It is recommended to limit the daily intake of salt and cooking oil to 6 g/day and 25-30 g/day, respectively.
 - Daily sugar intake must be lower than 50 g/day (although the ideal amount would be 15 g/day), without exceeding 10 % of the total daily caloric intake.
 - The consumption of alcohol must not exceed 25 g/day (men) and 15 g/day (women). Children, adolescents, pregnant and lactating women should avoid consuming alcohol.
- Avoid:
 - The consumption of smoked and cured meats.
 - Food waste.
- It is recommended to:
 - Learn to read labels in order to make healthy food choices.
 - Choose fresh foods.
 - Apply good practices in the kitchen.

4.2.3 Guidelines

Table 3. Dietary guidelines in China		
Food group	Frequency of consumption	Portions
Vegetables	Daily, in each meal	300-500 g/day, of which half must consist of dark green vegetables
Fruits	Daily	200-350 g of fresh fruit/day
Cereals, tubers and legumes	Daily	Daily portion: 250-400 g/day, of which, 50-150 g must be whole grains and legumes, and 50-100 g of tubers
Nuts	-	In small quantities (due to their high caloric value)

Table 3. Dietary guidelines in China		
Food group	Frequency of consumption	Portions
Soybean products	Daily	At least 25 g of soybeans/day
Milk and dairy products	Daily	300 ml of milk/day
Meat and animal-based products	Weekly	280-525 g of poultry or lean meat/week
Fish	Weekly	280-525 g/week
Eggs	Weekly	280-350 g/week
Water and other liquids	Daily	7-8 cups of water (1500-1700 ml water/day)

Source: Dietary guidelines for Chinese residents (Chinese Nutrition Society, 2016).

4.3 Europe (Nordic countries): Finland

Finland published the latest version of its dietary guidelines in 2014 (National Nutrition Council, 2014). Similar to Norway, these guidelines are based on the Nordic Nutrition Recommendations (2012).

4.3.1 Description

Finnish food guides use a food triangle and a food plate model to facilitate their comprehension by the population. The triangle represents the foods that are part of a healthy diet according to their frequency of intake (Figure 5). The food plate model has the same goal and message as the food triangle, but focuses on a single meal.

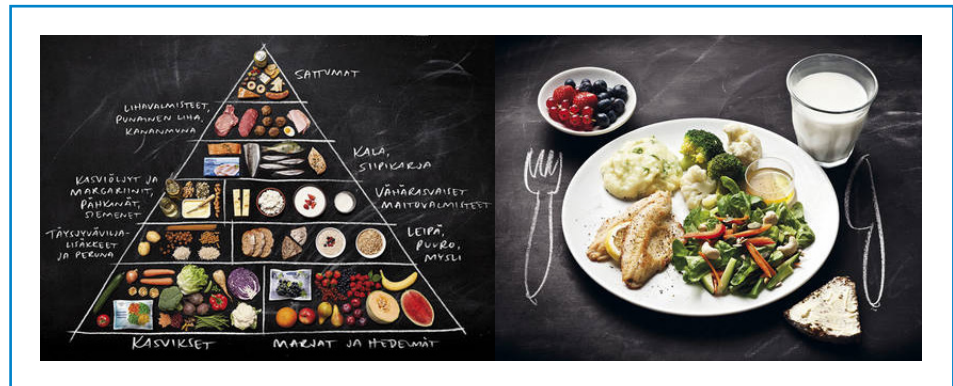


Figure 5. Food triangle and plate model used in Finnish food guides. **Source:** (National Nutrition Council, 2014).

4.3.2 Messages

- Consume:
 - Whole grain cereals (bread, pasta) several times a day. Choose fibre-rich and low-salt products. Avoid products made of refined flour with high quantities of fat and sugar.
 - Fruits, berries and vegetables frequently (a minimum of 500 g/day, excluding potatoes).
 - Low-fat dairy (or fat-free, if possible) products (5-6 dl/day) and 2-3 slices of low-fat cheese daily.

- Moderate quantities of red meat (<500 g per week). Select meat products with low fat and salt content.
- Fish (of different kinds) 2-3 times per week.
- Consume and use salt in moderation. Consume low-salt food products. Salt intake should be <5 g/day.
- Drink water when thirsty. Decrease the consumption of soft drinks and sweet juices.
- Undertake moderate physical activity (brisk walking) for at least 150 minutes/week or hard physical activity (running) for 75 minutes/week.
- Eat regularly. Read and learn to understand the information included in food labels.
- Use vegetable oils in cooking and salads and to spread on bread.

4.3.3 Guidelines

Table 4. Dietary guidelines in Finland		
Food group	Frequency of consumption	Portions
Vegetables and Fruits	Frequently	>500 g/day (excluding potatoes)
Whole grain starch-based products (bread, pasta)	Daily, multiple times	-
Nuts (raw or toasted)	-	-
Milk and dairy products	Daily	500-600 ml/day of milk; 2-3 slices of low-fat cheese
Red meat and animal-based products	In moderation	<500 g/week
Fish (of different kinds)	2-3 times per week	-
Eggs	-	-
Legumes	-	-
Water and other liquids	When thirsty	-
Virgin olive oil	-	-

Source: Finnish nutrition recommendations (National Nutrition Council, 2014).

4.4 Europe (Nordic countries): Norway

Norwegian dietary guidelines on diet, nutrition and physical activity (2014) are based on the Nordic Nutrition Recommendations (2012) and the Food-Based Dietary Guidelines for public health promotion and prevention of chronic diseases, published by the Norwegian Nutrition Council (2011). These two documents were merged by the Norwegian Directorate of Health to create the Norwegian guidelines on diet, nutrition and physical activity, (2014).

4.4.1 Description

Norwegian food guides do not include specific dietary guidelines.

4.4.2 Messages

- Adopt a varied diet.
- Establish a proper balance between the amount of energy derived from eating and drinking and the amount that is really required to perform daily tasks.
- Consume high quantities of:
 - Fruits, berries and vegetables (at least 5 daily).
 - Whole grain products (every day).
 - Fish (2-3 times per week, for dinner). Fish may be used as a sandwich filling.
- Consume lean dairy products every day.
- Consume processed meat and red meat in moderation. Choose lean meat and lean animal-based products.
- Use sugar and salt in moderation. Limit the consumption of food and beverages with high sugar content.
- Choose cooking oils and liquid margarine over butter.
- Drink water as the liquid of choice.
- Engage in physical activity for at least 30 minutes each day.

4.4.3 Guidelines

Food group	Frequency of consumption	Portions
Vegetables	Daily	At least 5 portions each day of fruit, berries and vegetables
Fruits	Daily	At least 5 portions each day of fruit, berries and vegetables
Whole grain products	Daily	High quantities
Nuts (raw or toasted)	-	-
Lean dairy products	Daily	-
Processed meat and red meat	In moderation	-
Fish	2-3 times per week (preferably at dinner)	High quantities
Eggs	-	-
Legumes	-	-
Water and other liquids	Daily	-
Virgin olive oil	-	-

Source: Norwegian guidelines on diet, nutrition and physical activity (Norwegian Directorate of Health, 2014).

4.5 Europe (Nordic countries): Sweden

The Swedish National Food Agency published the latest version of the national dietary guidelines in 2015 (Livsmedelsverket, 2015). Like Norway and Finland, the dietary guidelines for healthy eating

are based on the Nordic Nutrition Recommendations (2012). Swedish dietary guidelines seek to lead consumers towards a healthy and sustainable diet that is also environment-friendly.

4.5.1 Description

Swedish food guides use a simple graphic with three key messages in traffic light colours (Figure 6):

- Green: recommends eating more fruit, berries, vegetables, nuts, seeds, fish and shellfish. It also recommends engaging in more physical activity.
- Amber: consumers must make changes to their diet and switch to whole grains, healthy fats and low-fat dairy products.
- Red: decrease the consumption of red and processed meat, salt, sugar and alcohol.



Figure 6. Traffic light graphic used in food guides in Sweden. **Source:** (Swedish National Food Agency, 2015).

The food plate model is also included in Swedish food guides in order to promote the consumption of different food groups and to enable consumers to make healthy food choices. This model is used in conjunction with the *Keyhole symbol*, a label with the image of a keyhole which identifies the most healthy food products within each food category. Foods labelled with this symbol contain more dietary fibre and less fats, sugars and salt than similar food products without this label. Thus, a simple and identifiable logo can be a quick and effective tool that helps consumers to make healthier food purchases. It also promotes the innovation, development and reformulation of healthier food products by the food industry.

4.5.2 Messages

- Maintain a correct energy balance by eating the necessary amounts of food.
- More:

- Fruits and vegetables: choose vegetables with a high-fibre content such as tubers, cabbage, cauliflower, broccoli, beans and onions.
- Fish and shellfish: consume 2-3 times per week. Consume a large variety of fish combining oily and low-fat varieties. Choose eco-labelled shellfish.
- Exercise: engage in a physical activity for at least 30 minutes (brisk walks). Reduce the amount of time spent sitting still.
- Switch to:
 - Whole grain cereals: choose whole grain options for pasta, bread, cereals and rice.
 - Healthy fats: choose healthier cooking oils (for example, rapeseed oil).
 - Low-fat dairy products: choose low-fat and unsweetened products enriched with Vitamin D.
- Consume less:
 - Red and processed meat: consume no more than 500 grams a week, limiting the amount of processed meat.
 - Salt: Choose low-salt products. Use less salt when cooking and opt for iodised salt. The recommended consumption of salt is no more than 6 g/day of salt.
 - Sugar: reduce the intake of sugary drinks, sweets, pastries, ice-creams and other products with high sugar content. It is recommended that the caloric intake from sugar be no more than 10 % of the total daily caloric intake.
 - Alcohol: consume less than 10 g/day for women and 20 g/day for men.

4.5.3 Guidelines

Table 6. Dietary guidelines in Sweden

Food group	Frequency of consumption	Portions
Vegetables	Consume more	-
Fruits	Consume more	-
Starch-based products (preferably whole grain), potatoes	Consume more	-
Nuts (raw or toasted)	Consume more	-
Milk and dairy products	-	-
Red and processed meat	Consume less	<500 g/week
Fish and shellfish	Consume more 2-3 times per week	-
Eggs	-	-
Legumes	-	-
Water and other liquids	-	-
Virgin olive oil	-	-

Source: Sweden's Dietary Guidelines (Swedish National Food Agency, 2015).

4.6 Europe: United Kingdom

The first dietary guidelines were published in 1994 in the United Kingdom and have been regularly updated since then. The latest version of these dietary guidelines was drafted by the Executive Agency of the Department of Health and Social Care in the United Kingdom (Public Health England), and was published in March 2016 (Public Health England, 2016). The “Eatwell Guide” has been accepted by the Food Standards Agency (FSA), the body in charge of food safety and hygiene in England, Wales and Northern Ireland; as well as food labelling policy in Wales and Northern Ireland, and food policy in Northern Ireland.

4.6.1 Description

British food guides use a visual representation in the shape of an oval which includes five food groups within a varied and nutritious diet. The proportion in which each food group should contribute to a healthy and balanced diet is also included in Figure 7.

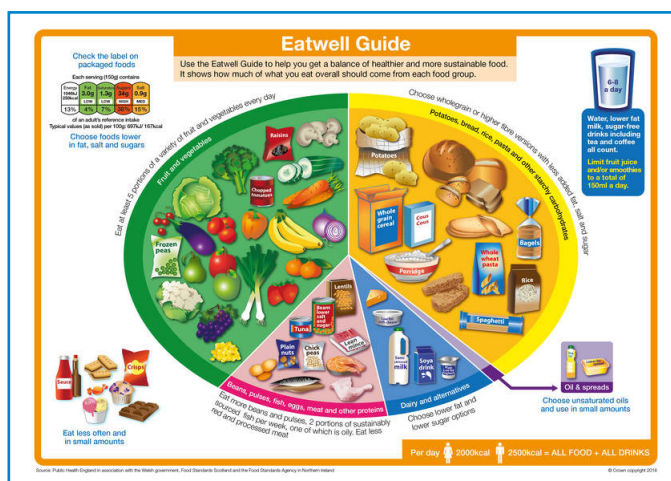


Figure 7. Visual representation used in British food guides. **Source:** (Public Health England, 2016).

4.6.2 Messages

- Consume:
 - High amounts of cereals (bread, pasta, rice), preferably whole grain, and potatoes.
 - 5 portions each day of fruit and vegetables.
 - Dairy products and dairy alternatives (for example, soy drinks). Choose options with low fat and sugar.
 - Legumes such as beans.
 - Meat.
 - 2 portions of fish each week (one of them must be an oily fish).
 - Eggs.
 - Unsaturated oils in small quantities.

- Consume foods and beverages with high sugar, salt and fat content only occasionally and in moderation. It is recommended to consume no more than 6 g/day of salt.
- Drink 6-8 glasses/cups of liquids each day.
- The recommended amounts of daily physical activity are included in the “Physical Activity Guidelines for adults” guides.

4.6.3 Guidelines

Table 7. Dietary guidelines in the United Kingdom

Food group	Frequency of consumption	Portions
Vegetables	Daily	5 portions each day of fruit and vegetables
Fruits	Daily	5 portions each day of fruit and vegetables
Starch-based products (bread, pasta, rice), preferably whole grain; potatoes	-	High quantities
Nuts (raw or toasted)	-	-
Dairy products and dairy alternatives (for example, soy drinks)	-	-
Meat and animal-based products	-	-
Fish	2 times per week	2 portions (at least one of them must be an oily fish)
Eggs	-	-
Legumes	-	-
Water and other liquids	Daily	6-8 glasses/cups each day
Virgin olive oil	-	-

Source: Eatwell Guide (Public Health England, 2016).

4.7 Europe: Germany

The German Nutrition Society is responsible for developing dietary guidelines, which are endorsed by the German Ministries of Health and Agriculture. The first German dietary guidelines were published in 1956 and have been regularly updated since then. The latest consolidated version was published in 2013 (German Nutrition Society, 2013).

4.7.1 Description

German food guides are based on the nutrition circle, which is divided into six food groups:

- Cereals and potatoes.
- Vegetables.
- Fruits.
- Milk and dairy products.
- Meat, sausages, fish and eggs.
- Fats and oils.

The segment size of each food group within the nutrition cycle decreases from the first (cereals and potatoes) to the last group (fats and oils), referencing the recommended amounts for each food group. A seventh group (water and beverages) represented by a glass of water, is located in the centre of the nutrition circle (Figure 8).



Figure 8. Nutrition circle used in German food guides. **Source:** (German Nutrition Society, 2013).

4.7.2 Messages

- Enjoy a varied diet.
- Consume:
 - High amounts of cereals (preferably whole grain) and potatoes.
 - 5 portions each day of fruit and vegetables.
 - Milk and dairy products every day, fish 1 or 2 times per week; and meat, sausages and eggs in moderation.
 - Small amounts of fats and foods rich in fats.
- Consume and use sugar and salt only occasionally and in moderation.
- Drink a lot of liquids, at least 1.5 litres each day.
- Do not overcook meals.
- Devote time to meals, enjoying them.
- Monitor body weight and maintain an active lifestyle. Physical exercise for 30-60 minutes/day is recommended.

4.7.3 Guidelines

Table 8. Dietary guidelines in Germany

Food group	Frequency of consumption	Portions
Vegetables	Daily	5 portions each day of fruit and vegetables
Fruits	Daily	5 portions each day of fruit and vegetables
Starch-based products (preferably whole grain), potatoes	-	High quantities
Nuts (raw or toasted)	-	-
Milk and dairy products	Daily	-
Meat and animal-based products (sausages)	In moderation	-
Fish	1-2 times per week	-
Eggs	In moderation	-
Legumes	-	-
Water and other liquids	Daily	At least 1.5 litres/day
Virgin olive oil	-	-

Source: Ten guidelines for wholesome eating and drinking (German Nutrition Society, 2013).

4.8 Europe: Netherlands

The dietary guidelines of the Netherlands published in 2015 (Health Council of the Netherlands, 2015), are an updated version of the 2006 and 1986 guidelines. They are revised by the Standing Committee on Public Health and Standing Committee on Health Care. The Committee is assisted by the Netherlands Nutrition Centre, the National Institute of Public Health and the Environment.

4.8.1 Description

The guidelines describe the level of knowledge on the links between diet and chronic ailments and make recommendations on healthy dietary patterns for the general population. Dietary factors and effects on health have been taken into consideration when developing them, and the relationship between nutrients, foods and dietary patterns, and the risk of chronic illnesses has been researched. Risk factors that are responsible for at least one of the ten most important chronic diseases in the Netherlands have been examined. These diseases include coronary heart disease, stroke, heart failure and Type 2 diabetes mellitus, chronic obstructive pulmonary disease, breast cancer, colorectal cancer, lung cancer, dementia and cognitive impairment, and depression. The guidelines are based on a thorough review of the scientific literature, on prospective cohort studies or observational research, random controlled trials and meta-analyses.

The food guides of the Netherlands classify their guidelines into four groups: increased consumption recommended, replacement recommended, limiting recommended, and maintaining the current recommended consumption, as depicted in Figure 9. The recommendations include seven food groups and different subgroups.

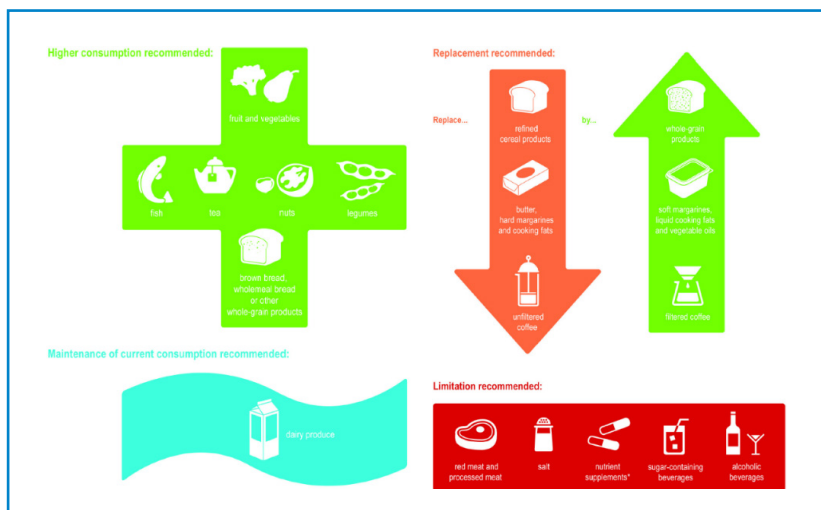


Figure 9. Visual representation used in Dutch food guides. **Source:** (Health Council of the Netherlands, 2015).

4.8.2 Messages

On this basis, a dietary pattern that involves eating more fruit and vegetables and less animal-based food has been formulated. The guidelines are divided into four groups:

- Increased consumption recommended
 - Eat at least 200 g of vegetables and at least 200 g of fruits each day.
 - Eat at least 90 g of whole grain bread or other whole grain products.
 - Eat legumes weekly.
 - Eat at least 15 g of unsalted nuts, daily.
 - Eat fish weekly, preferably oily fish.
 - Drink three cups of tea each day.
- Replacement recommended
 - Replace refined cereal products with whole grain products.
 - Replace butter, hard margarines, and cooking fats with soft margarines, liquid fats, and vegetable oils.
 - Replace unfiltered coffee with filtered coffee.
- Limiting recommended
 - Limit the consumption of red meat, particularly processed meat.
 - Minimise the consumption of sugary beverages.
 - Do not drink alcohol or no more than one glass per day.
 - Limit salt intake to 6 g daily.
 - Nutrient supplements are not needed, except for specific groups that are prescribed supplements.
- Maintaining the current recommended consumption
 - Consume some amount of dairy products each day, including milk or yogurt.

Food group	Guidelines	Risk reduction
Vegetables and Fruits Cucumbers, tomatoes, red peppers, peas, French beans and other beans. Leafy green vegetables such as spinach, chard, endives, lettuce and water cress. Fresh, dried or canned fruit, and fruit juice and fruit fibre, including pectin	Eat at least 200 g of vegetables and at least 200 g of fruit each day	Coronary heart disease, stroke, colorectal cancer, lung cancer and diabetes
Protein-rich products <i>Meat</i> A distinction is made between red meat (cattle, pig, goat, sheep and horse) and white meat (chicken, turkey, duck and geese and domestic rabbits); and between unprocessed meat (sliced or minced) and processed meat (smoked, salted, with added preservatives and animal-based products) <i>Dairy products</i> Milk, yoghurt and cheese <i>Eggs</i> A source of proteins, but also of cholesterol (200 mg/egg) <i>Legumes</i> Soybeans, lentils, chickpeas and peas <i>Nuts</i> Walnuts, almonds, hazel nuts, cashew nuts, pistachios, macadamia nuts, Brazil nuts and pecans	Limit the consumption of red meat, particularly processed meat Consume some amount of dairy products each day, including milk or yoghurt Eat legumes weekly Eat at least 15 g of unsalted nuts, daily	Stroke, diabetes, colorectal cancer and lung cancer Colorectal cancer and diabetes Coronary heart disease Cardiovascular disease
Carbohydrates and fibre-rich products Cereals include wheat, rice, oats, rye, barley, spelt and maize. "Cereal products" include bread, crackers and crisp breads, puff pastry, batter and other coatings, and flour. A product is considered whole grain if it contains at least 25 % of whole grain flour <i>Dietary fibre</i>	Eat at least 90 g of whole grain bread or other whole grain products daily	Coronary heart disease, stroke, diabetes and colorectal cancer
Products rich in fats and fish <i>Fats and oils</i> Butter, margarine, and olive or sunflower oil. Trans fatty acids are reduced to less than 1 % <i>Fish and fatty acids from fish</i> Oily fish (herring, salmon and mackerel) and non-oily fish (pollock, cod, plaice, and Pangas catfish)	Replace butter, hard margarines, and cooking fats with soft margarines, liquid cooking fats, and vegetable oils Eat a portion of fish weekly, preferably oily fish	Cardiovascular disease Cardiovascular disease and stroke

Table 9. Dietary guidelines in the Netherlands		
Food group	Guidelines	Risk reduction
Beverages		
<i>Tea</i> Green tea and black tea	Drink three cups of tea each day	Stroke and diabetes
<i>Coffee</i> There is a difference between filtered coffee (eliminates substances that increase cholesterol; it refers to coffee made with filters, coffee pods, instant coffee and vending-machine coffee made with liquid coffee concentrate) and unfiltered coffee (boiled coffee, Greek and Turkish coffee)	Replace unfiltered coffee by filtered coffee	Coronary heart disease, stroke and diabetes
<i>Sugary drinks</i> Drinks with added sugar and fruit juice, due to the addition of sucrose, fructose or glucose. These include fruit juice beverages and “nectars”, carbonated drinks “sodas”, ice tea, vitamin-fortified water and sports drinks	Reduce the consumption of sugary drinks	Diabetes
Alcoholic drinks A standard glass of alcohol (10 g of alcohol), 250 ml of beer (5 % of alcohol), 100 ml of wine (12 % of alcohol) or 35 ml of alcohol (35 % of alcohol)	Do not drink alcohol or no more than one glass each day	Stroke, coronary heart disease (60 g of alcohol or more on occasion), cardiovascular disease, breast cancer, colorectal cancer, lung cancer, diabetes and dementia
Salt	Maximum of 6 g daily	Cardiovascular disease

Source: Dutch dietary guidelines (Health Council of the Netherlands, 2015).

4.9 Europe: France

In France, the National Public Health Agency (*Santé Publique France*) has recently updated its Recommendations Concerning Diet, Physical Activity and Sedentary Behaviour for Adults, first published in 2001: “Recommandations relatives à l'alimentation, à l'activité physique et à la sédentarité pour les adultes” (Santé Publique France, 2019). During this procedure, *Santé Publique France* has actively collaborated with different French institutions such as: French Agency for Food, Environmental and Occupational Health & Safety (*l'Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail*, ANSES), the High council for Public Health (*Haut Conseil de santé publique*, HCSP) and the Directorate General of Health (*Direction générale de la santé*, DGS).

4.9.1 Description

Different models of visual representation that quantified the desired dietary guidelines were studied: the (daily and weekly) plate model and other container models such as a cup or spoon. Finally, a model based on the tricoloured traffic signal was selected which includes guidelines in writing for better comprehension by consumers (Figure 10).



Figure 10. Traffic light graphic used in food guides in France. **Source:** (Santé Publique France, 2019).

4.9.2 Messages

- Increase:
 - Fruit and vegetables, regardless of how they are served (raw, cooked, frozen or canned), so that 70 % of adults consume at least 3.5 portions of fruit and vegetables/ day and 50 % of adults consume at least 5 portions of fruit and vegetables/day.
 - Daily physical activity that is the equivalent of at least 30 minutes of brisk walking each day, and reduce sedentary behaviour in children (time spent watching TV, playing videogames, etc.).
 - Foods rich in starch, including cereals (especially whole grain cereals, with a high fibre content), potatoes, legumes, etc. They must be present in each meal.
 - Folic acid intake through diet in order to reduce by at least 30 % the number of women of childbearing age (15-49 years) who are at risk of folate deficiency (folate levels in plasma <3 ng/ml).
- Reduce:
 - Total fats, especially saturated fats in foods that must be consumed in moderation: pastries, meats, butter, sauces and certain cheeses.
 - Sugar (soft drinks, sweets, chocolate, pastries, desserts, etc.).
 - Salt. When using, opt for iodised salt.
 - Alcoholic drinks. Do not exceed 2 glasses/day for women and 3 glasses/day for men.

- Consume meat, fish, shellfish and eggs alternately 1 or 2 times per day. Choose preferably lean meat and fish (at least 2 times per week).
- Consume foods rich in calcium (mainly dairy products, in addition to vegetables and, for people who drink mineral water, to consume mineral water with greater calcium content).
- Enjoy the benefits of sunlight in moderation.
- Keep body weight in check regularly.
- Promote breastfeeding in order to increase by at least 15 % the percentage of newborn infants fed with mother's milk.
- Reduce by a third the appearance of anaemia caused by a lack of iron in lactating women of childbearing age (15-49 years) in low-income households.

4.9.3 Guidelines

Table 10. Dietary guidelines in France		
Groupe alimentaire	Repère principal	Données complémentaires
Fruits et légumes	Au moins 5 portions par jour (de 80 à 100 g)	<p>Sous toutes les formes: frais, surgelés ou en conserve</p> <p>Essayez d'augmenter votre consommation</p> <p>Pas plus d'un verre de jus de fruit par jour, de préférence pressé</p> <p>Les fruits séchés sont à consommer occasionnellement car ils sont très sucrés</p> <p>Si vous pouvez, privilégiez les fruits et légumes bio</p> <p>Fruits à coque sans sel ajouté (noix, noisettes, pistaches, amandes...): une petite poignée par jour. Ils ne sont pas recommandés aux personnes ayant des allergies à ces fruits</p>
Pain, pâtes, riz, semoule, pommes de terre	<p>Un à chaque repas</p> <p>Ou une portion à chaque repas</p> <p>Au moins un aliment complet ou semi complet par jour</p>	<p>Si vous pouvez, privilégiez les produits céréaliers bio</p> <p>Parmi les céréales du petit déjeuner, seule les céréales complètes non sucrées font partie de ce groupe</p>
Lait, yaourts, fromage	<p>2 par jour</p> <p>Ou 2 portions par jour</p>	<p>Une portion = 150 ml de lait = 125 g de yaourt = 30 g de fromage</p> <p>Pensez au lait et au fromage déjà contenus dans les plats que vous préparez ou du commerce</p> <p>Compte tenu des risques liés aux contaminants (ou polluants), veillez à varier les produits laitiers</p>
Fruits à coque	Par jour	<p>Une petite poignée de fruits à coque, car ils sont riches en oméga 3: noix, noisettes, amandes et pistaches non salées, etc.</p>

Table 10. Dietary guidelines in France

Groupe alimentaire	Repère principal	Données complémentaires
Viande et volaille, poissons, oeufs, légumes secs	<p>En alternance:</p> <p>Viande et volaille</p> <p>Privilégier (ou préférer) la volaille et ne pas dépasser (ou limiter à) 500 g de viande¹ par semaine</p> <p>Légumes secs (lentilles, haricots, pois chiches, quinoa...): Au moins 2 fois par semaine; peuvent remplacer la viande et la volaille</p> <p>Poisson et fruits de mer:</p> <p>2 fois par semaine (dont un poisson gras²)</p>	<p>¹ boeuf, porc, veau, mouton, chèvre, cheval, sanglier, biche</p> <p>Si vous pouvez, privilégiez les légumes secs bio</p> <p>² saumon, maquereau, sardine, hareng...</p> <p>Sous toutes les formes: frais, surgelés ou en conserve</p> <p>Varié les espèces et les lieux d'approvisionnement (surtout si vous en consommez beaucoup), afin de limiter l'exposition aux contaminants (ou polluants)</p>
Aliments gras, sucrés, salés	<p>Produits et boissons sucrés, produits salés, plats préparés du commerce Nutriscore D et E</p> <p>Limiter la consommation</p> <p>Charcuterie (dont jambon blanc)</p> <p>Limiter la consommation</p> <p>Ne pas dépasser 150 g par semaine et privilégier le jambon blanc</p>	<p>Font partie de ce groupe: les céréales du petit déjeuner sauf les céréales complètes non sucrées, les pâtisseries, le chocolat, les desserts lactés, crèmes glacées, les sodas, les jus de fruits et les biscuits apéritifs...</p> <p>Font aussi partie de ce groupe: saucisses, lardons, bacon, viandes en conserve, jambons secs, crus...</p>
Huiles, beurre, margarine	<p>Tous les jours en petites quantités</p> <p>Ou: Eviter les excès Privilégier l'huile de colza et l'huile de noix</p>	<p>Le beurre est à limiter et à réserver à un usage cru ou sur les tartines</p>
Boissons	<p>La seule boisson recommandée est l'eau, à volonté</p>	<p>La consommation de boissons sucrées et au goût sucré devrait rester exceptionnelle, et pour les consommateurs, ne pas dépasser un verre par jour. Privilégier alors un jus de fruits</p> <p>Limiter également les boissons édulcorées dont la consommation entretient le goût pour le sucré</p> <p>Le thé, café et infusions non sucrés contribuent à l'apport en eau</p>

Table 10. Dietary guidelines in France

Groupe alimentaire	Repère principal	Données complémentaires
Sel	Réduire la consommation de sel	Réduire l'ajout de sel en cuisine et à table Ne pas resaler avant de goûter Ne pas ajouter de sel en cuisinant des produits en conserve Préférer le sel iodé Attention aux aliments assez ou très salés: pain, soupes du commerce, charcuterie, certains fromages...

Source: *Recommandations relatives à l'alimentation, à l'activité physique et à la sédentarité pour les adultes* (Santé Publique France, 2019).

4.10 Europe: Portugal

The first Portuguese food guide was published in 1977 and it was last revised and updated in 2003. However, in recent years, the Portuguese authorities have detected two emerging problems in the population with regard to the diet-health relation: 1) the Portuguese dietary pattern has been increasingly deviating from the basic principles of a healthy diet such as the Mediterranean diet, and 2) the co-existence of the Mediterranean diet pyramid (Mediterranean Diet Foundation, 2010) and the wheel graphic used in Portuguese food guides generates confusion among Portuguese consumers, as on several occasions, it is difficult to compare the dietary guidelines of both models. In spite of the fact that the Portuguese food wheel represents the basic principles of the Mediterranean Diet, it does not reflect the socio-cultural and environmental aspects which are reflected in the Mediterranean diet pyramid. For this reason, the Faculty of Food Sciences and Nutrition of the University of Porto (*Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto*), in collaboration with the Directorate-General of Health (*Direção-Geral da Saúde*), developed and published in 2016 a food guide that attempts to make the dietary recommendations of the Portuguese food wheel more akin to those of the Mediterranean Diet, in order to promote healthy habits among the Portuguese population (FCNAUP, 2016).

4.10.1 Description

As commented earlier, the Portuguese food guide uses a wheel graphic divided into seven segments that represent the different food groups: fats and oils, milk and dairy products; meat, fish, shellfish and eggs; legumes, cereals and cereal-based products, tubers; vegetables; fruits. The greater the segment size, the higher the recommended intake of those foods. Water is placed at the centre of the food wheel in order to highlight the importance of hydration (Figure 11).



Figure 11. Wheel graphic used by the Portuguese food guide. **Source:** (FCNAUP, 2016).

4.10.2 Messages

- Eat well to live better.
- Consume a large variety of foods within each food group or category. In order to have a varied, balanced and complete diet, eat foods from each group every day. It is important to highlight that although nuts do not constitute a separate category in the wheel, their intake is recommended.
- Consume the foods placed in the largest segments of the food guide graphic more frequently, and those located in the smallest segments less frequently; in order to maintain a proper balance.
- Limit the consumption of:
 - Food products with high sugar content. Read food labels in order to identify the products that contain lower amounts.
 - Salt (<5 g/day). A moderate consumption of foods and food products with high levels of salt (crisps, salted snacks, canned foods, etc.).
- Choose water over beverages that contain added sugar, alcohol and caffeine.
- Alcoholic drinks are not recommended for children, adolescents, pregnant and lactating women.
- Exercise regularly.

4.10.3 Guidelines

Table 11. Dietary guidelines in Portugal		
Food group	Frequency of consumption	Portions
Vegetables	Daily, multiple times	3-5 portions/day 2 bowls of salad (180 g) 1 bowl of cooked vegetables (140 g)
Fruits	Daily, multiple times	3-5 portions/day 1 piece of fruit - medium size (160 g)
Cereals and cereal-based products, tubers	Daily, multiple times	4-11 portions/day 1 loaf of bread (50 g) 1 thin slice of cornbread (70 g) 1 and a half potato - medium size (125 g) 5 spoonfuls of breakfast cereal (35 g) 6 biscuits (35 g) 2 spoonfuls of raw rice/pasta (35 g) 4 spoonfuls of cooked rice/pasta (110 g)
Milk and dairy products	Daily, multiple times	2-3 portions/day 1 cup of milk (250 ml) 1 liquid yoghurt or 1 and a half solid yoghurt (200 g) 2 thin slices of cheese (40 g) 1/4 fresh cheese - medium size (50 g) 1/2 cream cheese (coalhada) - medium size (100 g)
Meat, fish and eggs	Daily, multiple times	1.5-4.5 portions/day Raw meat/Fish (30 g) Cooked meat/Fish (25 g) 1 egg - medium size (55 g)
Legumes	Daily, multiple times	1-2 portions/day 1 spoonful of dry raw legumes (for example, chickpeas, beans, lentils) (25 g) 3 spoonfuls of fresh raw legumes (for example, peas, beans) (80 g) 3 spoonfuls of cooked/fresh legumes (80 g)
Fats and oils	Daily, multiple times	1-3 portions/day 1 spoonful of olive oil/oil (10 g) 1 spoonful of pork fat (10 g) 4 spoonfuls of cream (30 ml) 1 spoonful of butter/margarine (15 g)

Source: *Guia Alimentar Mediterrânico* (FCNAUP, 2016).

4.11 Europe: Spain

In 2005, the AESAN launched the “Strategy for Nutrition, Physical Activity and Prevention of Obesity” (the NAOS Strategy) in order to raise awareness among the Spanish population on the increasing prevalence of obesity and its consequences for health. The NAOS Strategy has promoted multiple initiatives that encourage consumers and especially children and young people to adopt healthier habits by means of a safe and healthy diet and regular exercise. Dietary guidelines for children and adolescents between the ages of 3-16 were published in 2005 (“Healthy nutrition from childhood to adolescence. Feeding your children”), the NAOS Pyramid in 2006, recommendations for the general public in 2008 (“Eat healthy and move: 12 healthy decisions”) and nutritional guidelines

for schools in collaboration with the autonomous communities (“Consensus Document on Food in Educational Centres”) in 2010 (AESAN, 2005, 2006, 2008, 2010a, b).

There are other dietary guidelines and food guides drafted by Associations for Nutrition such as: the Mediterranean Diet Pyramid by the Mediterranean Diet Foundation in 2010, the “FINUT Pyramid” by the Ibero-American Nutrition Foundation in 2014 or the “Dietary Guidelines for the Spanish Population” drafted by the Spanish Society of Community Nutrition in 2016 (Mediterranean Diet Foundation, 2010) (FINUT, 2014) (SENC, 2016).

4.11.1 Description

Spanish food guides use a graphic in the shape of a food pyramid to represent the characteristics of a varied and balanced diet such as the traditional Mediterranean Diet. The food pyramid has three levels where the different food groups are located according to their recommended frequency of consumption: daily (cereals and whole grain products, fruits, vegetables, olive oil and dairy products), weekly (fish, poultry, legumes, nuts, potatoes, eggs, red meats and animal-based products) and occasionally (sweets, snacks and sugary drinks). They also recommend engaging in physical activity (Figure 12).



Figure 12. Nutrition pyramid used in Spanish food guides. **Source:** (AESAN, 2006).

4.11.2 Messages

- Enjoy a varied diet. Divide the daily food intake into 4-5 meals per day (breakfast, lunch, evening tea, dinner), avoiding copious meals.
- Breakfast is an important meal.
- Consume:
 - High amounts of cereals, preferably whole grain.
 - 5 portions of fruits and vegetables daily.
 - Milk and dairy products daily.
 - Fish 2-4 times per week.
 - Small amounts of fats and foods rich in fats. Choose healthier fats such as omega-9 unsaturated fatty acids (olive oil), omega-6 (sunflower and soybean oils) and omega-3 (nuts, soybean oil and oily fish).
- Limit salt intake (<5 g/day).
- Choose fibre-rich foods.
- Water is the best beverage: drink at least 1.5 litres/day.
- Monitor body weight and maintain an active lifestyle. Exercise regularly (exercise muscles for 20 min/day, 2-3 times a week).

4.11.3 Guidelines

Table 12. Dietary guidelines in Spain		
Food group	Frequency of consumption	Portions
Vegetables	Daily, multiple times	5 portions of fruit and vegetables (there can be 2 portions of vegetables). 150 g of raw vegetables may be consumed as a salad (a plate or bowl: tomato, lettuce, pepper, cucumber, onion, radish, endive, carrot, etc.) and another portion of boiled or stir-fried vegetables as a main or a side dish (courgettes, French beans, Brussels sprouts, cabbage, cauliflower, spinach, peas, asparagus, carrots, leeks, turnip greens, aubergines, etc.)
Fruits	Daily, multiple times	5 portions each day of fruits and vegetables (there may be 3 portions of fruits). Each portion of fruit may be around 120 g or of a medium size: a banana, an apple, a pear, an orange or a similar fruit, a pineapple slice, two slices of melon or watermelon. A 150 ml glass of fresh fruit juice is also equivalent to a portion
Starch-based products (cereals, rice, pasta), preferably whole grain; potatoes	-	High quantities
Nuts	Weekly, multiple times	-

Table 12. Dietary guidelines in Spain		
Food group	Frequency of consumption	Portions
Milk and dairy products	Daily, multiple times	-
Meat and animal-based products	Weekly, multiple times	-
Fish	2-4 times per week	A portion of fish is equal to 100-125 g of fish fillets or 200-250 g of an entire fish (not filleted)
Eggs	Weekly, multiple times	-
Legumes	2-3 times per week	-
Water and other liquids	Daily	At least 1.5 litres/day (5-8 glasses of water or other liquids/day)
Virgin olive oil	Daily, multiple times	Small amounts

Source: Eat healthy and move: 12 healthy decisions (AESAN, 2008).

4.11.4 Spain: Catalunya

Within Spain, the Department of Health of the Public Health Agency of Catalunya (ASPCAT) has drafted, as part of its strategy lines, a set of food-based dietary guidelines called “Small changes to eat better”. This proposal includes a healthy and sustainable dietary model in accordance with the Sustainable Development Goals of the United Nations (GENCAT, 2019).

4.11.4.1 Description

The new set of dietary guidelines proposed by the ASPCAT sets three goals for improving the health of the general population:

1. Reduce the frequent consumption of ultraprocessed food products.
2. Reduce excess weight in children.
3. Increase the number of individuals who follow the recommendations of a Mediterranean diet.

4.11.4.2 Messages

To fulfil the proposed goals, the food guide contains three simple and clear messages, accompanied by pictures that help consumers to understand the foods and food conduct that should be *boosted* (Message 1), those that should be *reduced* (Message 2) and those that it is recommended to *modify and replace* by other healthier and more sustainable alternatives, with regard to either quantity or type (Message 3). For example, moderate physical activity must be boosted (30 minutes/day at least 5 times a week, which is equal to 150 minutes/week); whereas sugar and salt intake must be reduced (salt <5 g/day; sugar <10 % of the total caloric intake). Figure 13 displays examples of the aforementioned messages.



Figure 13. Presenting the message structure of the ASPCAT dietary guidelines. **Source:** (GENCAT, 2019).

To draft this food guide, all the existing scientific evidence was reviewed and other international guides in print were consulted, such as “Find your way” (Swedish National Food Agency, 2015); with subsequent adaptations to our socio-cultural and traditional preferences, priorities, production and availability.

4.11.4.3 Guidelines

Table 13. Dietary guidelines in Catalunya, Spain		
Food group	Frequency of consumption	Portions
Vegetables	2 per day, at least, at lunch and dinner “Include, at least, 5 portions every day (3 of fruit and 2 of vegetables)”	1 portion of vegetables is equal to: <ul style="list-style-type: none">• 1 plate of cooked vegetables (French beans, mashed vegetables, vegetable medley)• 1-2 tomatoes, carrots, cucumbers• 1 pepper, 1 courgette, 1 aubergine
Fresh fruit	3 per day, at least “Include, at least, 5 portions every day (3 of fruit and 2 of vegetables)”	1 portion of fruit is equal to: <ul style="list-style-type: none">• 1 orange, apple, pear, peach, banana• 1 bowl of cherries, strawberries, grapes, red berries1-2 slices of melon, watermelon, pineapple2-3 apricots, plums, mandarin oranges, figs, medlars
Whole grain starch-based products Bread, pasta, rice, couscous, etc., and also potatoes and other tubers	At each meal	-

Table 13. Dietary guidelines in Catalunya, Spain

Food group	Frequency of consumption	Portions
Nuts (raw or toasted)	3-7 handfuls each week	A handful every day
Milk, yoghurt and cheese	1-3 times per day	-
Meat, fish, eggs and legumes	No more than 2 times per day, alternately	-
Meat Red meat consists of the muscular meat of mammals such as ox, cow, pig, sheep, horse and goat. White meat, therefore, is meat from poultry as well as from rabbits	3-4 times per week (a maximum of 2 times per week for red meat)	-
Fish It is worth consuming different types of fish, both oily and non-oily varieties, and preferably sustainably sourced. Shellfish is also included in this group	3-4 times per week	-
Eggs	3-4 times per week	-
Legumes Thanks to their high nutritional levels of carbohydrates and proteins, they may be included in the group of starch-based products and also in protein products (meat, fish, eggs and legumes)	3-4 times per week	-
Water	When thirsty	-
Virgin olive oil	For seasoning and cooking	-

Source: "Small changes to eat better" (GENCAT, 2019).

5. Discussion

In order to fulfil the established objective, FBDG-based (Food-Based Dietary Guidelines) guides published by organisations and bodies in other countries were studied.

On general lines, all national and international dietary guidelines fulfil the characteristics of healthy eating models with low environmental impact (Sustainable Healthy Diets) that are included in the guide that assesses and describes the state of play regarding developments in healthy and sustainable national dietary recommendations (*Plates, pyramids, planet. Developments in national healthy and sustainable Dietary guidelines: a state of play assessment*) published by the FAO and Oxford University in 2017 (FAO/FCRN, 2017):

1. Diversity: a wide variety of foods.
2. Balance between the energy intake and energy requirements of each individual.
3. A diet based primarily on minimally processed tubers; whole grains, seeds and unsalted nuts; legumes; fruits and vegetables; oils and fats with a beneficial Omega 3:6 ratio.

4. Small quantities of fish and aquatic products from certified fisheries.
5. Moderate consumption of meat and dairy products.
6. Very limited consumption of foods rich in fats, simple sugars or salt, and low in micronutrients (crisps, sweets, sugary drinks).
7. Water as the beverage of choice, limiting the consumption of other drinks, especially sugary soft drinks.

From the comparative analysis of the different international food guides under study, we may state that:

- All the reviewed food guides recommend the consumption of fruits, vegetables, cereals, tubers, nuts, milk and dairy products, meat, fish, legumes, eggs, water and oil.
- The food guides of Finland, Norway and Spain (GENCAT) recommend the consumption of whole grain cereals (other countries make a general statement that whole grain starch-based products are preferable).
- Only the food guides of China and the United States recommend the consumption of soybean products.
- With regard to “dairy products” (milk, yoghurt, cheese, etc.), only American and British food guides include soy drinks as lactose-free alternatives. Norway is the only country that specifically recommends the consumption of lean dairy products.
- In general, all food guides recommend reducing the consumption of meat, and especially red and/or processed meat.
- The food guides of the United States, Sweden and Spain (GENCAT) are the only ones that include shellfish within the “fish” group.
- With regard to oil consumption, only the food guides of China and Portugal include a recommended daily intake amount (25-30 g/day and 10 g/day, respectively). With the exception of the United States, China, the Netherlands, France and Portugal, all countries recommend consuming virgin olive oil.
- Generally, all food guides recommend reducing the intake of salt and simple sugars. Nevertheless, only some countries recommend specific daily intake amounts.
 - Salt: most countries agree with the value recommended by the WHO (<5 g/day). The United States has a slightly higher value (<5.75 g/day). China, Sweden, the United Kingdom and the Netherlands propose an intake higher than that of the WHO (<6 g/day).
 - Sugar: only the United States, China, Sweden, France and Spain (GENCAT) recommend a maximum daily sugar intake, and all agree that the caloric value of the amount of sugar ingested should not exceed 10 % of the total daily caloric intake.
- Generally, all countries recommend reducing alcohol consumption. Nevertheless, the food guides of the United States, China, Sweden, the Netherlands and France make more specific recommendations (maximum daily intake).
- All food guides recommend engaging in daily physical exercise.

These results are in line with the study carried out by Montagnese et al. (2015), which compares the FBDG of 34 European countries. Of these FBDG, 67 % (23 out of 34) adopt the pyramid as a food guide

illustration, and classify foods into five or six groups. In spite of the differences between countries, dietary patterns, geographic conditions and cultural heritage (ethnicities), most of the key nutrition points are shared between the different European FBDG studied. The basic message is to consume appropriate quantities of grains, vegetables and fruits along with a moderate intake of fats, sugars, meats, caloric beverages and salt.

They also coincide with the analysis made by Herforth et al. (2019) of the FBDG included in the FAO. The authors point out that recommendations regarding the consumption of dairy products, red meats, fats and oils and nuts are more variable. Although the international focus of the WHO promotes the consumption of nuts, whole grains and healthy fats, these messages are not universally echoed in all countries. The future challenge for FBDG development is to include considerations regarding environmental sustainability, as well as to pay greater attention to socio-cultural factors, including rapidly changing dietary trends.

Conclusions of the Scientific Committee

Once the different food guides based on internationally available food items have been reviewed and discussed from a comparative perspective, the following food consumption guidelines are made for the Spanish population.

Guidelines for the Spanish population					
Food group	Composition	Nutritional value	Frequency of consumption	Portions	
				Net weight of each portion (raw)	Examples
Vegetables	70-90 % water, 1-5 % proteins, 1-2 % fat, 2-10 % carbohydrates	Fibre, vitamins, minerals	2-4 portions per day (mix different products, both raw and cooked)	Vegetables and fruits: 150-200 g	1 plate of assorted salad 1 plate of cooked vegetables 1 large tomato, 2 carrots 1 large potato or 2 small ones
Fruits	70-90 % water, 1-3 % proteins, 0-1 % fat, 5-20 % carbohydrates	Fibre, vitamins (especially Vitamin C), minerals	3-5 portions per day. Replace occasionally with juice	120-200 g of fresh fruit 150 ml of fruit juice	1 medium piece 1 medium bowl of cherries or strawberries 2 slices of melon
Cereals, preferably whole grain	Bread and flour: 10 % water, 8-10 % proteins, 1-3 % fats, 50-80 % carbohydrates	Fibre (in whole grain products), vitamins (B-group), minerals	Daily 4-6 portions per day	40-60 g of bread	3-4 slices or a small loaf
	Cereals and rice: 6-7 % proteins, 1-2 % fats, 85 % carbohydrates	Fibre (in whole grain products), variable, vitamins (B-group), minerals		60-80 g pasta, rice	1 normal plate

Guidelines for the Spanish population					
Food group	Composition	Nutritional value	Frequency of consumption	Portions	
				Net weight of each portion (raw)	Examples
Nuts	2-5 % water, 15-25 % proteins, 45-70 % fats, 10-20 % carbohydrates	Fibre, minerals, vitamins, lipids	Weekly, multiple times	20-30 g Without added salt	1 handful or an individual portion (15 g)
Milk and dairy products	Milk: 90 % water, 3.5 % proteins (casein), 3-4 % fats, 5 % carbohydrates (lactose)	Proteins, Ca, P, vitamins (B and D-group)	Daily 2-4 portions per day	200-250 ml of milk	1 glass/cup of milk
	Cheese: 25 % proteins, 2 % carbohydrates, Variable lipid content	Proteins, Ca, P, vitamins (B and D-group)		80-125 g of fresh cheese 40-60 g of cured cheese	2-3 slices of cheese 1 individual portion (variable)
	Yoghurt: 3-5 % proteins, 1-3 % fats, 14 % carbohydrates	Proteins, Ca, P, vitamins (B and D-group)		125 g yoghurt and other fermented milk products, without added sugars	1-2 units of yoghurt
Meat and animal-based products	Beef, mutton, pork: 60-65 % water, 12-20 % proteins, 8-30 % fats	Proteins, vitamins (B-group), minerals	2-4 portions per week. Preferably chicken or rabbit. No more than 2 portions of red meat per week	100-125 g	1 medium fillet of lean meat and poultry 1 quarter chicken 1 quarter rabbit
	Poultry: 60-70 % water, 20-25 % proteins, 3-8 % fats	Proteins, vitamins (B-group), minerals			
Fish/shellfish	Fish and shellfish: 60-70 % water, 15-23 % proteins, 1-15 % fats, 0-2 % carbohydrates	Proteins, minerals: I, F, omega 3 fatty acids (oily fish)	At least 2 portions per week. 1-2 portions of oily fish per week	125-150 g	Fish and shellfish: 1 individual fillet or various portions of shellfish
Eggs	80 % water, 6-10 % proteins, 8-12 % fats	Proteins	2-4 times per week	Medium-sized (53-63 g)	1-2 eggs
Legumes	10-20 % water, 19-24 % proteins, 1-5 % fats, 50-60 % carbohydrates	Proteins, fibre	2-4 portions per week	50-60 g	1 normal individual plate
Virgin olive oil	99 % fat	Monounsaturated fatty acids: oleic acid	Daily Preferably raw	10 ml	1 table spoon

Guidelines for the Spanish population					
Food group	Composition	Nutritional value	Frequency of consumption	Portions	
				Net weight of each portion (raw)	Examples
Water	100 % water	Water	1.5-2.5 litres per day	200-250 ml	1 glass of water
Sugar	Table sugar	-	<30 g/day. Avoid foods with added sugar	5-10 g	Dessert spoon
Salt	NaCl	-	<5 g/day = 2 g sodium/day. Do not add to the cooking process. Avoid foods with added salt	-	Pinch of salt

With regard to composition and nutritional value, the data on nutrients in the table is for 100 g of the edible parts of the foods. The recommendations for adults made in different Food Composition Tables both within Spain and internationally (Ortega Anta et al., 2004) (BEDCA, 2007) (Souci et al., 2008) (Mataix et al., 2009) (Moreiras et al., 2018) (USDA, 2018), have been considered when establishing the portions, in order to provide the most representative data for each food group. Given the significant natural variability that may be posed by food items within a same group with regard to their nutritional composition, the portions are given according to intervals.

The Scientific Committee considers that the adoption by the Spanish population of a varied and balanced diet marked by a lower consumption of animal-based foods and a higher amount of plant-based foods (that fulfil the established caloric needs and the dietary recommendations for fruits and vegetables), may improve their health and wellbeing, and simultaneously reduce the environmental impact.

Apart from following up on the dietary recommendations proposed in this report, the AESAN Scientific Committee also adopts part of the WHO guidelines and recommends the following:

- Healthy eating habits begin in the early years of life; breastfeeding favours healthy growth and improves cognitive development; it also provides long-term benefits including reducing the risk of obesity and noncommunicable diseases in later stages of life.
- Caloric intake must be in proportion to the caloric expenditure, which prevents excess weight. Fats must account for no more than 30 % of the total caloric intake, and the presence of saturated fats must be monitored.
- The consumption of free sugars lower than 10 % of the total caloric intake is part of a healthy diet. For greater benefits, it is recommended to reduce sugar intake to less than 5 % of the total caloric intake.
- Salt consumption must not exceed 5 grams per day (equivalent to 2 g of sodium per day) to prevent hypertension and reduce the risk of cardiovascular disease and stroke in adults.

- It is recommended to adopt a healthy and sustainable diet marked by the predominance of plant-based food items and a moderate consumption of animal-based products. In all cases, the consumption of seasonal and local produce must be boosted.
- Food wastage must be reduced as an additional measure for preserving our planet and in order to contribute to a more sustainable environment for future generations.

References

- AESAN (2005). Agencia Española de Seguridad Alimentaria y Nutrición. Estrategia para la Nutrición, Actividad Física y Prevención de la Obesidad" (Estrategia NAOS). Available at: http://www.aecosan.msssi.gob.es/AECOSAN/web/nutricion/seccion/estrategia_naos.htm [accessed: 10-06-20].
- AESAN (2006). Agencia Española de Seguridad Alimentaria y Nutrición. Pirámide NAOS - Estrategia NAOS. Available at: http://www.aecosan.msssi.gob.es/AECOSAN/web/nutricion/subseccion/piramide_NAOS.htm [accessed: 10-06-20].
- AESAN (2008). Agencia Española de Seguridad Alimentaria y Nutrición. Decálogo "Come sano y muévete: 12 decisiones saludables" - Estrategia NAOS. Available at: http://www.aecosan.msssi.gob.es/AECOSAN/docs/documentos/nutricion/educanaos/come_sano_muevete.pdf [accessed: 10-06-20].
- AESAN (2010a). Agencia Española de Seguridad Alimentaria y Nutrición. La alimentación de tus niños y niñas. Nutrición saludable de la infancia a la adolescencia. Available at: http://www.aecosan.msssi.gob.es/AECOSAN/docs/documentos/nutricion/educanaos/alimentacion_ninos.pdf [accessed: 10-06-20].
- AESAN (2010b). Agencia Española de Seguridad Alimentaria y Nutrición. Documento de Consenso sobre la Alimentación en los Centros Educativos. Available at: http://www.aecosan.msssi.gob.es/AECOSAN/web/nutricion/subseccion/documentos_e_informes.htm [accessed: 10-06-20].
- AESAN (2019). Agencia Española de Seguridad Alimentaria y Nutrición. Informe del Comité Científico de la Agencia Española de Seguridad Alimentaria y Nutrición (AESAN) sobre Ingestas Nutricionales de Referencia para la población española. *Revista del Comité Científico de la AESAN*, 29, pp: 43-68.
- Bechthold, A., Boeing, H., Tetens, I., Schwingshackl, L. and Nöthlings, U. (2018). Perspective: food-based dietary guidelines in Europe-scientific concepts, current status, and perspectives. *Advances in Nutrition*, 9 (5), pp: 544-560.
- BEDCA (2007). Base de Datos Española de Composición de Alimentos. Available at: <http://www.bedca.net> [accessed: 10-06-20].
- Blackstone, N.T., El-Abbadi, N.H., McCabe, M.S., Griffin, T.S. and Nelson, M.E. (2018). Linking sustainability to the healthy eating patterns of the Dietary Guidelines for Americans: a modelling study. *Lancet Planet Health*, 2 (8), pp: 344-352.
- BOE (2011). Ley 17/2011, de 5 de julio, de seguridad alimentaria y nutrición. Artículo 36, "Estrategia de la nutrición, actividad física y prevención de la obesidad (NAOS). BOE N° 160 de 6 de julio de 2011, pp: 71283-71319.
- Buttriss, J.L. (2016). The Eatwell Guide refreshed. *Nutrition Bulletin*, 41, pp: 135-141.
- Buttriss, J.L., Briend, A., Darmon, N., Ferguson, E.L., Maillot, M. and Lluch, A. (2014). Diet modelling: how it can inform the development of dietary recommendations and public health policy. *Nutrition Bulletin*, 39, pp: 115-125.
- Chinese Nutrition Society (2016). Dietary guidelines for Chinese residents (Chinese: 中国居民膳食指南). Available at: <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/China/en> [accessed: 10-06-20].
- EFSA (2010). European Food Safety Authority. Scientific Opinion on establishing Food-Based Dietary Guidelines. *EFSA Journal*, 8 (3), pp: 1460.
- EFSA (2015). European Food Safety Authority. The food classification and description system FoodEx2 (revision 2). *EFSA supporting publication* 2015, EN-804.

- FAO (2020). Food and Agriculture Organization. Food-based dietary guidelines. Available at: <http://www.fao.org/nutrition/education/food-dietary-guidelines/en/> [accessed: 10-06-20].
- FAO/FCRN (2017). Food and Agriculture Organization/University of Oxford. Plates, pyramids, planet. Developments in national healthy and sustainable dietary guidelines: a state of play assessment. ISBN: 978-92-5-109222-4.
- FAO/WHO (2019). Food and Agriculture Organization/World Health Organization. Sustainable healthy diets-Guiding Principles. ISBN: 978-92-5-131875-1 (FAO); 978-92-4-151664-8 (WHO).
- FCNAUP (2016). Faculty of Food Sciences and Nutrition from the University of Porto. Guia Alimentar Mediterrânico. Relatório Justificativo Do Seu Desenvolvimento. Available at: <https://nutrimento.pt/noticias/guia-alimentar-mediterranico-relatorio-justificativo-do-seu-desenvolvimento/> [accessed: 10-06-20].
- Ferguson, E.L., Darmon, N., Briend, A. and Premachandra, I.M. (2004). Food-based dietary guidelines can be developed and tested using linear programming analysis. *Journal of Nutrition*, 134, pp: 951-957.
- Ferguson, E.L., Darmon, N., Fahmida, U., Fitriyanti, S., Harper, T.B. and Premachandra, I.M. (2006). Design of optimal food-based complementary feeding recommendations and identification of key “problem nutrients” using goal programming. *Journal of Nutrition*, 136, pp: 2399-2404.
- FINUT (2014). Fundación Iberoamericana de Nutrición. Pirámide FINUT. Available at: <https://www.finut.org/articulos/publicacion-piramide-finut-2014/> [accessed: 10-06-20].
- Fundación Dieta Mediterránea (2010). Pirámide de la Dieta Mediterránea: un estilo de vida actual. Guía para la población adulta. Available at: <https://dietamediterranea.com/nutricion-saludable-ejercicio-fisico/> [accessed: 10-06-20].
- GENCAT (2019). Agencia de Salud Pública de Cataluña. Pequeños cambios para comer mejor. Generalitat de Catalunya. Available at: http://salutpublica.gencat.cat/web/.content/minisite/aspcat/promocio_salut_alimentacio_saludable/02Publicacions/pub_alim_salu_tothom/Petits-canvis/La-guia-peq-cambios-castella.pdf [accessed: 10-06-20].
- German Nutrition Society (2013). Ten guidelines for wholesome eating and drinking. Available at: <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/germany/en/> [accessed: 10-06-20].
- Health Council of the Netherlands (2015). Dutch dietary guidelines 2015. Publication n° 2015/24E. Available at: <https://www.healthcouncil.nl/documents/advisory-reports/2015/11/04/dutch-dietary-guidelines-2015> [accessed: 10-06-20].
- Herforth, A., Arimond, M., Álvarez-Sánchez, C., Coates, J., Christianson, K. and Muehlhoff, E. (2019). A Global Review of Food-Based Dietary Guidelines. *Advances in Nutrition*, 10 (4), pp: 590-605.
- Mataix, J., García Diz, L., Mañás Almendros, M., Martínez de Vitoria, E. and Llopis González, J. (2009). Tabla de composición de alimentos. Editado: Universidad de Granada.
- Montagnese, C., Santarpia, L., Buonifacio, M., Nardelli, A., Rita Caldara, A., Silvestri, E., Contaldo, F. and Pasanisi, F. (2015). European Food-Based Dietary Guidelines: A Comparison and Update. *Nutrition*, 31 (7-8), pp: 908-915.
- Moreiras, O., Carbajal, A., Cabrera, L. and Cuadrado, C. (2018). Tablas de composición de alimentos. Guía de Prácticas. (19th edición). Madrid, Pirámide.
- National Nutrition Council (2014). Finnish nutrition recommendations 2014. Available at: <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/finland/en/> [accessed: 10-06-20].
- Norwegian Directorate of Health (2014). Norwegian guidelines on diet, nutrition and physical activity. 2014. Available at: <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/norway/en/> [accessed: 10-06-20].
- Ortega Anta, R.M., López Sobaler, A.M., Requejo Marcos, A.M. and Andrés Carvajales, P. (2004). In book: *La composición de los alimentos. Herramienta básica para la valoración nutricional*. Editorial Complutense, S.A; 1ª edición.
- Public Health England (2016). Eatwell Guide. Available at: <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/united-kingdom/en/> [accessed: 10-06-20].

- Santé Publique France (2019). Recommandations relatives à l'alimentation, à l'activité physique et à la sédentarité pour les adultes. Available at: https://static.cnsf.asso.fr/wp-content/uploads/2019/01/2019_SPF_reco-alimentation-activite-physique-sedentarite-adultes.pdf [accessed: 10-06-20].
- SENC (2016). Sociedad Española de Nutrición Comunitaria. Guías alimentarias para la población española. La nueva pirámide de la alimentación saludable. Available at: <https://www.nutricioncomunitaria.org/es/noticia/guías-alimentarias-senc-2016> [accessed: 10-06-20].
- SENC (2019). Sociedad Española de Nutrición Comunitaria. Guía de la Alimentación Saludable para Atención Primaria y colectivos ciudadanos. Recomendaciones para una alimentación individual, familiar o colectiva saludable, responsable y sostenible. Available at: <https://www.nutricioncomunitaria.org/es/noticia/guia-alimentacion-saludable-ap> [accessed: 10-06-20].
- Souci, S., Fachmann, W., Kraut, H. and Kirchhoff, E. (2008). Food composition and nutrition tables (17th edition). MedPharm Scientific Publishers, Stuttgart.
- Swedish National Food Agency (2015). Sweden's Dietary Guidelines: "Find your way to eat greener, not too much and to be active!". Available at: <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/sweden/en/> [accessed: 10-06-20].
- Tuomisto, H.L. (2018). Importance of considering environmental sustainability in dietary guidelines. *Lancet Planet Health*, 2 (8), pp: 331-332.
- UN (2015a). United Nations. The UN Decade of Action on Nutrition 2016-2025. Available at: <https://www.un.org/nutrition/es> [accessed: 10-06-20].
- UN (2015b). United Nations. Transformar nuestro mundo: la Agenda 2030 para el Desarrollo Sostenible. Available at: https://unctad.org/meetings/es/SessionalDocuments/ares70d1_es.pdf [accessed: 10-06-20].
- USDA (2018). United States Department of Agriculture. Food Composition Databases. Available at: <https://ndb.nal.usda.gov/ndb/foods> [accessed: 10-06-20].
- USDHHS/USDA (2015). United States Department of Health and Human Services/United States Department of Agriculture. Dietary Guidelines for Americans 2015–2020. 8th Edition. Available at: <http://health.gov/dietaryguidelines/2015/guidelines/> [accessed: 10-06-20].
- WHO (1998). World Health Organization. Preparation and use of food-based dietary guidelines. WHO Technical Report Series 880. Geneva.
- WHO (2018). World Health Organization. Alimentación sana. Available at: <https://www.who.int/es/news-room/fact-sheets/detail/healthy-diet> [accessed: 10-06-20].
- Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., Jonell, M., Clark, M., Gordon, L.J., Fanzo, J., Hawkes, C., Zurayk, R., Rivera, J.A., De Vries, W., Sibanda, L.M., Afshin, A., Chaudhary, A., Herrero, M., Agustina, R., Branca, F., Lartey, A., Fan, S., Crona, B., Fox, E., Bignet, V., Troell, M., Lindahl, T., Singh, S., Cornell, S.E., Reddy, K.S., Narain, S., Nishtar, S. and Murray, C.J.L. (2019). Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. *The Lancet Commissions*, 393 (10170), pp: 447-492.

