



THE PLACE OF FRUIT JUICE IN EUROPEAN FOOD-BASED DIETARY GUIDELINES

**Comparing fruit and vegetable consumption and recommendations
in food-based dietary guidelines across Europe.**

Callewaert T., De Kraker S., Horemans S., De Rycker J.

Compiled in 2016

The purpose of national food-based dietary guidelines (FBDGs) is to encourage the population to eat more healthily. Among all of the types of food featured in the guidelines, fruit and vegetables are major contributors to good health, and they are well represented in national FBDGs. Unfortunately, however, the European population does not comply with these guidelines. This applies to both overall recommendations and those for fruit and vegetables. In designing FBDGs, authorities pay special attention to the recommendations of International and European advisory bodies including the Food and Agriculture Organization of the United Nations (FAO), the European Food Safety Authority (EFSA) and the World Health Organization (WHO). While these recommendations are valid for every European country, the individual national FBDGs differ considerably, as does their compliance rate with the guidelines. The results highlighted in this paper raise three critical questions: *How can we bridge the gap between recommendations and consumption? Is there a logical explanation why one country recommends the foods that others discourage? What are the key factors that foster high compliance to FBDGs?*

TABLE OF CONTENTS

Methodology	3
Literature sources	3
Selection of data	3
Consumption data	3
Recommendation data	3
Comparison of data	4
Conclusions	4
Consumption of fruit and vegetable juices in Europe	5
Consumption of fruit juice	5
Consumption of whole fruit and vegetables in Europe	5
Consumption of 100% fruit juice as part of total fruit and vegetable consumption in Europe	6
Sales figures vs consumption data	6
The importance of the fruit and vegetable food group	7
Non-communicable diseases, free sugars and fruit and vegetable promotion	7
How food-based dietary guidelines are created	7
Why are dietary guidelines different in all European countries?	8
Compliance & complexity	9
Bibliography	11

METHODOLOGY

LITERATURE SOURCES

This paper presents the results of a review of a body of source materials published by regulatory agencies and international bodies responsible for food and nutritional issues. Its goal is to present an overview of the relationship between recommendations and the European consumption of fruit, fruit juice and vegetables. This includes the incentives for the recommendations for this food group in European national food-based dietary guidelines.

The main sources of data and information are publications from international and European institutions, and leading public health organisations, specifically the EFSA (European Food Safety Authorities), WHO (World Health Organization) and FAO (Food & Agriculture Organization of the United Nations). Other literature used as background or quoted in this paper that was not directly published by one of these three bodies is the result of a working group with members of these organisations, promoted or endorsed by them, or has been referred to as a credible source in one of their publications. The source of consumption data in this paper is based on 2015 sales figures drawn from the 2016 Market Report of the European Fruit Juice Association (AIJN), the representative association of the fruit juice industry in Europe.

SELECTION OF DATA

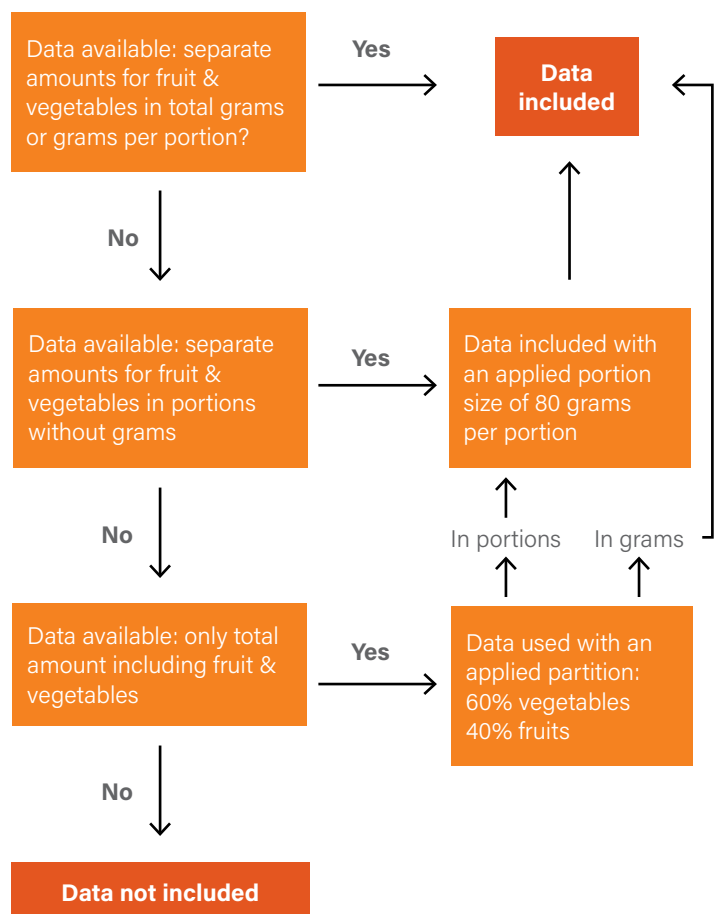
CONSUMPTION DATA

Consumption data was selected from the EFSA comprehensive food consumption database (EFSA, 2016), freely available on their website and downloaded in August 2016. Only countries' complete data, based on the determined selection criteria, were included. Selection criteria were established to obtain the largest possible relevant data collection. The criteria were: *chronic data of total population, level-one food, population class: adults*. Selection of food categories was determined as vegetables and vegetable products (including fungi), fruit and fruit products, fruit and vegetable juices. The second part of consumption data, based on sales figures, was provided by AIJN. The country data used was selected to match those countries with complete data in the EFSA database, even though the market report contains much more European data from many more countries.

RECOMMENDATION DATA

Numbers for the recommendations used in the comparisons in this paper were selected to match the countries that also have consumption data in the EFSA database and the AIJN Market Report. The numbers were abstracted from national dietary guidelines that were consulted on the FAO website (FAO, 2016). Countries with insufficient specified data were excluded from the paper. To obtain sufficient relevant data to use in the paper, countries with semi-specified data were included and organised as follows:

Flow of inclusion criteria for data from national FBDGs



European countries without available FBDGs in English, French or German were not included in this paper; however, the authors feel that this is a representative reflection of the current situation in Europe.

COMPARISON OF DATA

The like-for-like method is applied on all charts and tables used to demonstrate a comparison, an association or to gain insight. The term 'fruit and vegetables' does not include any form of fruit or vegetable juice unless specifically mentioned.

CONCLUSIONS

This paper is not a research study and not based on clinical trials. It is a review that presents a critical view of today's consumption and recommendations for fruit, fruit juice and vegetables in Europe. So it draws no final conclusions. However, the reservations and observations formulated in this paper may help answer the question as to whether available consumption data warrant the guidelines they are purportedly based on.

CONSUMPTION OF FRUIT AND VEGETABLE JUICES IN EUROPE

CONSUMPTION OF FRUIT JUICE

Figure 1: 100% fruit juice consumption (sales figures) among European adults in ml per resident (AIJN, 2016) vs. total recommendations per country for fruit and vegetables in national FBDGs (FAO, 2016)

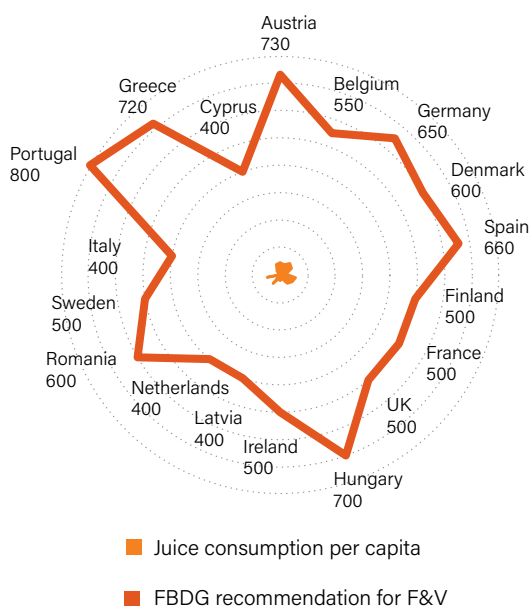
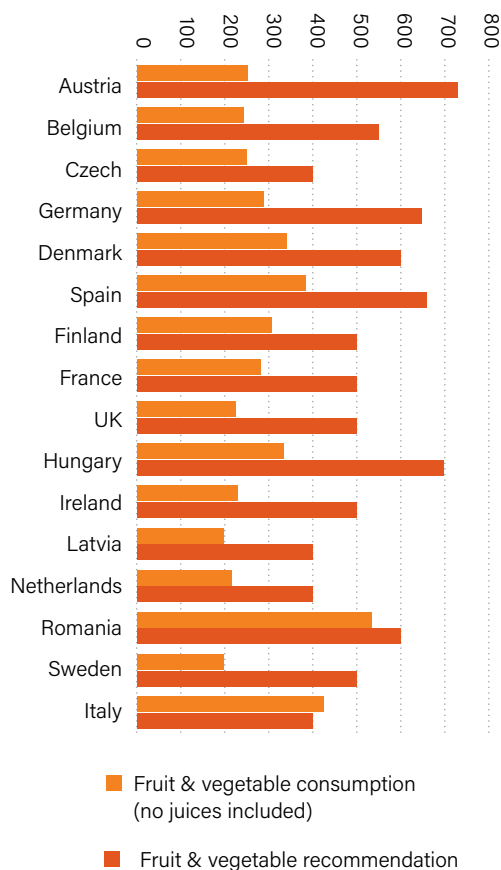


Figure 1 shows the contribution of 100% fruit juice consumption to the average recommendations for fruit and vegetables across all countries. The red spot in the middle of the graph shows how much 100% fruit juice the residents of these countries drink per person per day (PPPD) compared to the FBDG recommendations for total fruit and vegetable consumption in their country.

European citizens are advised by their national dietary guidelines to consume an average of 537 grams (EFSA, 2016) of fruit and vegetables a day. On the other hand, they consume only an average of 31 ml of 100% fruit juice a day. While in most countries authorities consider 100% fruit juice to equal one portion of fruit, European consumption data from the 2016 AIJN Market Report (AIJN, 2016) shows that the average fruit juice intake (31 ml) represents less than 30% of a fruit portion per person per day – based on average portion sizes for fruits and vegetables in FBDGs (FAO 2016).

CONSUMPTION OF WHOLE FRUIT AND VEGETABLES IN EUROPE

Figure 2: Whole fruit and vegetable consumption among European adults, in grams per resident, (EFSA, 2016) vs. recommendations in national FBDGs (FAO, 2016) – summarising vegetables and vegetable products (including fungi), fruit and fruit products (fruit and vegetable juices not included)

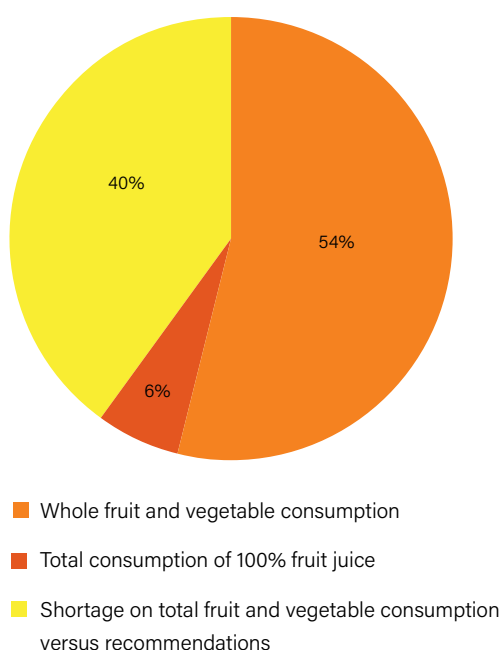


Note: Countries without available FBDGs and/or consumption data in the EFSA database were not included in this chart. However, this is a representative reflection of the current situation in Europe. These data only contain whole fruit and vegetable consumption data from national surveys, excluding all kinds of fruit and vegetable juices (see methodology).

Only one European country (Italy) meets its own recommendations. Figure 2 shows that the average compliance to country recommendations is 55%. Not all countries have specific and separate recommendations for fruit and for vegetables. Considering the separate available data for fruit only, the compliance is even worse. Only 41% of this limited population consumes the recommended amount of fruit.

CONSUMPTION OF 100% FRUIT JUICE AS PART OF TOTAL FRUIT AND VEGETABLE CONSUMPTION IN EUROPE

Figure 3: Average whole fruit and vegetable consumption (EFSA, 2016) and 100% fruit juice consumption (AIJN, 2016) among European adults vs. average recommendations for fruit and vegetables (FAO, 2016)



If one agrees with the statement of the majority of countries – that 100% fruit juice can be part of fruit and vegetable intake (FAO, 2016) – the population studied would consume 325 grams of foods belonging to the fruit and vegetable group. Consumption of 100% fruit juice being 31 ml per person per day (PPPD) (AIJN, 2016) represents less than 10% of this 325 gram amount. This assumption contradicts the common belief that people are drinking juice instead of eating fruit. As shown in Figure 3, if the 31 ml PPPD of 100% fruit juice is counted as part of daily fruit and vegetable intake, the total consumption results in a rounded compliance to the average recommendations of 60%. This still leaves the population with a big nutrition gap to bridge.

SALES FIGURES VS CONSUMPTION DATA

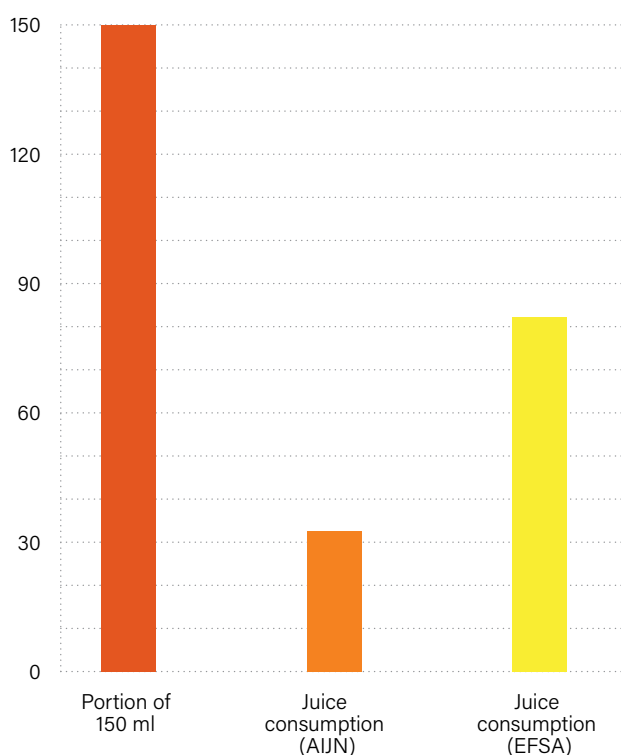
The 2016 EFSA Comprehensive European Food Consumption Database also contains data on fruit and vegetable juice consumption. An average of current consumption of fruit and vegetable juices extracted from this data shows a daily consumption of 82 ml a day (EFSA, 2016). Compared to the 100% fruit juice consumption data from AIJN's market report (31 ml PPPD, for the included countries (AIJN, 2016)) the EFSA data

seems to be high compared to AIJN consumption data. One reason for this perspective could be that EFSA database information on population surveys uses self-reporting evaluation techniques for dietary assessment. Self-reported data might overestimate the real consumption of 'healthy' foods and underestimate total energy intake/consumption of 'unhealthy' foods, resulting in 'socially preferred' answers (Cook, A, 2000). This can also be an issue of product classification, as the AIJN data covers only 100% fruit juice. The EFSA product classification is less specific and differs from country to country.

In contrast, consumption data from the juice industry can be interpreted as more accurate than self-reported data from food surveys. Even so, there is a risk of overestimation, given that waste loss has not been taken into account.

Where results from population surveys show an overestimation of juice consumption, the consumption of whole fruit and vegetables will probably also be over-reported. This raises the question: could the actual compliance to fruit and vegetable recommendations be even lower than 50%?

Figure 4: 100% fruit juice consumption among Europeans in ml per resident (AIJN, 2016) vs. consumption of fruit & vegetable juices (EFSA, 2016) vs. a 150 ml portion



THE IMPORTANCE OF THE FRUIT AND VEGETABLE FOOD GROUP

NON-COMMUNICABLE DISEASES, FREE SUGARS AND FRUIT AND VEGETABLE PROMOTION

According to the Eurodiet Report from the European Commission (DG SANCO – coordinated by the University of Crete, Greece), fruit and vegetable consumption should be widely promoted. It states that ‘the promotion of increased fruit and vegetable consumption across Europe should **be a key aspect of the European Community’s proposed nutritional policy**’ (Eurodiet, 2000). In contrast, the WHO recommends reducing the consumption of free sugars, including those from fruit juices and fruit juice concentrate. These guidelines were mainly developed to discourage the use of sweetening agents rather than fruit juice consumption per se. The WHO guideline does not refer to the sugars in fresh fruits and vegetables, or to sugars naturally present in milk, as there is no reported evidence of adverse effects from consuming these sugars (WHO, 2015).

Obviously, the daily consumption of 150 ml 100% fruit juice also contributes to a person’s free sugar intake, as these are naturally present in the fruit from which it is squeezed. Even then, consuming 150 ml of, for example 100% orange juice, which contains 13.5 grams of sugars (FJM, 2016) would fall below even the WHO’s most stringent recommendation, which restricts free sugar intake to 25 grams per day.

The health benefits of fruits and vegetables are well recognised. Hypertension, high serum cholesterol levels, obesity, smoking and low intake of fruit and vegetables were highlighted as the top five most important dietary risk factors leading to disease in the WHO European Region (WHO/FAO, 2003). Fruit and vegetables play a major role in establishing national FBDGs that aim to improve the health of a population and lower its risk of diet-related health problems.

Non-communicable diseases (NCDs) are a major cause of death worldwide (WHO, 2014), especially in high-income countries, where they are responsible for 87% of all deaths. In Europe, the prevalence of NCDs, such as obesity and type 2 diabetes, continues to increase. In many European countries, more than half of the population is overweight (Eurostat, 2008). Following this logic, general FBDGs should focus on the needs of people with NCDs, such as cardiovascular diseases, obesity and type 2 diabetes, and might contain unnecessary restrictions for people who do not suffer from these diseases. A healthy lifestyle is the best prevention for NCDs and is primarily a function of healthy eating habits. A broad

consensus exists on the health-protective effects of consuming an abundance of fruit and vegetables (WCRF, 2007). The EFSA outlines the foundations for establishing FBDGs on fruit and vegetables as follows:

***Fruit and vegetables** – Numerous ecological and prospective studies have shown a significant association of a high consumption of fruit and vegetables with a decrease in the risk of obesity, coronary heart disease and stroke (Eurodiet, 2000; WHO/FAO, 2003). Fruit and vegetables are important low-energy-density foods and at the same time important sources of dietary fibre, minerals (potassium and magnesium) and vitamins (vitamin C, folate) (EFSA 2010).*

HOW FOOD-BASED DIETARY GUIDELINES ARE CREATED

The WHO is convinced that good nutrition is important for health (WHO, 2015). The nutrient information published by the EFSA and WHO can seem quite complex and unclear to consumers, making it challenging for them to prepare nutritious meals. This lack of clarity suggests a need for clear nutritional advice that is presented in a form that consumers can understand, such as food-based dietary guidelines (FBDGs). For example, one of the rules for FBDGs is that they must use everyday language and avoid the technical jargon of nutrition science. However, establishing dietary guidelines is no easy task. Different population groups have different lifestyles, which go beyond the food that they eat. Nutritional status in the guidelines includes the way consumers prepare food and their patterns of food consumption. Because most people think in terms of food, not nutrition, the FAO and WHO recommend that every country develops its own FBDGs.

Messages to encourage healthy eating should be practical, comprehensive, simple, appealing and easy to remember (EFSA, 2010). They should also recommend foods that are affordable, accessible and varied so that they are suitable for various population groups. A joint FAO/WHO consultation report says that implementing FBDGs will be less successful if they impose radical changes to current habits rather than offering recommendations for small changes (EFSA, 2010).

In addition to their direct impact on people’s nutrition, other important societal factors form the foundations of effective FBDGs, including their interactions with sustainability, local economy or reducing the burden on the population (EFSA, 2010). These factors seem to be equal, if not more important than the health of an individual.

WHY ARE DIETARY GUIDELINES DIFFERENT IN ALL EUROPEAN COUNTRIES?

Given that the recommendations for setting dietary guidelines are generally well aligned between the international and European agencies (FAO, EFSA), it is interesting to note that national FBDGs differ significantly from country to country.

They recommend that national health authorities evaluate guidelines on their nutrient content as well as the environmental costs of implementing the recommended actions. This includes the cost of food production, processing, packaging, transport, storage and marketing (EFSA 2010).

The WHO designed its dietary guidelines to promote horticultural sustainability by emphasising the role of locally grown vegetables and fruit. One aim of this element is to support food systems that preserve the rural countryside and farmland, and require less energy for transport. So, these guidelines are not just based on nutritional needs. Moreover, dietary guidelines should be readily adapted to suit the eating habits, cultures and environments of different countries and regions (EFSA, 2010). EFSA points out that FBDGs have to be based directly upon the diet and disease relationships that are particularly important to the individual country.

Although all existing European FBDGs recognise the importance of eating fruits and vegetables, different interpretations remain on the definition of fruit and vegetables (see annex 1). Some examples: Norway includes potatoes in its fruit and vegetable group (FAO, 2014); Belgium separates fruit from vegetables (VIGEZ, 2011). Greece, in contrast, specifies 'wild greens' (FAO, 2016) and some countries recommend increasing fruit and vegetable intake without further quality or quantity specifications. Some countries' FBDGs recommend eating fresh or raw fruit and vegetables, while others recommend varying intake with canned and frozen foods. Still others advise frozen or canned fruit and vegetables as an emergency measure only. Hungary, for example, regards frozen, stewed, and dried varieties as integral parts of the fruit and vegetable group (FAO, 2016). But in France, guidelines specify frozen fruits only if fresh fruit is not available (PNNS 2002).

Pureeing, pressing and cooking affect the characteristics of foodstuffs, and this is used by some countries as a justification to eat (or not) certain foods. The presence of antioxidants in dried fruit is cited as a benefit, leading some countries to include it in their FBDGs. Other countries consider dried fruit as a 'discretionary food' because of its free sugars content. Norway, for example, specifically includes canned, frozen, raw and heat-treated vegetables, fruit, berries and dried fruit as part of the recommendation (FAO, 2016).

The Turkish FBDGs recommend fruit juice with all breakfasts (Dietary guidelines for Turkey, 2006). In Georgia, one glass of 100% fruit juice counts as a serving of fruit (FBDGs for Georgia, 2005). Estonia states that 100% juice has a high nutritional value (FAO, 2016) and France says that – while not completely equivalent to whole fruit – 100% fruit juice can help achieve nutritional goals (PNNS 2002). Greece refers to fruit juices as being likely to share some of the benefits of fruits. Latvia's FBDGs encourage people to drink citrus juice to increase the absorption of iron in the body from foods (FAO, 2016) and Romania's guidelines advise older people to drink one glass of fruit juice every day to improve their nutritional intake (FAO, 2016).

Depending on the country, FBDGs state that between 80 g and 300 g of fruit juice is equivalent to a piece of fruit. Most probably due to the WHO recommendation to '*minimise drinking sugary drinks*' and its adapted guideline on free sugars, 100% fruit juice shifted in its designation of 'good' to 'bad' in the Netherlands' '*Wheel of Five*' nutrition model (Voedingscentrum, 2016). In contrast, Croatia considers that there is no risk of excessive intake of vegetables and fruit (for example by drinking juice), provided the total energy intake is in balance (FAO, 2016).

These are just some examples of the many differences between some FBDGs in varying countries. Irrespective of their differences, all FBDGs agree that fruit and vegetables are good for health. Where some differ is in their inclusion (or exclusion) of 100% fruit juice in their recommendations.

In its 2010 report on the scientific opinion for establishing food-based dietary guidelines, EFSA says that: "*In most EU Member States, overweight and obesity, cardiovascular diseases, cancer, hypertension, dyslipidaemia, Type 2 Diabetes, and osteoporosis can be identified as important diet-related public health issues. The prevalence of these conditions varies considerably between countries...*" (EFSA, 2010)

The differences between EU countries in their prevalence of nutrient imbalances and diet-related public health issues – together with the considerable disparities across countries in dietary habits and traditions – explain why all European dietary guidelines are not identical. EFSA recommends that FBDGs are consistent with other public policies that have an impact on food availability and are integrated with other policies related to health promotion (EFSA, 2010). But providing FBDGs does not ensure compliance with them. The following table presents examples of high- vs low-complying countries.

COMPLIANCE & COMPLEXITY

Messages to encourage healthy eating should be practical, comprehensive, simple, appealing and easy to remember (EFSA, 2010). However, some examples of FBDGs reveal the opposite. Contrasting compliance to and complicity of FBDGs presents an intriguing assumption that complicity affects compliance. Or could this be a case of reversed causality?

Non-complying countries	Complying countries
<p>Netherlands (53.7%* compliance): Adults are advised to eat two servings of fruit per day (200 grams). DO eat:</p> <ul style="list-style-type: none"> ▪ Fresh fruit ▪ Pre-cut fruit ▪ Frozen fruit without added sugar ▪ Dried fruit without added sugar (limited up to a handful per day) ▪ Canned fruit in juice (limited: e.g. do not eat canned fruit in syrup) <p>Do NOT eat: juice, dried fruit with added sugar.</p> <p>The eco or organic label means sustainability.</p> <p>With tropical fruit, you should choose Fairtrade or Rainforest Alliance. Always wash fruit thoroughly under running water (Voedingscentrum, 2016).</p>	<p>Italy (106.1%* compliance): Fruit or fruit juice: three to four portions per day (one portion of fruit juice equals 150 ml) (FAO, 2016)</p>
<p>Sweden (39.4%* compliance): Eating lots of vegetables and fruit reduces the risk of problems such as obesity, cardiovascular disease and some types of cancer. It's a good idea to eat at least 500 grams of vegetables and fruit every day. This is equivalent to two generous handfuls of vegetables, root vegetables and legumes and two pieces of fruit, for example. But increasing your vegetable and fruit intake even slightly is good for your health. Sweet drinks trick the body into thinking you're not getting lots of calories. Water is by far the best drink for quenching thirst – much better than fizzy drinks, juice, soft drinks and sports drinks.</p> <p>Juices are not included in the 500-gram amount. Juice contains nutrients, for example vitamin C. However, juice provides less fibre and feels less filling than whole fruits and berries, but contributes the same amount of calories. Therefore juice is not included in the advice regarding 500 grams of vegetables and fruit a day. Smoothies, where you haven't filtered away the fibre, could constitute part of the recommended amount of fruit and vegetables (Livsmedelsverket 2015).</p>	<p>Romania (89%* compliance): Fruit: two to four portions per day. Fruit juice counts as a portion of fruit (3/4 cup fruit juice). For older people it is stated to drink one glass of fruit juice a day in order to improve their nutrition.</p> <p>Fruit juice is derived from the same food group, but contains much less fibre than whole fruit (FAO, 2016).</p>

* Compliance of whole fruit and vegetable (excluding all kinds of juices) consumption to national recommendations

With regard to communicating FBDGs, EFSA states: *“Overall, the consistency of the communication of nutrition messages to consumers is essential!”* (EFSA, 2010). From the table above, it is clear that EFSA has a point in simplifying these messages, as fewer restrictions do seem to lead to greater compliance.

Sweden is one of the countries with complicated FBDGs where the consumption of whole fruit and vegetables only meets 39.4% of total recommendations – far lower than the 55% average of all included European countries. Romania, on the

other hand, which encourages the elderly to drink fruit juice, meets the recommendations by 89%. These findings should not be considered as conclusions, as reversed causality might be involved. It is up to human behaviour specialists to determine the potential relationship between stricter rules and lower compliance. But there seems to be a link between the simplicity of FBDGs and countries’ willingness to comply. This is an issue that merits further exploration.

BIBLIOGRAPHY

- AIJN, 2016. Liquid Fruit Market Report 2015, European Fruit Juice Association market report, a concise and current snapshot of our industry. Brussels 2016.
- Cook. A , Pryer. J , and Shetty. P. Epidemiol Community Health 2000. The problem of accuracy in dietary surveys. Analysis of the over 65 UK National Diet and Nutrition Survey, 2000 54:611–616.
- Dietary guidelines for Turkey, 2006. Adequate and balanced nutrition. November 2006, Turkey Ankara.
- EFSA, 2016. The EFSA Comprehensive European Food Consumption Database. Consulted on August 2, 2016.
- EFSA, 2010. Scientific Opinion on Establishing Food-Based Dietary Guidelines, EFSA Panel on Dietetic Products, Nutrition, and Allergies, EFSA Journal 2010; 8(3):1460 , Parma, Italy 2010.
- Eurodiet, 2000. Nutrition & Diet for Healthy Lifestyles in Europe: Science & Policy Implications. Crete, June 2000.
- Eurostat, 2008. Overweight and obesity – BMI statistics, statistics on the proportion of adults who are overweight or obese in the European Union (EU). http://ec.europa.eu/eurostat/statistics-explained/index.php/Overweight_and_obesity_-_BMI_statistics. Consulted on August 2, 2016.
- FAO, 2016. Food and Agriculture Organization of the United Nations; Food-based dietary guidelines. <http://www.fao.org/nutrition/education/food-dietary-guidelines/home/en/>. Consulted on August 1, 2016.
- FAO, 2016. Dietary guidelines for the adult population in Hungary (Hungarian: Táplálkozási ajánlások a magyarországi). <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/hungary/en/>. Consulted on August 1, 2016.
- FAO, 2016. Romanian Guidelines for a healthy diet (Romanian: Reguli pentru o alimentație sănătoasă). 2006.
- FAO, 2016. Guidelines for healthy Italian food habits, 2003 (Italian: Linee guida per una sana alimentazione italiana. Revisione 2003). <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/italy/en/>. Consulted on August 1, 2016.
- FAO, 2016 Food-based dietary guidelines – Croacia (Croatian: Prehrambene smjernice) 2002, <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/croatia/en/>. Consulted on August 1, 2016.
- FAO, 2016. Dietary guidelines for adults in Greece, Ministry of health and welfare, Supreme Scientific Health Council, 1999. <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/greece/en/>. Consulted on August 1, 2016.
- FAO, 2014. Food-based dietary guidelines – Norway. Norwegian guidelines on diet, nutrition and physical activity. 2014 (Norwegian: Anbefalinger om kosthold, ernæring og fysisk aktivitet). Consulted on August 1, 2016.
- FBDG – for Georgia, 2005. Healthy eating – The main key to health, Public Health Department Ministry of Labor, Health and Social Affairs World Health Organization 2005.
- FJM, 2016. Nutrientchart 100% orange juice, an average of several European countries. Brussels, 2016.
- Livsmedelsverket 2015. Råd om bra matvanor – risk- och nyttohanteringsrapport, Swedish Food based dietary guidelines. <http://www.livsmedelsverket.se/globalassets/rapporter/2015/rapp-5-hanteringsrapport-slutversion.pdf>. Sweden, 2015.
- PNNS, 2002. La santé vient en mangeant, le guide alimentaire pour tous, Paper prepared under the National Nutrition and Health Program, Saint-Yrieix-la-Perche 2011.
- VIGEZ, 2011. Vlaams instituut voor gezondheidspromotie en ziektepreventie; de actieve voedingsdriehoek. <http://www.vigez.be/themas/voeding-en-beweging>. Consulted on August 1, 2016.
- Voedingscentrum, 2016. Gezond eten; de schijf van vijf. <http://www.voedingscentrum.nl/nl/gezond-eten-met-de-schijf-van-vijf.aspx>. Consulted on August 1, 2016.
- WCRF, 2007. World Cancer Research Fund and American Institute for Cancer Research. Food, nutrition, physical activity and the prevention of cancer: a global perspective. Washington DC, AICR. 2007.
- WHO, 2015. WHO calls on countries to reduce sugars intake among adults and children, press release. Geneva, March 4, 2015.
- WHO, 2015. Healthy Diet, Factsheet N°394: Updated September 2015. <http://www.who.int/mediacentre/factsheets/fs394/en/>. Consulted on August 5, 2016.
- WHO, 2014. Obesity and inequities, Guidance for addressing inequities in overweight and obesity Belinda Loring & Aileen Robertson, Denmark 2014.
- WHO/FAO, 2003. Diet, nutrition and the prevention of chronic disease. Report of a Joint WHO/FAO Expert Consultation. Geneva 2003.

Conflict of interest statement

As lead author of this paper it is my ethical obligation to report we received funding from the Fruit Juice Matters Programme in the establishment of this paper. However, this relationship has in no way affected the outcome and interpretations presented here. All contributors' neutrality and integrity is to be ensured.