

Research Article

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Changing the food for the future: food and sustainability

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Abstract: Sustainability is currently one of the most pressing topics, and it is accepted that food has strong implications on the concept. On the other hand, food is very relevant for tourism, since not only it is part of the daily behaviour, but also it is also presented as a product. That is why we need to train food professionals with an increasing awareness to these issues in order to enable them for the design and production of sustainable and balanced meals.

Within the context of two curricular units included in the graduation on Cookery and Food Production, students were challenged to develop sustainable and balanced meals by reformulating the proportions of food, giving privilege to the vegetable component of the dish and lesser importance to products of animal origin. This includes the dish design and naming of the recipes. Some teacher-student dialogue was used, complemented with primary data collected by a questionnaire.

Results were undoubtedly good. Students became aware of the differences between the quantities normally served and those needed from the health and nutrition point of view, which also have a greater impact on sustainability. Considering the 17 United Nations (UN) Goals, several were focused, namely no. 3 – good health and well-being and no. 12 – responsible consumption and production.

Intervening and training future professionals in this area will make it easier to convey these good practices not only to the hospitality service, but also to the public daily

life, with the potential to change mentalities about what should be the food for the future.

Keywords: Health; Sustainability; Plant-based diets; Food and tourism

1 Introduction

In the past years, there has been an increasing concern about sustainability, in light of its importance for the future of the planet. Food is one of the aspects that has a significant impact on sustainability, with implications in several of United Nations (UN) Sustainable Development Goals (SDGs) (Willett et al., 2019; United Nations, 2018).

Currently, we have a large body of scientific evidence supporting the need to change food systems to reduce consumption of animal products by promoting food patterns based on plant foods.

Besides the fact that plant-based diets are better for the environment and the planet, this food pattern is also better for the health of populations, which means that sustainability and health interconnect with each other, because the basis of a balanced diet is very close to the principles of sustainable food

(Hemphill, 2017; van Dooren, Douma & Aiking, 2017).

A report by the Lancet Commission, published earlier this year, refers to malnutrition, obesity and climate change as the three phenomena that have the greatest impact on the future of the planet and people. Malnutrition is currently the largest worldwide cause of health loss, either through lack of food or through excessive consumption of foods of low nutritional value, leading to obesity. In addition to the effect that this phenomenon has on health, it is related to and aggravates climate change that, in turn, will lead to the production of foods with lower nutritional content, increase the price of food and divert food consumption to foods with less nutritional relevance and greater energy density, reinforcing obesity, creating a vicious cycle that strengthens itself (Swinburn et al., 2019).

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For tourism, food is relevant, firstly because it is part of the daily behaviour. As tourists, in any country or place, people always need to eat. On the other hand, food can also be offered and presented as a product. Food is part of culture and people often consume it as part of the touristic experience.

Although it is not easy to retrieve data on how many tourists we have in Portugal each year, numbers from the National Authority for tourism show that, in 2018, we had a total of 57.6 million tourist overnight stays in the country, coming from the total number of people who used any kind of tourist accommodation establishment (Turismo de Portugal, 2019). Even if we consider that a part of these are work-related accommodation, all these people must have eaten during their trip. If we estimate an average of two meals a day, we have around 115 million meals a year, which is a considerable number of food items and food practices with an impact on sustainability. A considerable percentage of them may be truly “foodies”, people who travel because of their search for (nice) food experiences.

Animal food production is one of the factors that contribute the most to the degradation of the earth, loss of biodiversity and climate change. Foods of vegetable origin are more efficient at converting natural resources into energy and nutrients for human consumption (Riordan & Stoll-Kleemann, 2015). Greenhouse gas emissions amounting to 15%–23% are related to agriculture; but of these, 12%–19% have to do with animal production, which means that reducing meat consumption is imperative not only for health reasons, but also for sustainability issues (Swinburn et al., 2019).

However, in our society and particularly in developed countries, meat and dairy products are seen as positive “healthy” foods, particularly as an exceptional source of protein. The food industry reinforces these messages and way of thinking and also makes these products being seen as extremely affordable (Riordan & Stoll-Kleemann, 2015).

Not only these foods are perceived as extremely good and important, but also our food patterns translate and extend this way of thinking by excessive consumption of meat, which is a common practice. The centrality of the dishes is in the meat or fish, and this is something that is taught to us since we are very young, which becomes a habit and part of our conception of what is a proper food pattern and standard (de Boer & Aiking, 2017; Riordan & Stoll-Kleemann, 2015; Graça et al., 2019).

In any restaurant, and for the great majority of chefs, the recipes that are available always highlight meat or fish. Protein, as a nutrient, is viewed as the most important of nutrients, and dishes are protein-centred, with meat or fish as the main component of the dish. This puts

vegetal components at the last place, with most people not appreciating them and often doing without them or treating them as a mere decoration element on a plate (de Boer & Aiking, 2019).

While meat has a symbolic meaning associated with convenience, wealth and well-being (Korzen & Lassen, 2010), vegetables are foods associated with poverty and food shortages. Despite the recommendations and countless studies that associate and recommend a greater intake of vegetables, people do not value their consumption or their importance in health (IFIC Foundation, 2018; Mc Morrow et al., 2016; Schösler & de Boer, 2018) and our current consumption does not meet the recommendations (Lopes et al., 2017).

The education of food professional poses an important role in these subjects, while it can deconstruct myths and provide an opportunity to engage these professionals in innovative ways of looking at food, the way it is thought about and how it is served to the consumer (Navarro et al., 2012), thus creating a break for change and novel food systems.

For all these reasons, the objective of this research was to train future food professionals for increasing their awareness on these issues and, on the other hand, enabling them for the design and production of sustainable and balanced meals. The purpose of this work was to increase awareness about health and sustainability issues in tourism and hospitality students, increase technical skills in vegetable preparation and cooking, design and develop sustainable and balanced meals and understand the difference between current and future practices.

2 Methodology

Within two curricular units that work as an interdisciplinary subject between Dietetics and Culinary Arts, specific tasks were added to an assignment focusing on health, nutrition and sustainability. Apart from the usual recipe development that occurs for these classes, the tasks included calculation of food portions (FCNAUP, 2003) and carbon footprint (CLEANMETRICS, 2008) for each dish and also renaming of the dishes stating the vegetable items first and the animal products last.

A questionnaire was created to assess students' feedback on the assignment and how it affected their competence and awareness on sustainability and health. Since no other similar studies or questionnaires were found related to this subject, the authors developed a questionnaire considering the objectives of the study. The ques-

tionnaire included 16 total questions, which consisted of 3 initial questions to characterise the sample (nationality, age and gender); 9 linear-scale questions, in which a Likert Scale of 9 points was used to evaluate how the assignment contributed to competence and awareness (knowledge of sustainability, knowledge of how food relates to sustainability, awareness on sustainability, knowledge on food groups and recommended portions, technical skills on cooking and preparing vegetables, ability to create more balanced and sustainable dishes, awareness on the need to increase vegetable consumption and reduce meat consumption); 2 questions on the importance of the role of cooking professionals on these issues and 2 final questions about how much students enjoyed doing the assignment and which aspects could be improved.

The questionnaire was developed using Googleforms platform and was sent to all of the students who attended both classes. The data were analysed using the software RStudio version 1.1.453.

3 Results and discussion

A total of 37 students answered the questionnaire (40.5% female and 59.5% male). The age of the respondents varied from a minimum of 20 to a maximum of 42 years, with an average of 24 years.

The results from the questions about how students perceived their acquired competences related to sustainability and balanced meals are presented in Figure 1. The boxplots clearly show that the majority of responses are concentrated between 6 and 9, revealing that they felt the proposed assignment increased their knowledge in this matter.

A total of 89.2% of students scored 6 or more on the question about if the assignment contributed to increased knowledge on sustainability and 67.7% scored 7 or more on the question about how the assignment contributed to understanding the impact food has on sustainability. This teaching–learning–experience also greatly contributed to learn about food groups and food portions; 70.3% scored 7 or more on food groups and 86.5% on food portions, with 40.5% scoring 9 for this question. Although food groups and food portions are covered in Nutrition class in the first year, only in the last semester (6th semester, 3rd year), students have the opportunity to explore food portions in the practical classes, observing exactly what a certain amount of gram means visually on a plate. They got this opportunity only due to the collaborative work done by the two teachers (authors) involved in the study.

The competence that reached lower values was about learning of vegetable cooking techniques. Results varied from 1 to 9, with 35.1% of students scoring less than 6. Nevertheless, 56.75% of the students answered this question 7 to 9 points. The lower values on this question imply that students must better explore these cooking techniques and be trained in them.

Globally, students feel that this assignment largely contributed to their ability to create more sustainable and balanced meals. This was the question that scored the higher values, 78.4% scoring 7 or above, of which 56.8% scored 8 or 9.

Students also reported that this teaching–learning experience contributed to an increased awareness about food and sustainability. These results are presented in Figure 2.

A total of 81.1% scored 6 or more on general increased awareness of sustainability. Awareness of the importance of reducing meat consumption and increasing vegeta-

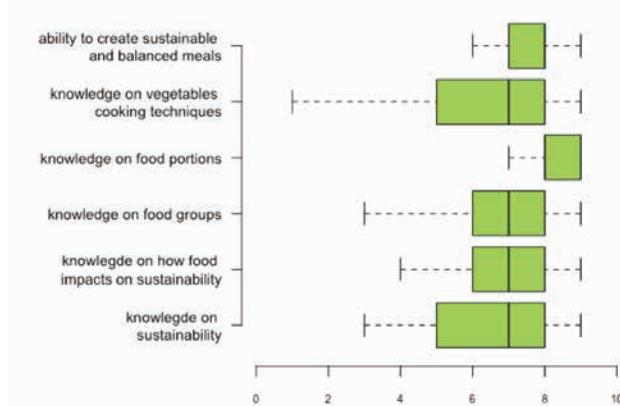


Figure 1: Students' perceived acquired competences

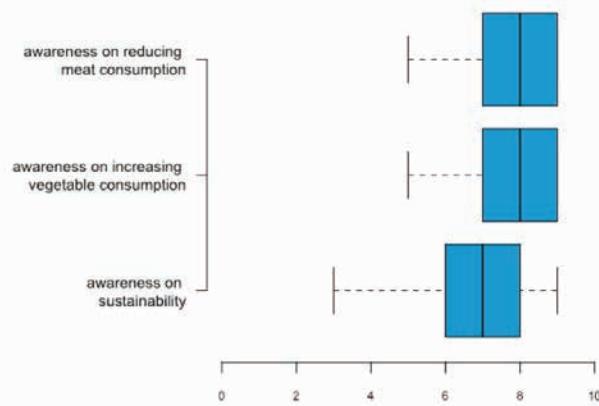


Figure 2: Students' report on their awareness of food and sustainability

ble consumption was even higher, with 84.2% scoring between 7 and 9 for increasing vegetables and 83.8% scoring in the same range for reducing meat.

All the students stated that cooking professionals (chefs) have an important role to play on sustainability issues, considering that this role is very important, with 83.8% scoring between 7 and 9, of which 54.1% scored 9.

General feedback on the assignment was very positive (86.5% scored between 7 and 9 on how much they enjoyed working on the assignment). Only 10 students wrote comments on the single open question, stating that it was a motivating and dynamic experience that generated self-interest and commitment, especially the fact that they were working to present to an outer public. The less-positive aspect is the fact that some student groups may be too big, which does not always allow for the best group interaction.

We have stated before that plant-based foods have a negative perception. Although they are excellent food from the nutritional and environment point of view, their value is not well recognised either by the public or by food professionals.

Of all the plant-based foods, vegetables are considered the most difficult to know (too many varieties are available) and are harder to choose and select, either from the quality point of view, meaning the characteristics of each vegetable that allow the consumer to know that it is in the right state for preparation and cooking, organoleptic quality, or from the cooking procedure point of view – which vegetables go better with what and how to cook them. Students feel they are less creative with vegetables, and that they associate vegetable cooking and preparation as being harder and more time consuming.

This reflects on the teachers; as the mindset of cooking professionals is meat-centred, cooking classes do not focus on vegetable cooking techniques. So, when faced with the challenge to do it, students find it hard to cope with the challenge. Also, although students were specifically trained on this during the assignment, it is the one competence that scored lower values on the questionnaire, which means that more effective and broader work must be done in this area, probably starting from the first year of cooking classes.

Another issue that emerged was the perception that vegetable food is less tasty food. Studies have shown that taste is the major driver of food choice and acts as the main barrier when trying to reduce meat consumption, which is extremely linked to pleasure (Riordan & Stoll-Kleemann, 2015). When confronted with the need to reduce meat by half or more, students reported "... no one will like that..." and "... people will be hungry if they don't eat

meat..., no one will eat the vegetables...". Chefs wish to provide good experiences and the idea of pleasure seems to be clearly associated with the meat-eating experience. There are several factors that contribute to taste perception, the physiological ones (basic tastes and flavour), individual factors, such as preferences, health or mood, and the ones that are related to food palatability, such as texture, colour, shape, sound, and temperature

(Aschemann-Witzel, Ares, Thøgersen, & Monteleones, 2019; Eertmans, Baeyens, & Van den Bergh, 2001; Forde, 2018). Chefs must be able to act on these last ones, working to create plant-based foods that are extremely tasty, full of flavour, with a nice texture, shape and colour, innovating to increase acceptability and consumer experience. Once again, this is an issue that needs to be addressed in cooking classes, reformulating the curricula in order to increase the number of classes of vegetables and other plant-based foods that are prepared and cooked.

Nutrition and carbon footprint calculation, comparing animal- versus plant-based foods, yields a lot of surprise and discussion. From these discussions, we were led to believe that it is important to advocate for plant-based food, so that they gain a different status, more modern and fashionable, associating the concepts of intelligence, social status, elegance and wealth to eating of these types of food. Using some of these exercises to create posters and other material to become available for cooking professionals and consumer may be a way of changing the perceptions, and therefore changing the way people eat and look at different foods.

4 Conclusion

This study allowed for a better understanding of some of the issues underlying the low use and consumption of vegetables, related to cooking professionals. It also showed that with adequate challenges and proper training, it is possible to change perceptions and increase awareness on the health and sustainability concerns, allowing for better practices.

Investing on new techniques for cooking and presenting plant-based foods, we are creating a pathway to increase vegetable consumption, which will address SDG no. 3 – good health and well-being, while reducing the focus on animal proteins and foods. This also responds directly to the SDG no. 12 – responsible consumption and production. Indirectly, these actions will then act on many of the other UN 17 objectives, namely: no. 6 – clear water and sanitation, no. 8 – decent work and economic

growth, no. 11 – sustainable cities and communities, no. 13 – climate action, no. 14 – life below water and no. 15 – life on land. Also, all this work is developed in partnership with other institutions, looking to get the message out to the public, acting to foster healthy lifestyles, which addresses objective no. 17 – partnerships for the goals.

Intervening and training future professionals in this area will make it easier to convey these good practices to the hotel, catering and tourism employers and market, leading to the creation of differentiated and innovative products. As tourism, restaurants and catering services are so widely distributed and are largely used by tourists and people in their daily working or leisure activities, this setting could have a pedagogical role in the sense that a more innovative/sophisticated experience could allow the message to be brought to the public (consumers) with the potential to change mentalities and the perception about what should be the food for the future.

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As a nutritionist, she started her career in ICA (2000–2005), a catering company, as a member of the Quality Department, auditing catering units, training in hygiene and food safety and in management of the Quality Assurance System. She has been the Coordinator of the Master's degree for Quality and Food Safety in Catering Services and the Master's degree for Innovation in Culinary Arts.

Anna Lins attended the Cookery and Food Production Course at ESHTE, while she began to develop her expertise in Japanese cuisine in the Midori Restaurant (Cesar Park Penha Longa). She was the first Portuguese woman to venture these paths and the first to be certified by All Japan Sushi Association. She has worked in Bica do Sapato Sushi Bar, QB Essence, and started her own projects, Umai "Asian twist" and Izakaya. She has also written a book on sushi and has participated in numerous gastronomic events. Since 2009, she has been teaching Culinary Arts – World and Dietetic Cuisine at Estoril Higher Institute of Tourism and Hotel Studies. In 2015, she became the executive chef of the Go Natural healthy catering chain,

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References

- [1] Aschemann-Witzel, J., Ares, G., Thøgersen, J., Monteleone, E. (2019). A sense of sustainability? –How sensory consumer science can contribute to sustainable development of the food sector. *Trends in Food Science & Technology. Article in Press*. <https://doi.org/10.1016/j.tifs.2019.02.021>
- [2] de Boer, J., Aiking, H. (2017). Pursuing a low meat diet to improve both health and sustainability: how can we use the frames that shape our meals? *Ecological economics*, 142, 238–248. <http://doi.org/10.1016/j.ecolecon.2017.06.037>
- [3] de Boer, J., Aiking, H. (2019). Strategies towards healthy and sustainable protein consumption: A transition framework at the levels of diets, dishes, and dish ingredients. *Food Quality and Preference*, 73, 171–181. <http://doi.org/10.1016/j.foodqual.2018.11.012>
- [4] CLEANMETRICS. (2018, May, 9). *Food Carbon Emissions Calculator*. Retrieved from <http://www.foodemissions.com/foodemissions/Calculator.aspx>
- [5] Eertmans, A., Baeyens, F., & Van den Bergh, O. (2001). Food likes and their relative importance in human eating behavior: review and preliminary suggestions for health promotion. *Health Education Research*, 16(4), 443–456. <http://doi.org/10.1093/her/16.4.443>
- [6] Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto. (2003). A nova RODA DOS ALIMENTOS. Porto.
- [7] Forde, C. G. (2018). From perception to ingestion; the role of sensory properties in energy selection, eating behaviour and food intake. *Food Quality and Preference*, 66, 171–177. <http://doi.org/10.1016/j.foodqual.2018.01.010>
- [8] Graça, J., Truninger, M., Junqueira, L., Schmidt, L. (2019). Consumption orientations may support (or hinder) transitions to more plant-T based diets. *Apetite*, 140, 19–26.
- [9] Goyal, R., & Deshmukh, N. (2018). Food label reading: Read before you eat. *Journal of Education and Health Promotion*, 7(1), 56. http://doi.org/10.4103/jehp.jehp_35_17
- [10] Hemphill, L. (2017). Sustainable Food Systems for Preventative and Prescriptive Medicine, 1–3.
- [11] IFIC Foundation. (2018). 2018 Food and Health Survey Report (pp. 1–63). International Food Information Council Foundation. Retrieved from <https://foodinsight.org/wp-content/uploads/2018/05/2018-FHS-Report-FINAL.pdf>
- [12] Jacob, C., Boulbry, G., & Guéguen, N. (2017). Does the information regarding the ingredients composing a dish influence consumers' decisions? An evaluation in a restaurant. *Journal of Hospitality & Management*, 26(2), 207–214. <http://doi.org/10.1080/19368623.2016.1194796>

- [13] Korzen, S. & Lassen, J. (2010). Meat in context. On the relation between perceptions and contexts. *Appetite*, 54(2), 274-281.
- [14] Lopes, C., Oliveria A., Torres, D., Severo, M., Alarcão, V., Guiomar, S., ... Ramos, E. (2017). Inquérito Alimentar Nacional e de Atividade Física (IAN-AF 2015-2016). Porto: Universidade do Porto. Retrieved from <https://ian-af.up.pt/relatorios>
- [15] Mc Morrow, L., Ludbrook, A., Macdiarmid, J. I., & Olajide, D. (2016). Perceived barriers towards healthy eating and their association with fruit and vegetable consumption. *Journal of Public Health*, 5((4)), fdw038–10. <http://doi.org/10.1093/pubmed/fdw038>
- [16] Navarro, V., Serrano, G., Lasa, D., Aduzriz, A.L., Ayo, J. (2012). Cooking and nutritional science: Gastronomy goes further. *International Journal of Gastronomy and Food Science*, 1, 37-45. doi:10.1016/j.ijgfs.2011.11.004
- [17] Schösler, H. & de Boer, J. (2018). Towards more sustainable diets: Insights from the food philosophies of “gourmets” and their relevance for policy strategies. *Appetite*, 127, 59-68.
- [18] Swinburn, B., Kraak, V., Allender, S., Atkins, V., Baker, P., Bogard, J., ... Dietz, W. (2019) The Global Syndemic of Obesity, Undernutrition, and Climate Change: *The Lancet* Commission report. *Lancet*, 393, 791-846. doi.org/10.1016/S0140-6736(19)30310-1
- [19] Riordan, T. & Stoll-Kleemann, S. (2015). The challenges of changing dietary behaviour toward more sustainable consumption. *Environment*, 57(5), 4–12.
- [20] Turismo de Portugal. (2019). *Estatísticas – Dormidas*. Retrieved from <https://travelbi.turismodeportugal.pt/pt-pt/Paginas/PowerBl/dormidas.aspx>
- [21] United Nations. (2018). *Sustainable Development Goals*. Retrieved from <https://sustainabledevelopment.un.org/?menu=1300>
- [22] van Dooren, C., Douma, A., Aiking, H., Economics. (2017). Proposing a novel index reflecting both climate impact and nutritional impact of food products. *Ecological Economics*, 131, 389–398. <http://doi.org/10.1016/j.ecolecon.2016.08.029>
- [23] Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., ... Vermeulen, S. (2019). Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet*, 393(10170), 447–492. [http://doi.org/10.1016/S0140-6736\(18\)31788-4](http://doi.org/10.1016/S0140-6736(18)31788-4)