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# Twelfth International Conference on Culinary Arts and Sciences

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**The Worshipful Company of Cooks  
&  
The Institut Paul Bocuse Research Center**





MENU, FOOD & HOSPITALITY MAGAZINE

# MENU

**VOLUME 10 - SPECIAL ISSUE**

REPORT OF ICCAS PROCEEDINGS

**Twelfth International Conference  
on Culinary Arts and Sciences**

# **TWELFTH ICCAS INTERNATIONAL CONFERENCE ON CULINARY ARTS AND SCIENCES**

**Lyon, 2 – 3 June, 2022**

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# PREFACE

**MENU is the magazine of the Institut Paul Bocuse.**

MENU provides updates on the Institut's latest research and innovations and shares views relevant to the **Culinary arts, Food service, and Hospitality**.

It offers a **multidisciplinary, open source of information** by diffusing experimental research data from pilot and applied fieldwork, conducted primarily at the Institut's site, and helps distribute commentary and preliminary work from the Institut's public and private partners.

This magazine aims for a broad audience beyond just scientists, including students and professionals in food service, hospitality, and food sectors.

MENU favors papers that contribute to the challenge of **tasty, healthy, and sustainable diets** for all people and in all contexts.

This volume (#10) publishes the works presented at the 12<sup>th</sup> International Conference on Culinary Arts and Sciences held in Lyon on June 2<sup>nd</sup> and June 3<sup>rd</sup> 2022 – Some of these communications will be published in a special issue of the Elsevier® *International Journal of Gastronomy and Food Science*.

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# ICCAS 2022

## The 12th International Conference on Culinary Arts and Sciences

2 – 3 June, 2022

### **Sustainable meal systems worldwide: Challenges for Culinary Arts and Sciences**

#### **The ICCAS**

The International Conference on Culinary Arts and Sciences (ICCAS) was founded in 1993 by the Worshipful Company of Cooks of London as a forum for culinary artists and scientists from academia and industry to present their work and share ideas. ICCAS is the only international conference that brings together the two sides of the international food industry, food science and food service.

Eleven ICCAS conferences have been held around the world in countries which include England, Egypt, Norway, Portugal and the USA.

The 12<sup>th</sup> conference will be the first time that ICCAS will be held in France, in Lyon, also known as the capital of the French gastronomy.

The Institut Paul Bocuse, a leading higher education school in Culinary Arts, Food service and Hospitality, will host the conference.

The venue will uniquely bring together food scholars from all over the world with local, national and international culinarians, food scientists, food enthusiasts, members of the food trade.

#### **Theme of the 12<sup>th</sup> ICCAS conference**

The way we eat and the food we produce, process and distribute are intrinsically linked to the health and well-being of individuals as well as to the protection of the planet.

**The 12<sup>th</sup> ICCAS conference focuses on the active role of the culinary arts and food sciences in the creation and dissemination of healthy and tasty foods that meet the economic, societal and environmental challenges of sustainable meal systems for all citizens.**

**Sustainability** is understood as the capacity to be beneficial in a long term regarding the environmental, health, social and cultural dimensions.

**Meal systems** are understood as all the factors surrounding the production, the distribution and the consumption of meals, namely the food items to be used (source, quality, plant vs. animal etc.), the preparation of meals, their context (places, occasions, at home, in restaurants, ...) their distribution (service, delivery – especially developed in the COVID-19 pandemic context, ...) and the social relations around the meal (commensality). It operates within- and is influenced by- social, cultural, political, economic and environmental contexts.

In addition to developing the central thrust of the conference, themes will focus on:

**Food Culture:** Role of culture in the way we are eating and its evolutions. Topics include: gastronomic heritage, acculturation, ethnic restaurants, *terroir* and geographical indications, food tourism, transmission, culture and identity.

**Foodservice and Hospitality:** The provision of sustainable foods and services in commercial and institutional settings. Topics include: Culinary production and innovation, menus, food variety, food provenance, public meals in education, health and workplace.

**Food Systems and Politics:** The distribution systems that encompass agricultural commodities as they travel and transform from farm to table. Topics include: Agricultural, urban and food distribution systems, social justice, just transition, food geography, food economics, governance issues.

**The resilience of the food and food service sector in a crisis context:** the impacts of covid19 on the food and hospitality sector. Topics include: adaptation to sanitary measures, managing social distance, alternatives to on-site consumption and food delivery, economic and managerial impacts of confinement and deconfinement.

**Food Marketing, Food Habits and Consumer Behavior:** Understanding market influences. Topics include: The marketing of food products and foodservice, nudging, eating and drinking habits and behaviors.

**Food Science and Safety:** Making food safe and plentiful. Topics include: food science, food technology, food fortification, food safety, sensory evaluation and analysis, and biotechnology.

**Nutrition and Wellbeing:** The place of food in overall health, disease prevention, healing and wellbeing: Topics include: Nutrition, food consumption, food choice, portion size, demographic determinants, food security and wellbeing.



**ICCAS 2022**  
Lyon, France

## PART I - ORAL PRESENTATIONS

### SESSION 1: FOOD ADAPTATION TO HEALTH CONCERNS AND CONSUMER PREFERENCES

# Effects of Dietary and lifestyle management on type 2 diabetes development among Ethnic minority adults living in the UK: A generational shift

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This communication was submitted as a paper for the special issue of the *International Journal of Gastronomy and Food Science*.

## Introduction

Non-communicable diseases (NCD) contribute to most health problems worldwide and are the main drivers for causing disability (Global Burden of Disease Study, 2017). An increase in disability globally was observed due to metabolic conditions such as type-2 diabetes (T2D) (Global Burden of Disease Study, 2017). Besides disability, diabetes is today also one of the top ten causes of death worldwide (Ahmed *et al.*, 2020); thus, it has become a common disease which needs health emergencies. A rapid burden of diabetes in adults is observed in the UK and the prevalence is increasing over time (Diabetes UK, 2019). The higher risk group of T2D includes ethnic populations such as South Asian or Black Afro-Caribbean people (Diabetes UK, 2019).

Jointly genetic, epigenetic, and environmental factors related to T2D (Prasad and Groop, 2015; Ahmed *et al.*, 2020; World Health Organization, 2021). Environmental means modifiable factors include dietary behaviour and physical activity (Prasad and Groop, 2015). Ethnic minorities such as South Asians genetically carry fewer  $\beta$ -cells, and over the life-course failure of those cells leads to diabetes (Bhopal, 2013). Thus, to reduce CVD risk and improve health in adults, prevention of T2D demands priority by enhancing a healthy diet and lifestyle globally (Hu, 2011). It is because more than half of the T2D cases are possible to prevent or delay by maintaining a healthy lifestyle and dietary habits (Diabetes UK, 2019).

In general, unhealthy dietary habits triggered the global burden of disease (GBD 2016 Risk Factors Collaborators, 2017), causing diabetes, cardiovascular disease ("CVD"), and certain cancers. Dietary habits are dynamic and are influenced by individual choice, health benefits, and culture, where the people grow and live for a long time (Pieroni *et al.*, 2007). Thus, the choice of fruits and vegetables, amount of daily consumption of those, and the cooking style differ due to acculturation and affect T2D diabetes prevention and development.

The changing pattern of such modifiable factors like dietary behaviour for different generations in ethnic populations is unclear yet in literature, particularly in the UK, as some evidence exists for the immigrant population in the US. Research in the US demonstrated that an unhealthy dietary habit such as low fruit and high fast food existed due to long-time acculturation in Latina immigrants in the USA (Kasirye *et al.*, 2005). Acculturated first-generation Chinese Americans consume more sweets, fatty foods, and soft drinks, and thus were advised to reduce such unhealthy diets; while the second generation was advised to follow a healthy lifestyle including more fruit and vegetable consumption (Lv and Cason, 2004).

The fourth prominent risk factor for mortality worldwide is deemed as sedentary activity (Ranasinghe *et al.*, 2013). A lower level of physical activity was stated by South Asians born population outside the UK (1st generation) than those born inside the UK (2nd generation). This difference can be partly explained by cultural differences (Williams *et al.*, 2011). Past studies show that North African, South Asian, African Caribbean, and Mexican immigrants in Europe are less prone to taking sufficient physical exercise due to acculturation and are more likely to be overweight and obese and developing diabetes (Gilbert and Khokhar, 2008; Gualdi-Russo *et al.*, 2014).

Socio-cultural factors influence the likelihood of becoming a smoker or drinker (Best *et al.*, 2001). Among the Indians, Pakistanis, and Black Caribbeans, smoking and alcohol drinking habits are reported more by the second generation than the first (Wang and Li, 2019). Either active or passive smoking

(Zhang *et al.*, 2011) and alcohol drinking enhance the earlier onset of T2D (Johnson, Bazargan and Cherpitel, 2001).

### **Objective**

Despite such importance, to the author's knowledge and research, no study focused on the generational effect on the onset of T2D in dietary and healthy lifestyle habits in Asian, African, and Caribbean adults living in the UK. Thus, the study aims to investigate whether these changing dietary and lifestyle habits affect the onset of T2D in terms of generations. Moreover, whether generation of Asian, African and Caribbean, living in the UK differs in terms of onset of T2D.

### **Method & design**

This study incorporated longitudinal self-reported data for 3459 Asian, African and Caribbean adults aged 25+ years whose information are available in both waves, namely, wave 7 (2016) and wave 9 (2019), from Understanding Society, the UK Household Longitudinal Study. Moreover, to identify the new cases of T2D between 2016 and 2019, this study excluded respondents who had already T2D in wave 7. Thus, the analytical sample includes respondents who were free from T2D in the baseline period.

This survey was initiated to collect data using a clustered and stratified probability sampling design in 2009-2010 from 40000 households who lived in the UK and visited them with new households each year to collect updated information (Gundi Knies, 2017; Jäckle, Gaia and Baghal, 2017).

Economic and Social Council and several departments from England, Welsh, Scotland, and Ireland funded to Understanding Society (Gundi Knies, 2017). The University of Essex, the University of Warwick, and the London School of Economics lead scientific issues (Gundi Knies, 2017). This study provides data to research longitudinally in health, social life, family, education, work, and income for the UK (including ethnic) population (Gundi Knies, 2017).

### **Data analysis**

Logistic regression was employed to quantify the risk of the onset of T2D in terms of dietary and lifestyle habits over the generations, adjusting for potential covariates. The association between generation and the development of T2D was examined. Four models were used to investigate whether this association was affected by other potential covariates by adding step by step in models as mentioned below. These models will facilitate the identification of the strong confounders. Dietary elements, such as fruit and vegetable intake were considered separately,  $\leq 2$  servings/day were set as the cut off for low intake level in the current study. The lifestyle habit elements are categorized as walked weekly and not walked weekly, smoker and non-smoker, and alcoholic and non-alcoholic individuals. The four models were:

- model 1: an unadjusted model,
- model 2: adjusted for gender, urban/rural, country of residence,
- model 3: adjusted for gender, urban/rural, country of residence, and sleep quality; and
- model 4: adjusted for gender, urban/rural, country of residence, sleep quality, high blood pressure and long-standing illness.

The study selected a reference group of individuals to compare the results. The reference group consists of the individuals (2nd+ generation) who had the lowest level of risk in developing T2D, and the other groups are compared with that reference group (Bruemmer *et al.*, 2009). To keep all the studied independent variables free from multicollinearity variance inflation factor (VIF) was calculated and found less than 5.0. Thus, these VIF values indicated no multicollinearity among the explanatory variables and satisfied the necessary condition for using binary logistic regression (Chatterjee and Hadi, 2006).

## Results

Results indicate that a significantly higher risk of developing T2D in 1st generation than the 2nd generation respondents in those who intake two or fewer servings/d of vegetable (unadjusted model 1: OR 2.50; 95 % CI 1.38, 4.54), and also in those who intake more than two servings/d of vegetable (unadjusted model 1: OR 3.41; 95 % CI 1.18, 9.84). However, these ORs revealed that first-generation respondents who intake more vegetables had higher odds than those who intake less. Moreover, this association remained significant even after the adjustment for gender, urban/rural, country of residence in model 2 (OR 2.48; 95 % CI 1.36, 4.51 for  $\text{veg} \leq 2$  servings/day vs OR 3.45; 95 % CI 1.20, 9.97 for  $\text{veg} > 2$  servings/day). The subsequent model 3- adjusted for gender, urban/rural, country of residence, and sleep quality (OR 2.62; 95 % CI 1.44, 4.79 for  $\text{veg} \leq 2$  servings/day vs OR 3.60; 95 % CI 1.24, 10.47 for  $\text{veg} > 2$  servings/day) has remained significant. The fully adjusted model 4, which is adjusted for gender, urban/rural, country of residence, sleep quality, high blood pressure and long-standing illness, (OR 2.32; 95 % CI 1.27, 4.25 for  $\text{veg} \leq 2$  servings/day vs OR 3.59; 95 % CI 1.23, 10.48 for  $\text{veg} > 2$  servings/day) has also remained significant. Thus, it is clear from the above results that first-generation respondents were more likely to develop T2D than the 2nd+ generations in terms of vegetable consumption.

Similarly, in the case of fruits consumption, the unadjusted model revealed that the effect of generation, which means higher risk in 1st generation than the 2nd generation, on T2D development was more pronounced in respondents who intake more than two servings/d of fruits (unadjusted model 1: OR 5.46; 95 % CI 1.66, 17.91) compared to 2 or less servings/d of fruits (unadjusted: OR 2.22; 95 % CI 1.22, 4.07) consumption. This association remained significant even after the adjustment for gender, urban/rural, country of residence in model 2 (OR 2.20; 95 % CI 1.20, 4.02 for  $\text{veg} \leq 2$  servings/day vs OR 5.42; 95 % CI 1.65, 17.80 for  $\text{veg} > 2$  servings/day). Similarly, model 3 adjusted for gender, urban/rural, country of residence, and sleep quality (OR 2.32; 95 % CI 1.27, 4.26 for  $\text{veg} \leq 2$  servings/day vs OR 5.72; 95 % CI 1.74, 18.83 for  $\text{veg} > 2$  servings/day) has remained significant. The fully adjusted model 4 (OR 2.17; 95 % CI 1.18, 3.99 for  $\text{veg} \leq 2$  servings/day vs OR 5.11; 95 % CI 1.54, 16.91 for  $\text{veg} > 2$  servings/day) has also remained significant. Therefore, the above results demonstrate that first-generation respondents were more prone to develop T2D than the 2nd+ generations in terms of fruits consumption.

For non-smokers, higher ORs were observed for first-generation than the 2nd generation in developing T2D in unadjusted (model 1: OR 2.20; 95 % CI 1.30, 3.71) as well as all four adjusted models (for example, fully adjusted model 4: OR 2.04; 95 % CI 1.20, 3.46).

For both alcoholic and non-alcoholic respondents, higher ORs were found for the first generation than the 2nd generation in developing T2D in unadjusted and all four adjusted models. For example, it is noted from the ORs that a higher odds was observed for alcoholic (model 1: OR 2.74; 95 % CI 1.17, 6.41 and fully adjusted model 4: OR 2.80; 95 % CI 1.18, 6.62) than the non-alcoholic (model 1: OR 2.47; 95 % CI 1.21, 5.02 and fully adjusted model 4: OR 2.40; 95 % CI 1.17, 4.93) respondents.

In the case of physical activity, the generational difference is relatively high for the respondents who walked weekly that means among the respondents, who did the physical activity, first-generation respondents were significantly more likely to develop T2D than the 2nd generation, for example, (unadjusted model 1: OR 2.93; 95 % CI 1.58, 5.44 and fully adjusted model 4: OR 3.06; 95 % CI 1.64, 5.72).

The strength of the association between generation and T2D development was increased by 5.6% for  $\text{veg} \leq 2$  servings/day, 4.3% for  $\text{veg} > 2$  servings/day, 5.5% for  $\text{fruit} \leq 2$  servings/day, 5.5% for  $\text{fruit} > 2$  servings/day, 5.5% for non-smokers, 4.8% for the alcoholic, 8.4% for non-alcoholic respondents in model 3 by the confounding effect of sleep quality. However, the strength of the association between generation and T2D development was decreased by 11.5% for  $\text{veg} \leq 2$  servings/day, 6.5% for  $\text{fruit} \leq 2$  servings/day, 10.7% for  $\text{fruit} > 2$  servings/day, 11.3% for non-smokers, 7.7% for non-alcoholic respondents in model 4 by the confounding effect of high blood pressure and long-standing illness.

**Conclusion**

The current study confirms that first generational is more likely to develop T2D than the second+ generation in terms of dietary and lifestyle habits in Asian, African and Caribbean adults aged 25+ years. Moreover, sleep quality, high blood pressure, and long-standing illness are strong confounders since a more change was observed in the association between generation and T2D development after adjusting for these covariates.

# Development of a healthy version of a Burger with “Fries”

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## Introduction

The Western eating pattern and the consequent food production system endangers the health of people and of the planet. Hamburgers are foods frequently included in Western eating patterns, included in takeaway, take-out, and fast foods associated with the increase in portion sizes, high intake of red meat, and high energy density meals related to a higher risk of NCD. Also, they are typically consumed by children, teenagers, and adults. These foods mainly consist of white bread, red meat and fried potatoes, a very low supply of non-starchy vegetables and are characterised by excessive fat, saturated fat, sugars, calories, and salt. A balanced calorie diet based on plant-based foods that can meet the needs of most micronutrients, fibre, carbohydrates, and most fat and protein is ideal for good health. To promote healthy eating habits, the Portuguese government has recently approved a decree that bans several food items from meal options for teenagers in schools, among which are hamburgers.

## Objective

Considering that the problem is not the concept of the food item, namely the hamburger itself, but rather its composition, the objective of this research was to adapt a traditional hamburger recipe to obtain a more balanced nutritional profile and assess consumer acceptance.

## Methodology

A traditional hamburger recipe was selected. In the first phase, nutritional value and food portions were calculated. Changes were proposed to comply with food and nutritional recommendations (reduce meat, include pulses, increase non-starchy vegetables, whole grain bread, reduce fat). A new recipe was tested to validate preparation and cooking, reformulated, and retested until the desired similarity for appearance, texture and flavour was achieved. Cost and footprint were also calculated. In the second phase developed recipe was cooked for sensorial analysis with a sample of potential consumers, evaluating appearance, texture, flavour, aroma, hedonic evaluation, and intention to consume.

## Results

A more balanced recipe, that highly complies with food and nutrition recommendations was developed. Energy, fat, and total protein were significantly reduced and a balance between animal and vegetable protein sources was achieved, without compromising flavour or texture and a good similarity with the original recipe. Sensorial analysis with a sample of 38 consumers was performed. Globally the menu had a good acceptancy and evaluation, with the hamburger getting the highest score. More than fifty per cent score above equal or more than 7 points in a 0-9 scale ( $\bar{x} = 6.8$ ).

## Conclusion

Our burger has a balanced nutritional composition and globally good evaluation and acceptability to our consumer sample and, also, affordable cost and low carbon footprint impact. The results from this research point to the possibility of offering a food product with high acceptance, but with a more adequate nutritional profile, and thus contribute to good food habits and improve health without preventing young people from having access to foods that they like and regularly consume.



# How does different indigenous yeast strains influence aroma development and flavour during fermentation of apple juice?

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## Introduction

There is an ever-increasing interest in locally produced drinks. When it comes to wine, beer and cider contemporary consumers demand products with complex taste profiles. Several studies have shown that indigenous strains of microorganisms can be used to produce drinks that have a more complex aroma profile than those based on conventional strains (Gamero et al., 2020; Gutiérrez et al. 2018). This has led brewers and winemakers to experiment with both the raw materials as well as more local strains of microorganisms in order to develop unique products. The starting point for this study was fermenting microorganisms isolated from local apple varieties. This was done to identify new strains with desirable properties for the production of locally produced beverages.

## Objective

The aim of this study was to investigate three local strains of *Saccharomyces cerevisiae* for potential differences regarding aroma development and taste during fermentation of apple juice.

## Method & design

This abstract is based on a Bachelor project by Philip Lavin (Lavin, 2021).

Three yeast strains (A16:20, A3 and A6:10), isolated from locally grown apples, were identified using MALDI-TOF (Bruker Daltonik GmbH) whereupon they were propagated and used as starter cultures by inoculation into unfiltered and pasteurized apple juice of the local apple variety 'Aroma'.

The fermentation process was monitored through chemical parameters (pH and Brix values as well as titrable acidity and ethanol content).

Samples were sent to e-Sense AB, Uppsala, for analysis of individual aroma compounds using gas chromatography, Micro 2xGC / FID (Alpha-Mos, Hercales 2).

The sensory analysis was performed using an expert panel consisting of six participants. The test was conducted at Kristianstad University's sensory laboratory. The approach was inspired by the sensory test that was presented in a study by Ye et al. (2014). The selection of panel members was made through a convenience selection and consisted of teachers as well as past and present undergraduate students at the Gastronomy Program. All participants had previous experience from sensory analysis. The test was designed and performed using the EyeQuestion software in a laboratory in accordance with ISO 8589: 2007.

The panel assessed the intensity of the aroma and flavor of predetermined attributes on a scale ranging from 0–100. Further, total liking of the products was indicated on a hedonic scale with nine steps from "Thoroughly dislike" to "Like extremely well". In order for the panelists to be able to choose an ambivalent standing, the option to "neither dislike nor like" was included in the middle of the scale.

Raw data from the microbiological and chemical analyses were processed in Excel software. Correlations (Pearson's correlation coefficient) and one-way ANOVA (Analysis of Variance) were performed. Data from the sensory test were analyzed using EyeOpenR, which is a program integrated with EyeQuestion. A two-way ANOVA (Analysis of Variance) with Tukey's test was used to identify any significant differences between the mean values for the different attributes and for the total approval of the products.

## Results

The results from the study showed that the different strains (A16:20, A3 and A6:10) generally behaved quite similar during fermentation (figure 1-5).

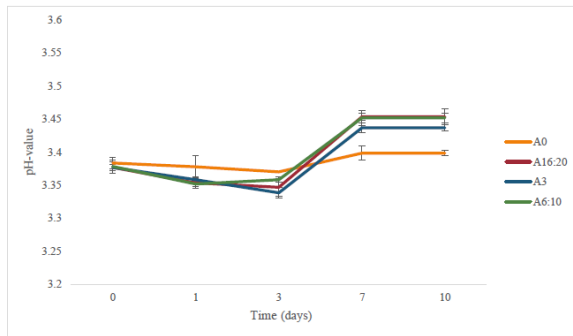


Figure 1. Change in pH value, presented as mean value and standard deviation for A0 (unfermented apple juice) and the strains A16: 20, A3 and A6: 10.

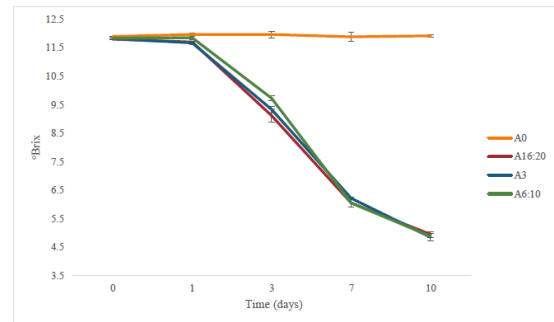


Figure 2. Change in soluble dry matter (Brix value) reported as mean value and standard deviation for A0 (unfermented apple juice), A16: 20, A3 and A6: 10.

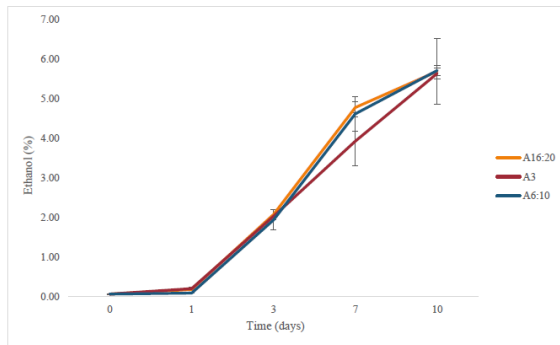


Figure 3. Production of ethanol (%) over ten days for strains A16: 20, A3 and A6: 10. Unfermented apple juice was used as a blank.

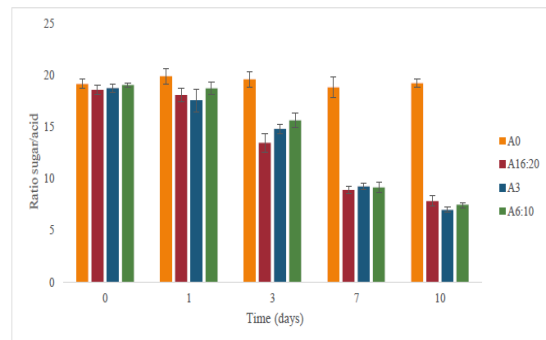


Figure 4. The sugar / acid ratio for A16: 20, A3, A6: 10 and A0 (unfermented apple juice).

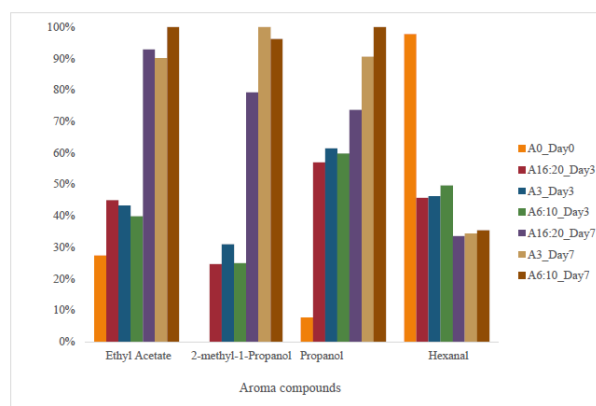


Figure 5. Development of those four aroma compounds that occurred in the highest concentration in the fermentate at day 3 and 7 compared to the control sample on day 0 (A0).

Further, the results show that apple juice inoculated with strain A6: 10, fermented for three days, was liked the most by the expert panel, while A6: 10, day 7, was least liked (Figure 6). A two-way ANOVA with Tukey's test shows that all strains at day 3, including the control sample A0, were significantly different ( $p > 0.001$ ) from all strains on day 7. However, the strains were not significantly different from each other ( $p < 0.05$ ), neither at day 3 nor day 7.

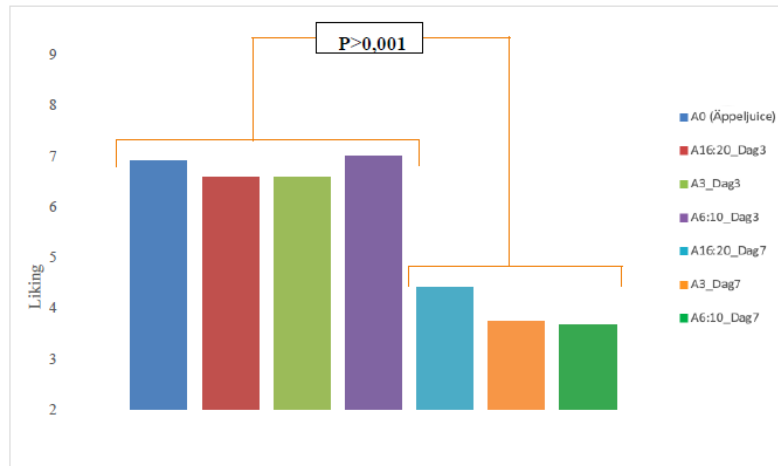


Figure 6. Comparison between the control sample (A0) and fermentations day 3 and day 7 for all strains. Reported as mean and significance ( $p < 0.01$ ) for total approval between day 3 and 7.

## Discussion

This study proves that wild yeast strains can be used to ferment apple juice and further it shows that fermentation for three days resulted in higher liking than fermentation for seven days for the selected strains. After fermentation for three days, the same level of liking was obtained for the unfermented apple juice. On the hedonic scale (1- 9), this value (approx. 7) means that the expert panel "Likes" all strains at day 3, while they 'somewhat disliked' all strains at day 7. At day 7, a significant ( $p < 0.001$ ) increase in 'off-flavours' was noted for all strains. A possible explanation for this, which was confirmed by the aroma analysis (Figure 5), is that at day 7, all strains had high concentrations of the ester ethyl acetate. At lower concentrations, Gutiérrez et al. (2018) state that ethyl acetate can contribute positively to the taste experience, but at high concentrations, as at day 7, it can give rise to a taste of solvent (acetone). The alcohol 2-methyl-1-Propanol (isobutanol) was also present in high concentrations at day 7. According to Espino-Díaz et al. (2016) isobutanol can give rise to a pleasant taste but can just like ethyl acetate at high concentrations taste solvent. According to Guiné et al. (2021), the quality of cider can be increased by adding nutrients to the apple juice that promotes yeast growth and reduces the risk of the formation of 'off-flavors'.

The commercial yeast strains usually used for fermentation are developed to bring about rapid fermentation, desirable sensory properties and stability (Hutkins, 2019). As an example, there is a great difference in the properties of strains of *S. cerevisiae* used in the production of alcoholic beverages and those used in the bakery industry. According to Adams et al. (2016) there are over 80 commercial strains of *S. cerevisiae* and of these only a few are used for beer, wine and cider production worldwide. According to Carrau et al. (2017) this results in overly similar and monotonous products. Several studies have shown that the use of indigenous and local strains of *S. cerevisiae* results in unique sensory properties and an increased complexity in the beverage (Lorenzini et al., 2019; Song et al., 2019). Several of these strains have a high fermentation capacity as they are already adapted to the environment (Song et al., 2019). Gutiérrez et al. 2018 and Capece et al. (2014) believe that there is an increasing trend among beer brewers, wine producers and cider makers to go back to a spontaneous fermentation with the microflora present on the raw material, in the premises and on the equipment to produce unique products. By isolating and identifying new yeast strains, evaluating them for growth

and their ability to form ethanol and flavorings, new and innovative products unique to the raw material and the local site can be created. Capece et al. (2014) believe that the challenge mainly lies in identifying strains that can be used in industrial manufacturing. Several of the unconventional strains can be difficult to propagate in sufficient concentrations to function in a standardized, large-scale, production.

## Conclusion

The study shows that:

- 1) The three investigated yeast strains affect fermentation processes, aroma and taste development in a similar way
- 2) A short fermentation time resulted in better liking
- 3) A longer fermentation time resulted in higher concentrations of compounds that contribute to off-flavors

This suggests that a limited period of fermentation resulting in a certain sugar reduction can give interesting lower-alcoholic meal drinks. The results of the study are based on apple juice of the variety 'Aroma' inoculated with three local yeast strains of *S. cerevisiae* isolated from apple. The result can therefore not be generalized to other apple varieties or other yeast strains of *S. cerevisiae* used in similar studies.

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# Bridge Builders Network – a Nordic multidisciplinary research network on healthy aging viewed from a food and nutrition perspective

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## Introduction

The Nordic region shares same challenges of an aging population in which an increased number are considered as malnourished and/or suffering from loneliness (Eustat, 2021; Volkert et al. 2019; WHO, 2021). This puts a pressure on the welfare state resources (European Commission, 2021). Health authorities in the Nordic countries focus on rehabilitation welfare technology solutions and the concept of healthy aging. Furthermore, the need for considering sustainable solutions requires sustainable food products for an increasing aging population. This challenges the retail and foodservice sector to provide access to food products and meal solutions that are culturally well known, acceptable and nutritionally adequate (Justesen, Mertanen & Lang, 2018) as part of a healthy aging approach. Above challenges demand new scientific knowledge as well as professionals from the areas of food, nutrition, sustainability, health care, social and health services working together. This reflects the complexity of healthy aging viewed from a food and nutrition perspective and demands a professional and multidisciplinary approach to address solutions that can accommodate these challenges. In order to respond to these challenges, the network “Bridge Builders – Building sustainable nutritional bridges between research and health and wellbeing services for elderly” was established in 2020 with funding from the Nordic Joint Committee for Agriculture and Food research (NKJ).

## Objective

Aim is to present the activities of the Bridge Builders network in order to discuss how a multidisciplinary approach can contribute with new knowledge to promote sustainable healthy aging in relation to food, nutrition, health and wellbeing services. We furthermore would like to invite researchers and practitioners to join the network.

## Method & design

Participants of the network have interdisciplinary competences, with different professional background and different expertise in research and development, and represent Denmark (University College Copenhagen), Finland (South-Eastern Finland University of Applied Sciences), Norway (University of Stavanger) and Sweden (Linnaeus University) (Table 1).

The network focusses on sustainable healthy aging by evidence-based research and practice in relevant and complementing areas (Table 2) with the aim to meet existing challenges. In our network activities, research topics, such as nutrition, sustainable diets and mealtime situations, are addressed in different contexts of healthy aging.

Activities also include implementation of research findings into the education of professionals in related areas (Table 2).

Identifying further complementing competencies by adopting the conceptual model Making most of mealtimes (M3) (Keller et al, 2014), would strengthen a holistic perspective of activities.

**Table 1. The partners of the Bridge Builders network**

Institutions	Institute	Degree Programme	Research group	Research background
Linnaeus University	Center for Collaborative Palliative Care, Department of Health and Caring Sciences		<u>Anna Sandgren</u> (Reg. Nurse, PhD)	Palliative care
	Department of Chemistry and Biomedical Sciences	Nutrition and Food Science (BSc)	Cornelia Witthöft (PhD)	Nutrition and Food Science
			Mohammed Hefni (PhD)	Nutrition and Food Science
Stavanger University	Faculty of Social Sciences – Norwegian School of Hotel Management	Hotel management Tourism management (Bsc)	Kai Victor Hansen (PhD)	Meal science and Hospitality
		Service Leadership in International Business (MSc)		
Copenhagen University College	Department of Nursing and Nutrition	Nutrition and Health (Bsc)	Lise Justesen (PhD)	Food and meal sciences
			Charlotte Mortensen (PhD)	Nutrition
			Anette Due (PhD)	Nutrition
			Anne Marie Beck (PhD MSc Dietitian)	Nutrition
South-Eastern Finland University of Applied Sciences - Xamk	Department of Tourism, Hospitality Management and Youth Work	Hospitality Management (BSc, MSc)	Riitta Tuikkanen, Lic. Sc. (Food Sciences), Licenced dietitan	Nutrition Consumer behaviour
		Social Services and Health Care (Elderly care) (BSc)	Sari Ranta, Gerontology PhD	Aging changes
	Department of Social Services and Promotion of Funtional Ability		Teija Rautiainen, Hospitality management (M.Sc.)	Food service processes
			Niina Rantakari, M.Sc (Food Sciences)	Nutrition

**Table 2. The description of the Bridge Builders network: research topics and expertise**

	Research topic - elderly	Target group	Previous project	Ongoing projects	Design/Methods	Partners
Linnaeus University	Mealtime situations, Palliative care	Older persons, their relatives and health care professionals at nursing homes  Hospitals, nursing homes, homecare		<u>Caring mealtime situation in nursing homes</u> <a href="https://lnu.se/forskning/sok-forskning/forskningsprojekt/projektmultidimensionella-parasarskilda-boenden/">https://lnu.se/forskning/sok-forskning/forskningsprojekt/projektmultidimensionella-parasarskilda-boenden/</a>	<b>Design</b> Quantitative and qualitative  Action research  <b>Methods</b> Grounded theory Content analysis	Kalmar County, Gothenburg University Orebro University
	Development of healthy food	All population groups	<u>Innovative legume-based foods and drinks for enhanced resource use efficiency in food systems</u> <a href="https://lnu.se/en/research/searchresearch/research-projects/project-innovative-legume-based-foods-and-drinks-for-enhanced-resource-use-efficiency-in-food-systems/">https://lnu.se/en/research/searchresearch/research-projects/project-innovative-legume-based-foods-and-drinks-for-enhanced-resource-use-efficiency-in-food-systems/</a>	<u>Gut microbiota composition and digestion of animal foods</u> <a href="https://lnu.se/en/research/searchresearch/research-projects/project-gut-microbiota-composition-and-digestion-of-animal-foods/">https://lnu.se/en/research/searchresearch/research-projects/project-gut-microbiota-composition-and-digestion-of-animal-foods/</a>  <u>Linnaeus Knowledge Environment: Sustainable Health</u> <a href="https://lnu.se/en/meet-linnaeus-university/knowledge-environments/sustainable-health/">https://lnu.se/en/meet-linnaeus-university/knowledge-environments/sustainable-health/</a>	<b>Design</b> In vitro/clinical studies  <b>Methods</b> Food processing,  Food prototype development,  -Food analysis (nutrients, bioactive compounds)	Food Companies Swedish University of Agricultural Sciences, Umeå University Lund University Technische University München,
Stavanger University	Meal Experience	Nursing homes	Foodback AS – <a href="http://www.foodback.com">www.foodback.com</a>	Free school breakfast for upper secondary schools in Rogaland county (2019–2023)	<b>Methods</b> Semi-structured interviews	Rogaland County administration
	Elderly	Homecare	Free School meal <a href="https://www.rogfk.no/f/p/1/155ec836b-ec40-4c3e-a988-7ebd3dc4e399/rapport1_2019_gratis-skolefrokost-i-vgs_revidert.pdf">https://www.rogfk.no/f/p/1/155ec836b-ec40-4c3e-a988-7ebd3dc4e399/rapport1_2019_gratis-skolefrokost-i-vgs_revidert.pdf</a>	WITH (Work Inclusiveness in Tourism and Hospitality) 2019–2021	Focus group interviews	Foodback AS
	Restaurant management	Hospitality management		Meal experiences 2.0 (2021–2022)	Grounded Theory	Nofima AS
	Free school meals	Gastronomy			Observations Photo documentation	
Copenhagen University College	Nutrition	Nursing homes	Innovative Rehabilitating Meals-on-wheels Service for Old People <a href="https://www.ucviden.dk/da/projects/de-gode-madkasser-3">https://www.ucviden.dk/da/projects/de-gode-madkasser-3</a>	The Breakfast Club <a href="https://www.ucviden.dk/da/projects/operation-morgenduft-dynamiske-v%C3%A6rtskaber-og-v%C3%A6rtskabende-eftervi">https://www.ucviden.dk/da/projects/operation-morgenduft-dynamiske-v%C3%A6rtskaber-og-v%C3%A6rtskabende-eftervi</a>	<b>Design</b> Intervention study	Frederiksberg municipality, Kastanjehaven)
	Rehabilitation	Elderly living at home		We will D <a href="https://www.ucviden.dk/da/projects/vi-vil-d-implementering-af-evidensbaseret-praksis">https://www.ucviden.dk/da/projects/vi-vil-d-implementering-af-evidensbaseret-praksis</a>	Actions Research Ethnographic study	Roskilde University Orebro University
	Sustainability Hospitality				<b>Methods</b> Visual methodologies	Copenhagen University
South-Eastern Finland University of Applied Sciences	Food related services Elderly	Aging people living at home Institutional and private caterers	Food service provision for older adults in a changing environment <a href="https://bit.ly/3nLIGkf">https://bit.ly/3nLIGkf</a>	Multiform food related services to promote older people's sense of community and functional capacity – Ikäruoka 2.0 <a href="https://bit.ly/3buMpMw">https://bit.ly/3buMpMw</a>	<b>Design</b> Service Design	Etelä-Savo and Kymenlaakso Regions Finnish institute of health and welfare Jamk University of Applied Sciences

## Results

Despite of the Corona pandemic, the network was launched, and partners established a common platform for sharing information and documents. A project website was established on the Xamk website.

Activities so far are:

- Monthly online meetings and presentations to present ourselves, our research areas, universities and countries. We further discussed new ideas for research and education related to healthy eating and aging.
- A workshop entitled “Lets’ learn from each other - workshop on older adults nutrition and healthy eating” was hold on zoom. Invited researchers from the network institutions made presentations.



- A report to NKJ on the networks progress was written (<https://www.xamk.fi/en/research-and-development-blog/lets-learn-from-each-other-workshop-on-older-adults-nutrition-and-healthy-eating-was-well-worth-it/>).
- An Erasmus+ exchange between several partners is ongoing.
- Preparation of articles and conference contributions.

According to the conceptual model “Making most of mealtimes (M3)” (Keller et al., 2014), complementing competences from various fields, e.g. technology, art, design and culture, social and behavioural sciences, are needed to address the challenges linked to healthy aging from a holistic perspective.

We are planning further activities such as public seminars, applications for funding for future research and development projects, teaching, and networking. Examples of themes are:

- Educational activities targeting professionals in the social-health care area and the foodservice sector.
- Digital welfare technologies to enable involvement of elderly in sustainable food related activities.
- Healthy aging.
- Meal time situation at different care context and at home e.g., using theoretical framework FAMM (Gustafsson et al., 2006).
- Collaboration and organization of municipalities, public and private food service providers to support access to healthy food and self-independent food activities.
- Meal communities to support appetite and social interaction.

## Conclusions

The Bridge Builders network brings together researchers and developers with different expertise to interlink and efficiently use knowledge generated from academia and practice. The network improves our knowledge and understanding of how to best address the challenges which the aging population faces. The network would benefit from complementing competences to promote healthy aging in a holistic perspective.

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## SESSION 2: CHEFS AND CONTEMPORARY FOOD ISSUES

# **Chef's knowledge and perceptions of farm-raised fin fish and how it impacts menu decisions.**

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Chefs are faced with increasing amounts of information about the sustainability levels of the food they purchase. This study investigates Chef's level of knowledge and their attitudes and behaviors toward farm-raised fin fish.

We surveyed 125 Chefs and other purchasers of seafood from restaurants across Canada. Findings reveal that Chefs obtain information about aquaculture from many sources but have most confidence in information they receive from certification bodies. Results suggest while Chefs have some general knowledge about farm-raised fish, many have not been educated on the details that determine the 'sustainability' of these choices which can lead to confusion. Further, while Chefs seem to be more accepting of farm-raised fish they believe consumers prefer wild-caught impacting their purchasing decisions.

Chefs have an opportunity as food leaders to educate consumers on the sustainable benefits of farm-raised fish. To advocate and reduce the stigma around farm-raised fish Chefs need to be well educated and confident in their own knowledge about the difference between the two production methods. Chefs can help make consumers aware of the value of eating farm-raised-fish as it reduces the potential for wild fish stocks to become depleted.

**Key words:** Restaurant, Aquaculture, Sustainability, Farm-raised, Chef

# Celebrity chefs: Jamie Oliver and Gordon Ramsay as arbiters of taste and custodians of culinary capital

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## Introduction

Food is crucial: it is basic and essential to our survival. Food also has sociological and psychological meaning: 'Food indicates who we are, where we came from and what we want to be' (Belasco 2002: 2). It has been suggested that food choices reflect taste as well as social and cultural belonging and therefore act as important indicators of differentiation. The fascination for food has led to a growing interest in celebrity chefs who have entered our households through their TV shows and cookbooks and embody aspects of our formation of taste in a sociological sense. This paper first discusses the concepts of the construction of taste. It then focuses on the findings from the analysis of Jamie Oliver and Gordon Ramsay's cookbooks and associated television (TV) shows.

The notion of taste appears as varied and ambiguous. It is connected to both the formation of identity and consumption (Kennedy et al. 2019). Taste can be used as both a measure to judge others as well as a way for people to position themselves within socio-cultural contexts (Bourdieu (1984) Finkelstein (2014). Any study on taste must include the research of French sociologist, Pierre Bourdieu. Bourdieu (1984) suggests that taste is socially conditioned, learned through education and intrinsically linked to social class. Bourdieu discusses the implications that different forms of capital, which he coins as social, economic, symbolic and cultural capital, have on the construction of taste. He argues that taste is an expression of social differences and that clearly identified rules regulate how taste is viewed and shared. These rules then determine patterns of behaviour which he refers to as the 'habitus. The habitus is the embodiment of cultural capital and is expressed through learned behaviour and well as entrenched perceptions of taste in food, music or clothing. His structuralist approach contends that taste functions to maintain strict social classes. Thus, taste is socially rather than individually constructed.

However, Bourdieu's theories should be nuanced when applied to a more modern interpretation of taste which revolves around the individual, as opposed to social class, as a post-modern expression of choice and self-identity. Rather than taste being socially driven, it is the individual that plays the crucial role in determining taste. The emergence of 'foodie cultures' and 'foodies' helps to reinforce this individualistic interpretation of taste (Naccarato and Lebesco 2012) where individuals are offered status according to the amount of 'culinary capital' that they possess, share and display through avenues such as social media. In this arena, the celebrity chef may also have an impact upon these manifestations of taste.

It could be suggested that taste no longer reflects strict social structures and is in a state of flux as consumers have increasingly become 'cultural omnivores' (Arsel and Bean 2012). Contemporary Western food cultures are characterised by an increase in novelty and choice that have brought about an erosion in the relationship between class and taste (Ashley et al. 2004). Vogler (2020) describes how certain foods go in and out of fashion and become markers of sophistication in one age, and a shortcoming in another. In a very Bourdieusian sense, when a certain food becomes accessible to the masses, the elite must move on to another in order to continue to mark their superiority

The term celebrity chef is associated with chefs and cooks that have become well-known through television and cookbooks. The phenomenon of the celebrity chef has flourished in the United Kingdom (UK) and in the world in the past 20 years, partly due to the growing popularity and myriad of food programming content in the media, both on and off-line ([Zopiatis](#) and [Melanthiou](#) 2019). Celebrity chefs appear to have acquired a form of cultural power that can be seen through their commercial activities as well as their involvement in food governance, ethics, food politics, health, entertainment and consumption (Hollows and Jones (2010 a and b); Stringfellow et al. (2013). It is this cultural power

that gives chefs such as Oliver and Ramsay legitimacy as arbiters of taste through the way in which they influence readers and viewers in their eating habits and other food related activities (Smith 2020). The role of the celebrity chef as a professional and as an expert is key to maintaining their status as tastemakers. To be able to influence readers and viewers, celebrity chefs must maintain their position of legitimacy and be seen as the ultimate proprietors of culinary capital and as arbiters of taste. As stated by Bourdieu (1984), the holders of capital are the ones who set the conventions and make the rules about taste. Chefs may therefore act as the gatekeepers to high social status in the way that they promote food choices by using their authority and knowledge.

### **Objective**

Little attention has been paid to the link between celebrity chefs and the construction of cultural taste. As such, the study is noteworthy as it will specifically seek to explore this link and will strive to offer a new interpretation of role of the celebrity chefs through the analysis of their UK TV shows and cookbooks. In addition, the proposed methodology has not previously been used to link the chefs and taste. The research will aim to assess how the celebrity chefs may impact upon taste in the aesthetic and cultural sense of the word.

### **Method and Design**

The data sources for the study are Oliver's, *Jamie's Italy* and its associated television show, *Jamie's Great Italian Escape* (2005) and Ramsay's *Great Escape* cookbook and TV show (2010). The used to choose these particular chefs was popularity and recognition in the UK, having a cookbook and associated TV series and finally using established personas extracted from the literature. Qualitative thematic analysis was applied to the images, films and texts. Data was collected by the sustained and repeated viewing and reading of the TV shows and cookbooks which were then manually coded to determine emergent themes. These themes were then linked to the framework extracted from the literature. Interpretation was made of the way in which celebrity chefs may impact upon the construction of taste where taste itself is an interpretable concept.

### **Results**

The findings show that there are a number of 'markers of taste' such as authenticity, tradition and class that can be found in the literature and have been extracted from the interpretation of the books and TV series. The chefs are arbiters in transmitting concepts of taste and distinction to viewers and readers. Oliver and Ramsay comment not only on the food but also on what it represents, imparting their knowledge of Italian and Indian culture. By buying into the chefs, both literally and figuratively, the viewers and readers accept them as a purveyor of 'good taste' in all things food. However, the chefs must strike a balance between expertise, instruction and usefulness in order for the reader and viewer to follow their brand. Undoubtedly, socioeconomic standing and prior knowledge of food, or being a self-proclaimed foodie, will have an influence on the perception and acceptance of the chefs.

#### Authenticity and tradition

The TV programmes fall under the tried and tested 'tour-educative' genre where the celebrity chef travels to a location, meets and cooks with the locals and goes back home with lessons learned. In the TV series the chefs are filmed interacting with a number of locals. Oliver spends time with 'nonnas' (grandmothers) and learns traditional Italian recipes and ways of cooking. Italian nonnas are widely recognised as the guardians and masters of Italian cuisine. In the first episode he starts his Italian adventure in a Neapolitan market, cooking for the locals. Ramsay also cooks for, and with, the locals in varying settings: from the slums of Mumbai to remote hill tribes, as he seeks to understand 'real' Indian cuisine. Through the chefs we are 'in the know'. Readers and viewers can display their inner foodie self and culinary savoir-faire by buying into the chefs. This is where the celebrity chef also plays a role as a 'public pedagogue' and educator.

The cookbooks mirror the TV series with some images taken from the shows presented in the books. Insight into the more personal worlds of the chefs can be found in the introduction to the books. Recipes are preceded by short texts that also guide the reader and give tips on the execution of the

recipes. This is another opportunity for the chefs to display their knowledge whilst the reader is able to gain 'culinary capital' by engaging with the chefs and getting some of their 'magic dust'. By endorsing the chefs, the public are displaying 'culinary cultural capital' in a Bourdieusian sense and hence displaying their 'good' taste. They are making judgements and justifications on their food choices and habits by 'consuming' the books and TV shows.

### Class

When considering Bourdieu's world of capital as an expression of wealth, class and belonging, one could suggest that the TV shows and cookbooks may disseminate notions of class and serve to express the chef's expertise as a form of transferable (culinary) cultural capital. This capital is then used as a currency by the viewers and readers. In following the chef, one may then display some of the behaviour associated with Bourdieu's concept of 'habitus' where the habitus serves as an expression of our belonging to a class and extends to our taste for food. In a post-modern interpretation of class and taste, the habitus may be more fluid as people can more easily expose themselves to a variety of high-brow items and activities and can therefore exhibit the behaviours that were once denied to them. The celebrity chef may serve as an agent to this change in the habitus and in the modern expressions of taste and belonging.

Although not openly referring to class, Oliver moves in the direction of making assumptions of affordability and choice. He recommends a barbecue supplier whose cheapest product is £755. Ramsay goes from the slums of Mumbai to cooking for the elite at the Taj Mahal Hotel. This may indicate that they clearly understand the target market that they are pitching to; a decidedly middle/upper class part the population, with the means and knowledge to follow the chefs as they navigate class references.

There are both explicit and implicit references to class, wealth and poverty in Ramsay's TV show, less so in the cookbook. In the TV series, he interacts much more with everyday people but cooks for the well-to-do. In the introductory chapter to the book, Ramsay says 'I knew the real Indian food was not to be found in fancy restaurants and hotel eateries; instead I had to travel the country and eat as ordinary Indians do, regardless of caste, class or religious differences' (2010, p.11). These all point to issues of class and caste, and although laudable, one must remember that Ramsay is accompanied by a film crew at all times and that his 'encounters' have most likely been carefully staged and edited for the purposes of the show.

### **Conclusion**

From the above findings, it could be suggested that Oliver and Ramsay use authenticity, tradition and culture as markers of taste. Viewers and readers build relationships with the chefs based on their own personal values and are ready to endorse the chef and 'consume' them through the purchase of the book or the viewing of the TV show. The limitations of the research will lie in the small sample size, the difficulty in analysing the data as well as the subjective nature of the findings. Although it will not claim to be an exhaustive approach to the study of the food, class and taste, this study may represent one aspect that is relevant to the link between celebrity chefs and taste; a link which may convey modern expressions of belonging from a social and cultural perspective as well as understanding the chefs as possible agents of social and cultural change in the UK.

# Reducing meat consumption in restaurants. How chefs perceive the place of meat in relation to sustainability issues?

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## Introduction

While the Covid-19 pandemic severely affected the restaurant industry, the crisis may have accelerated the industry's thinking about its environmental responsibility. In this sense, several recent initiatives in the luxury gastronomic sector are positioning themselves in favor of change: The chefs at Eleven Madison Park (New York, Three Michelin Star) and Geranium (Copenhagen, Three Michelin Star) have just turned their menus completely vegan. Current environmental recommendations point to the need to reduce the consumption of animal products, particularly meat, in the diet. For the restaurant sector, this recommendation comes up against various difficulties: meat is at the heart of the French culinary tradition. It is a highly symbolic food. In addition, recent studies show that eating in restaurants increases the likelihood of consuming meat. If the majority of the research on the topic of reducing meat consumption in restaurants focuses on consumers, very few are interested in the perceptions of chefs. The representation theory approach provides an interesting framework for better understanding chefs' perceptions, as well as the different elements that make up chefs' professional representations, specific to their occupation.

## Objective

This research aims to shed light on chefs' perceptions of meat consumption in restaurants, as well as on measures to reduce meat consumption for environmental reasons.

## Method & design

The study is based on a qualitative methodology, using an interview guide, with practicing chefs and chef trainers in a hospitality management school. A thematic analysis will be conducted.

## Conclusions

In terms of theoretical implications, this research explores professional representations and will show if an emerging societal trend (the reduction of meat consumption) induces interference in the elements that compose these representations. This ongoing research will provide answers to professionals concerning the management of sustainability in catering and the possible adaptations to be made to the place of meat.

**SESSION 3: CONSUMER'S KNOWLEDGE AND ATTITUDES TOWARD HEALTHY AND SUSTAINABLE FOOD**

# Insects as food – the impact of information, sustainability, and physical activity on consumer attitudes

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This communication was submitted as a paper for the special issue of the *International Journal of Gastronomy and Food Science*.

## Introduction

A growing population, together with current trends in food consumption, are major threats to our planet and contribute to global environmental degradation. It is, therefore, necessary that food production and diet are improved for the benefit of the planet and for our future health. In most western cultures, the consumption of foods originating from animal sources exceeds the recommended level. Excessive intake of products based on red meat has a negative effect on the climate due to greenhouse gas emissions during their production (Willet et al., 2019).

Research has shown that the risk of health problems, such as cardiovascular disease and colorectal cancer, increases with a larger intake than recommended of red meat and charcuterie (DeSmet and Vossen, 2016; Foley et al., 2011). Alternative protein sources are, therefore, needed to be able to feed the growing population in a sustainable way. These alternatives should have a comparable nutritional content to traditional products of animal origin and, at the same time, a lower impact on the environment (Meyer and Reguant-Closa, 2017).

A balanced diet providing sufficient energy and nutrition is considered important by most people who are interested in physical exercise (Rodriguez et al., 2013). Traditionally, foods of animal origin, i.e. meats, eggs and dairy products, are often highly valued as protein sources for physically active persons, since they contain all the essential amino acids and important micronutrients (Placention et al., 2021; Alparslan et al., 2020; Bianco et al., 2011).

Insects are eaten regularly as part of the diet in approximately 120 countries (Gedrovica, 2019; Berg et al., 2019). In the western world, however, insects are more rarely accepted as food, despite their good nutritional content and limited environmental impact (Gedrovica, 2019). In addition to a high protein content, insects contain unsaturated fats, vitamins and minerals (Wendin and Nyberg, 2021; Austuti and Komalasari, 2020). The main reasons for not eating insects are often based on social and cultural aspects, such as disgust and neophobia (Wendin and Nyberg, 2021; Wilkinson et al., 2018). However, some consumers may consider eating insects out of an interest for the environment and for their health (Nyberg et al., 2020). Research has shown that information and knowledge about nutrition and environmental factors may positively change consumers' attitudes towards insects as food (Gedrovica, 2019). Nevertheless, other research has shown that increased knowledge does not lead to any significant difference when it comes to disgust and neophobia (Hartmann, et al., 2015; Verbeke, 2015).

## Objective

The aim of this study was to investigate the attitudes of physically active consumers towards insects as food and whether these attitudes were affected by information about nutrition and sustainability.

## Method And Design

Physically active Swedish consumers were invited to answer a questionnaire concerning attitudes towards insects as food via social media platforms such as Facebook or via Kristianstad University's website. Participation was anonymous and voluntary. The goal was to recruit a minimum of 100 adult consumers, consisting of men and women aged 18 years or older. Approximately half of the recruited consumers received a flyer with information about the nutritional content and sustainability of insects as food, which was sent with the questionnaire, appendix 1. The web-based questionnaire was launched in April 2020. The software Eye Question, version: 4:11:62, The Netherlands, was used for



data collection. The questionnaire consisted of the following three parts: 1. Demography, 2. Sustainability and Health, and 3. Attitudes towards insects as food. The questions and answer options are shown in Table 1.

**Table 1.** Questionnaire

**Demography**

No	Question	Answer Options
1	How old are you?	One Choice <ul style="list-style-type: none"> <li>• Below 18</li> <li>• 18-30</li> <li>• 31-40</li> <li>• 41-50</li> <li>• 51-60</li> <li>• 61 or older</li> </ul>
2	What is your gender?	One Choice <ul style="list-style-type: none"> <li>• Woman</li> <li>• Man</li> <li>• Neutral</li> </ul>
3	How would you specify your diet?	One Choice <ul style="list-style-type: none"> <li>• All kind of foods</li> <li>• Vegetarian</li> <li>• Vegan</li> <li>• Other</li> </ul>
4	How many days per week do you exercise?	One Choice <ul style="list-style-type: none"> <li>• Every day</li> <li>• 4-6</li> <li>• 1-3</li> <li>• Less than 1</li> </ul>

**Sustainability and Health**

No	Question/Statement	Answer Options
5	The food I eat should be organic	Scale
6	The food I eat should be locally produced	<ul style="list-style-type: none"> <li>• Do not agree at all (1)</li> </ul>
7	The food I eat should be mainly plant based	<ul style="list-style-type: none"> <li>• Do not agree fully (2)</li> </ul>
8	Food waste should be kept to a minimum	<ul style="list-style-type: none"> <li>• Neutral (3)</li> </ul>
9	The food I eat should be rich in protein	<ul style="list-style-type: none"> <li>• Agree somewhat (4)</li> </ul>
10	The food I eat should contain necessary minerals and vitamins	<ul style="list-style-type: none"> <li>• Fully agree (5)</li> </ul>
11	The food I eat should contain high quality fat	
12	I always plan what I will eat	
13	The food I eat is important for my physical activities	

**Attitudes towards insects as food**

No	Question/Statement	Answer Options
14	Have you eaten insects?	One Choice <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• Maybe</li> </ul>
15	Would you consider eating insects in the future, as a source of protein?	One Choice <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• Maybe</li> </ul>
16	I would gladly buy food containing insects	Scale
17	I would like to eat toasted insects	<ul style="list-style-type: none"> <li>• Do not agree at all (1)</li> </ul>
18	I would like to use insect flour in different food products	<ul style="list-style-type: none"> <li>• Do not agree fully (2)</li> </ul>
19	I would like to eat insects included in a dish	<ul style="list-style-type: none"> <li>• Neutral (3)</li> </ul>
20	I would like to add insects to a drink, e.g. a smoothie	<ul style="list-style-type: none"> <li>• Agree somewhat (4)</li> </ul>
21	I would like to eat insects as snacks	<ul style="list-style-type: none"> <li>• Fully agree (5)</li> </ul>
22	I would never consider eating insects	
23	I might consider eating insects in a different form	
24	If you agreed with statement 23, please give examples	

25	I would consider eating insects if it was healthy	
26	I would consider eating insects if it was environmentally friendly	
27	I would consider eating insects if they were tasty	
28	I would never consider eating insects as a source of protein	
29	I might consider eating insects for other reasons	
30	If you agreed with statement 29, please give examples	

The collected data were processed using descriptive statistics. Mean values and standard deviations were calculated and Students t-tests were performed to compare the groups of consumers using Excel (Microsoft Office), significance level was  $p < 0.05$ .

## Results And Discussion

Consumer data from a total of 123 physically active Swedish consumers were obtained during the test period. Of these, 67 participated in the group without information and 56 in the group with information. The gender distribution of both groups was fairly similar, with 1/3 men and 2/3 women. Almost half of the consumers belonged to the group aged 18-30 years and the second largest group was those aged 41-50 years. A major proportion, approximately 85%, ate all kinds of food and 15% were vegetarians. The consumers in both groups were equally divided between exercising either 1-3 days per week or 4-6 days per week.

Concerning sustainability, there was a significant difference between the groups regarding one statement, where the group with information considered organic food as more important. For the other statements, both groups had relatively neutral attitudes. However, both groups considered keeping food waste to a minimum to be important, Table 2.

The groups differed significantly concerning all health statements, where the group with information expressed greater concern, Table 2. This may be due to higher momentary awareness from reading the information sheet, which is in line with earlier studies showing the importance of health information (Saba et al., 2019).

**Table 2.** Results

Question/Statement	Group without information (m±std)	Group with information (m±std)	Significance $p < 0.05$
<i>Sustainability and Health</i>			
The food I eat should be organic	2.8±1.3	3.3±1.2	*
The food I eat should be locally produced	3.8±1.3	3.5±1.2	ns
The food I eat should be mainly plant based	2.6±1.4	2.7±1.4	ns
Food waste should be kept to a minimum	4.0±1.4	4.1±1.1	ns
The food I eat should be rich in protein	2.1±0.7	3.1±1.3	***
The food I eat should contain necessary minerals and vitamins	2.2±0.6	3.1±1.3	***
The food I eat should contain high quality fat	2.2±0.7	2.8±1.3	**
I always plan what I will eat	1.7±0.7	2.2±1.2	*
The food I eat is important for my physical activities	1.8±0.7	2.4±1.2	**
<i>Attitudes towards insects as food</i>			
Have you eaten insects?	44%	24%	***
Would you consider eating insects in the future, as a source of protein?	39%	36%	ns
I would gladly buy food containing insects	3.1±1.6	2.9±1.6	ns
I would like to eat toasted insects	2.4±1.5	2.0±1.5	ns
I would like to use insect flour in different food products	3.4±1.6	3.3±1.6	ns
I would like to eat insects included in a dish	2.9±1.6	2.6±1.5	ns
I would like to add insects to a drink, e.g. a smoothie	2.7±1.5	2.3±1.6	ns
I would like to eat insects as snacks	2.5±1.6	2.0±1.5	ns
I would never consider eating insects	2.2±1.5	2.3±1.5	ns
I may consider eating insects in a different form	2.8±1.5	2.6±1.4	ns

If you agreed with the statement above, please give examples	as flour in bread, bars, burgers etc.	as flour	
I would consider eating insects if it was healthy	3.3±1.6	3.3±1.5	ns
I would consider eating insects if it was environmentally friendly	3.3±1.6	3.2±1.4	ns
I would consider eating insects if they were tasty	3.6±1.5	3.3±1.5	ns
I would never consider eating insects as a source of protein	2.0±1.4	2.4±1.5	ns
I might consider eating insects for other reasons	2.4±1.2	2.5±1.3	ns
If you agreed with the statement above, please give examples	If healthy If sustainable If tasty	If low price If available Out of curiosity	

Attitudes of participants with and without information are given in the latter part of Table 2. Less than 50% of the consumers had experience of eating insects, although it should be noted that a significantly larger proportion of the consumers in the group without information had eaten insects. In both groups, approximately 35-40% of the consumers would consider eating insects. This rather low percentage may be linked to the fact that feelings of disgust and neophobia are commonly connected with insects as foods (Gedrovica et al., 2019).

A comparison between the two consumer groups showed no significant difference concerning attitudes towards insects as food, meaning that the information given did not have an impact. The impact of information is debated where, for example, Cristino et al. (2021) and Gedrovica (2019) suggest that information has a great impact on attitudes, while Hartmann et al. (2015) and Verbeke (2015) have shown that attitudes are based on culture and tradition. The attitudes reported here are slightly below neutral; however, it seems that attitudes would be slightly more positive if the consumers could be convinced that insects as food are good for their health, good for the environment, and are tasty. This shows the complexity of food attitudes, where many factors have to be taken into account (Wendin and Nyberg, 2021; Wendin et al., 2021). In addition, the comments suggested that insects should be “invisible” and could be added to different foods after grinding, e.g. as insect flour in bread, bars etc., which is in line with earlier studies (Hartmann et al., 2015).

## Conclusions

In conclusion, this study showed that the attitudes of physically active Swedish consumers towards insects as food were not affected by information about positive nutritional and sustainability aspects. The result showed great complexity concerning food attitudes.

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# Nutritional, sensory quality and general processing trends for the “Western” consumer in the case of sea cucumber species *Parastichopus tremulus*

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## Introduction

Sea cucumbers are echinoderms considered for centuries by some coastal nations to be an important part of traditional diets [i]. These marine animals have a wide distribution in the world’s Oceans ([ii]-[iii]) and can be generally divided into cold water and tropical species. Historical records show that the medical practices of the Chinese Ming Dynasty involved consumption of the local tropical species (*Apostichopus japonicus*) for nourishing the blood, providing vital essences, improving kidney disorders and reducing intestinal dryness, among others. The traditional Catalan consumption of sea cucumber muscle bands (Spanish Mediterranean coastal species *Parashtichopus regalis*) cooked with rice – ‘espardenyà’ – has been considered a delicacy, while Alaskan native communities consume sea cucumbers (*P. californicus*) fresh, smoked or dried, from daily catches. In the framework of the HOLOSUSTAIN project ([www.holosustain.no](http://www.holosustain.no)) researchers have been focusing on establishing a good overview of available commercial processing and commercial products of sea cucumbers. Further the nutritional and food quality of red sea cucumber *Parastichopus tremulus* from the Norwegian coast and the related enzymatic activities which could influence sensorial properties (texture, loss of color, etc.) and storage stability have been studied.

## Objectives

The main ambition of the HOLOSUSTAIN consortium and platform since its initiation in 2019 has been to promote knowledge acquisition and sustainable valorization of the Atlantic Ocean Sea cucumber species. In the end of the project, the consortium of HOLOSUSTAIN will transfer comprehensive, strategic guidelines on “Potential applications for the North Atlantic Sea cucumber species at the Western Food & Pharmaceutical market, sustainable fisheries management, processing and aquaculture” to the authorities and the relevant Industrial sectors. In view of this overall goal, we have focused on several sub-objectives:

- 1) to carry out a comprehensive bibliographic review to assess the existing formats on the market, consumer preferences, new food and value-added market opportunities (additives, nutraceuticals, bioactive compounds).
- 2) to define best processing approaches from the raw material from *P. tremulus* for development of both “Eastern” and/or “Western” consumer targeting products.

Thus, the nutritional characteristics, sensorial properties and texture-related enzyme profile have been studied for *P. tremulus*, in parallel with application of different processing techniques.

## Methods & Design:

### 1) Metanalysis for overview of the available commercial processing and marketed formats

For initial review purposes, all bibliographic sources in Google Scholar, Academia, PubMed Central and Mendeley have been reviewed using the following search keywords in different combinations: sea cucumber, holothurian, species, fisheries, market, size, trade, management, consumer, formats, bioactivity and nutraceutical. Due to the huge number of results yielded by the search we have preselected for review only those references that combined the criteria with authorship from official administrative fisheries, food control organs that offer relevant statistical data (FAO, Southeast Asian Fisheries Development Center, World Trade Organization, the Norwegian Seafood Council) or works which treated topics on the combinations of the keywords sea cucumber, trade, market, size, formats and nutraceutical. From all these publications we have selected the most recent sources (from 2010–

2019) to establish the current status of consumer preferences and trading trends. Of the various Western markets with active sea cucumber fisheries and a history of traditional consumption, we have specifically focused on the European and North American markets. The Asian market data have been focused on Hong Kong (China), Singapore, Taiwan and the Philippines as major merchandise trade centers in Asia that have carried out value chain analyses which adequately reflect the traditions in food consumption in the Orient.

### 2) Nutritional composition analysis of *P. tremulus*

Total protein, fat, water content, dry matter, ash content, fatty acid and amino acid profiles, minerals and heavy metals were determined by relevant food analytical methods as according to Kjerstad et al., 2015<sup>[iv]</sup> in *P. tremulus* samples from different seasons.

### 3) Processing and sensorial quality study

- **Gutting:** The gut incision was made on the underside of the sea cucumber, about 1.5-2 cm below the mouth opening. The length of the incision was about 1.5-2 cm.
- **Cooking:** Boiling was performed in sea and fresh water, sea water pH was adjusted or sea water with 30% coarse salt added. Boiling in a vacuum bag versus immersion in water were also compared.
- **Drying:** Sea cucumbers were dried in drying cabinets at a temperature of 29°C.
- **Salting:** Dry salting with high salt content was tested and different storage times (from 4-10 days)
- **Protein concentrate development through hydrolysis with food grade enzymes:** 120 min processing with combinations of two different food grade enzymes (2% final volume; Novozymes) has been shown to yield high quality functional ingredients (in powdered or liquid form) for possible food applications<sup>[v],[vi],[vii]</sup>.

Muscle texture and body wall thickness were measured instrumentally after slaughtering of the sea cucumbers with a texturometer (Stable Micro Systems).

### 4) Enzyme activity study of texture-relevant cathepsins

For the analysis of the cathepsin activity Abcam ab65303 Cathepsin K and ab65306 Cathepsin L Activity Assay (Fluorometric) kits were used, according to the instructions of the manufacturer. Activity detection was carried out on a Synergy HTX plate reader. Cathepsin-related peptide profile was analyzed by Tris-Tricine SDS electrophoresis.

## Results

Red sea cucumbers (*P. tremulus*) contain around 90% water, 3-5% protein, 3-4% ash and less than 1% fat. The nutrient content is highest in September and decreases towards March and June, while the water content increases. Our analyses showed that the period with the lowest nutrient content coincided with the spawning period. It is likely that the reduction in nutrient content is related to the build-up of gonads and reproduction from winter to summer. The results indicated that processing of sea cucumbers can give higher yields and nutrient content if they are fished in the autumn compared to spring and early summer. This is in line with the experience of Norwegian fishermen. Red sea cucumbers are a good source of protein and contain as many as 17 amino acids, many of which are considered health-promoting if included in the diet. The fatty acid profile showed that even though red sea cucumber contains little amounts of total fat, the proportion of the healthy polyunsaturated fatty acids ARA, EPA and DHA is high (27%). *P. tremulus* contains high amounts of calcium, potassium, magnesium and phosphorus, which are important health-beneficial minerals. As for the seasonal variations in this content, the analyses showed that the minerals in most cases were highest in September and lowest in June. Cadmium (Cd), mercury (Hg) and lead (Pb) were found in very low concentrations, below the limit values for seafood. The experimentally defined nutritional properties of *P. tremulus* could allow for nutritional and health claims according to the active EU legislation, providing up to 50% of the daily recommended doses for some minerals (e.g. "Calcium aids in the

development of strong bones and teeth”; “An adequate magnesium intake can support to maintain normal blood pressure”, “Potassium contributes to normal functioning of the nervous system, normal muscle function and maintenance of normal blood pressure”, etc.). Observed food quality in line with the applied processing (gutted, cleaned, boiled, salted) was good, aligning with most of the requirements of the “Eastern” consumers. Cathepsin activities were studied in the body wall of *P. tremulus*, as part of sea cucumber autolysis mechanisms which greatly affect textural properties. Cathepsin L activity of 15 RFU/g protein was measured in a pooled sample (10 individuals) from the summer of 2019, which was not high and could support a good food quality after processing. No measurable cathepsin K levels were found in the same raw material batch. Sea cucumber-based ingredients, processed through food-grade hydrolysis for incorporation in ready-to-eat foods could be more suitable for the “Western” consumer preferences.

## Conclusions

A large amount of data is already available on the nutritional, biofunctional composition and health-beneficial effects of various species among the temperate and cold-water sea cucumbers. Therefore, sea cucumbers, and Norwegian coastal species *P. tremulus* in particular, could be used for the development of functional food products and supplements, with high nutritional quality. This work has given new insight in the seasonal variation of the nutritional value of red sea cucumber, indicating optimal fishing seasons for this species. However, the trials were carried out in a small area on the Northwest coast of Norway. How the nutritional value and other compounds as heavy metals vary with geographic localization is not documented.

A high number of whole dry, encapsulated and extracted food products and supplements are already offered worldwide on platforms like Amazon, Alibaba and go4WorldBusiness, among others. An increase of 9.5% compound annual growth rate (CAGR) in the market segment for sea cucumber capsules is projected by 2025 (Global [“Sea Cucumber Capsules Market”](#) Research Report 2020-2025).

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# Animal-based vs plant-based protein quality. A survey of millennial students nutritional knowledge and food preferences

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## Introduction

The food system around the mass production of meat and by-products constitutes a major driver of global warming, diminution of Earth's resources, land degradation and deforestation, as well as contamination of aquatic and terrestrial ecosystems (IPCC, 2019; UN Environment Programme, 2018). At its current levels, worldwide food consumption practices are high, and particularly so in meat products. Proof lies in the environmental data, which is swiftly accumulating on the unsustainability of meat (Sabaté *et al.*, 2014).

At the present day, meat production is accountable for occupying over half of the Earth's cultivable land resources and for driving greenhouse gas emissions. Supporting those findings is Eshel's research (2014), which found that meat eaters employ over 160 percent of land resources when compared to those people who are reliant on a plant-based diet. In fact, although varying across several crop categories and regions, the global average water footprint related to crop production is remarkably lower when compared to the effect of meat production over freshwater sources (Mekonnen *et al.*, 2012).

Meat production necessitates around 2422 Gm<sup>3</sup> of water per year, the provision of just 1 kg of animal protein demands almost 100 times more water than producing 1 kg of grain protein (Lonnie and Johnstone, 2020). As a result, only a mitigated, global shift in dietary changes that are mainly reliant on nutritionally balanced, plant-based sourced of protein could sustainably feed 10 billion people by 2050. This would guarantee nutritional adequacy, food security and food sufficiency (LEAP, 2020; Willet *et al.*, 2019). According to the European Environment Agency (2019) there are increasing concerns related to the linkage between an excessive consumption of animal-derived proteins and issues related to health and environment. Within this context, 1 in 5 people living in the UK have already stopped or reduced their meat consumption (The Vegan Society, 2020).

Currently, there is increased awareness, particularly popular within millennials, regarding the adoption of a healthy, balanced diet which includes plant-based sources of protein. A conscious consumerism is in fact driving the trend towards the consumption of novelty food, more particularly plant-based, protein-rich products. In fact, according to data collected by Proveg Int. (2019) the UK's purchase and consumption rates of vegan products, more specifically milk, meat, margarine, cheese, readymade meals, and seafood, are amongst the highest in Europe. Within this frame of perpetual development, consumers are looking beyond the label. Eager to experiment with the inclusion of a wider variety of food options into their diet, their interest in converting and expanding their palate is increasing and subject to a continuous evolution (Mintel, 2018).

What used to appeal to a niche sector, is guaranteed to have a prosperous future within the food and beverage industry. In fact, vegans and vegetarians is projected to be a quarter of the British population by 2025, and flexitarians just under half of all UK consumers (Sainsbury's, 2019). Despite the increase in the number of people switching to a plant-based diet, meat consumption remains highly ingrained in Western culture and the disposition to stop or reduce consumption of animal products therefore remains relatively low. Consumers often describe plant-based products to have unappealing taste, texture, and appearance. Meat substitutes are difficult to find, often highly priced and more challenging to cook than their meat counterparts (Forbes, 2019; Mintel, 2020).

The lack of a wide array of studies conducted on the subject might be due to the concept of protein quality that remains a "grey area". The consumption of proteins-enriched products is nothing but a



relatively recent trend. The significance of this research ties back to the fact that there is a limited amount of evidence and literature related to familiarity with the concept of protein content and perceptions related to healthfulness and wellbeing. More importantly, no past research has taken into consideration millennial university students.

This study aims to assess millennial university students' nutritional knowledge and preferences related to food regimes, with a particular insight on the protein quality content of food, which focuses and distinguishes mainly between plant-based and animal-based protein sources.

### **Method & Design**

The current study is a cross-sectional exploratory survey of university students (millennial and generation z) of multi-ethnic background. The tool was a validated, semi-structured survey (Huges *et al.*, 2014), adapted to fit the population millennial population and it was launched via the online survey tool provided by the University of West London (UWL) which is compliant with GDPR regulations. The questionnaire used was used by Huges *et al.*, (2014) and modified to fit the aim of the current research. The adapted questionnaire was piloted to 10 students. Participants were recruited via email announcements with the participant information forms and link to the online questionnaire for the students that agree to participate (convenience and snowball sampling was used for students to enhance the possibilities of accessing a broader audience). Students were therefore asked to inform their colleague about the study (snowballing sampling). Students did not receive any form of compensation for participating to the research. The research received an ethical approval from the University of West London. A total count of 106 people completed the questionnaire.

The data were analysed using the excel programme for descriptive statistics on demographics and frequencies were determined for the relevant questions, as well as statistically evaluated (chi square test) on factors of gender differences, education level, and culinary knowledge.

### **Results**

106 people responded to the study; the majority of whom identify as male (52%). The population of this study is ethnically diverse such as Indian (13%) Pakistani (9.4%), Asian (6%) even though the majority describes themselves as belonging to a white background (36%). Most of the participants (39.6%) live alone in a private accommodation and relies on a total annual income of £20,000 to £29,999.

It was expected the population of the respondents are millennials, and therefore between the ages of 22-37 years old. Almost half of the respondents have obtained a degree (47.2%), followed by a 38.7% of the population who has attained a post-graduate degree. Most of respondents (84%) are students studying at the hospitality sector. Only a small minority are attending the science and health sector (11.3%). The fact that the demography mainly consists of students belonging to the hospitality suggests that they are involved by trade in the food and beverage sector and may already be knowledgeable to the topics covered in the questionnaire, or on plant-based diets. However, the rest of the participants may not be receive nutritional education in nutrition.

Results revealed that most of participants are responsible for the food shopping, planning of meals, and cooking. Regarding their activity level, 74.5% of the population defines themselves as leading a moderately active lifestyle. 60.4% of the respondents rate their cooking knowledge as being good, while a 39.6% defines it as being excellent. It emerged that most of the participants believes to be very knowledgeable in healthy eating. In addition, 70.8% of the respondents describes their diet as being healthy and balanced. These findings correlate to literature, which highlights that millennial are leading a revolutionary approach to food, represented by a shift towards a healthier, more mindful relationship with food itself. Not only they want to limit themselves in acknowledging where their food has been sourced from, but they desire feeling good about the food they consume (FSA, 2020).

From the cross-sectional study emerged that 44.3% respondents are adopting a flexitarian diet, followed by 40.6% of respondents who defines themselves as being meat eaters. The rest of the population define themselves to be vegan or fall under the vegetarian or vegan diet. Those findings are also in line with the literature, highlighting that Millennials and Gen Z are leading the shifting away

from an excessive consumption of meat, by adoption of plant-based diets, particularly the flexitarian dietary regime (YouGov, 2021; Rosenfield et al., 2020). It emerged that the most popular protein sources are eggs (20.8%), plant sources (18.3%) and fish (15.8%). Those findings are in line with the fact that 44.3% of the population identify as flexitarian. Protein sources which are being currently avoided are meat (23.6%) and poultry (20.4%), followed by meat substitutes (18.4%) and soy products (11.6%). 70.8% of the respondents acknowledge consuming protein-rich foods an average of 2 to 4 times a day, followed by 18.9% who eats 5 to 7 portions. Only 10.4% of participants actively consumes one or less protein sources per day. This is confirmed from the literature that protein is viewed as a “positive” macronutrient by consumers, who generally think that a higher intake is therefore to be preferred (Possidonio *et al.*, 2021).

The respondents were familiar with methods for measuring protein quality. Data revealed that almost half of the population (44.4%) is not familiar with any of those methods. The measuring methods respondents are the most familiar with are the biological value (21.5%) and the amino acid score (19.4%), followed by the protein efficiency ratio (11.8%). Only 2.8% of the respondents are familiar with the concept of protein digestibility. 33.8% of respondents believe that a high protein diet would be most beneficial for professional athletes, followed by a moderately 31.8% of people who believe that anyone can benefit from a diet high in protein.

We have assessed the knowledge of the participants in relation to the definitions of a vegetarian, plant-based, and vegan diet. It emerged that 86.8% of the population associates a vegetarian regime with the exclusion of any type of meat and fish, but the possible inclusion of animal-derived products. None of the respondents stated that it allows the consumption of any animal product. 55.7% of the population states that a plant-based diet is best described as being like vegan/vegetarian diet, followed by a 33% of respondents who believe it may just limit or exclude meat. 88.7% of respondents indicate veganism as a dietary lifestyle involving the total exclusion of red/white meat, fish, and animal derived products from the diet. Finally, respondents state that a plant-based diet correlates the most with the vegan dietary regime (55.7%), followed by a 37.7% of people who associate it with a vegetarian diet. The current study highlighted that multi-ethnic millennials are the leaders of a global shift away from meat consumption and towards the adoption of a plant-based diet, more specifically flexitarianism. The findings illustrate that the majority of respondents are already adopting a flexitarian lifestyle and experiment with plant-based diet or has already done so in the past. Plant-based products also appear to be a flavourful, nutritious alternative to animal products. Food knowledge, as well as the preferences, perceptions, and decisions of the individual confirmed to be unique and strictly connected to their own history, experiences, and personal background.

Plant proteins are the least limiting factors that stop them from regularly consuming plant-based foods. According to the majority of the respondents, factors influencing their own buying behaviour towards the purchase and consumption of proteins often assume different forms. However, the main factors being related to specific dietary requirements such as allergies and intolerances to specific foods, as well as ethical or environmental concerns. Moreover, plant-based diet is generally perceived as being healthier, even if not as an ideal solution for losing weight. It has also to be noticed how most respondents are aware of the key role played by TV advertising and media in affecting their purchasing behaviour and perceptions around protein quality. While palatability and taste appear not to be issues associated with the consumption of plant-based proteins, price inaccessibility as well as a lack of interest in going plant-based are crucial obstacles faced by respondents.

There is a limitation of generalising the data from the current study as many of the millennials have university education. Due to the educational selected population we have many respondents identifying as flexitarian, and are knowledgeable on plant-based proteins.

# Barriers towards plant-based food consumption are experienced differently according to dietary lifestyle: Results of a Consumer survey in 10 EU countries.

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## Introduction

Despite social marketing investment in promoting healthy food consumption, the population in EU-MS under-consume fruits, nuts, vegetables, legumes, beans, pulses and whole grains, while overconsume meat and ultra-processed foods (often high in fat, sugar and salt, while low in dietary fibre). Europeans eat twice or more the recommended levels of red or processed meat, and overconsume sugar by several orders of magnitude.

In 2018, the International Panel on Climate Change (IPCC) called for systemic transitions based on an alarming need for urgent mitigation investments, policy instruments, acceleration of technological innovation and behaviour changes to avoid reaching the irreversible climate tipping point. In 2021, the last IPCC report indicates “It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred.” In 2019, EAT-Lancet Commission issued guide for diets within planetary boundaries. The concurrence of obesity, undernutrition and climate change is considered as a syndemic with sweeping effects on human health and the environment. In 2020 the SAPEA called for concerted actions, involving multiple actors including consumers, on multiple levels of governance to transition of the European food system towards a more sustainable one.

## Objective

To evaluate differences on stated experience of barriers towards consuming plant-based foods by dietary lifestyles in 10 EU Countries.

## Method & design

During April/May 2021 a large-scale quantitative consumer survey was carried out in Austria, Denmark, France, Germany, Italy, The Netherlands, Poland, Romania, Spain and the United Kingdom as part of the EU H2020 Innovation Action Smart Protein. The questionnaire included sociodemographic characteristics (age, sex, education, locality of residence, household composition, etc.). It addressed barriers towards adopting plant-based diets. Barriers were expressed as level of agreement or disagreement (Likert scale 1 totally disagree-5 fully agree) with 26 statements such as “I don’t want to change my eating habits or routine”, “Plant-based food products would not be filling enough”, “I think humans are meant to eat lots of animal-based meat”, “I wouldn’t get enough energy or strength from plant-based food products”, “Plant-based food products would not be tasty enough”, etc. Differences between diet lifestyles in barrier scores were evaluated with ANOVA and effect sizes with *Eta* squared. Data were analysed with SPSS 25, and a *p* value < 0,05 was considered significant.

	Dietary Lifestyle												Eta Squared
	Omnivore		Flexitarian		Pescatarian		Vegetarian		Vegan		Total		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
I don't want to change my eating habits or routine.	3.34	1.13	2.71	1.02	2.84	1.19	3.02	1.19	2.95	1.33	3.11	1.14	.063
Plant-based food products would not be filling enough.	3.17	1.04	2.55	1.07	2.53	1.24	2.35	1.22	2.31	1.32	2.91	1.12	.086
I don't want people to think I'm being difficult or too alternative.	2.75	1.10	2.51	1.12	2.75	1.14	2.63	1.28	2.78	1.35	2.67	1.13	.009
I think humans are meant to eat lots of animal-based meat.	3.26	1.02	2.57	1.07	2.47	1.27	2.29	1.31	2.31	1.37	2.96	1.12	.107
I wouldn't get enough energy or strength from plant-based food products.	3.18	1.05	2.53	1.09	2.53	1.36	2.31	1.32	2.28	1.42	2.91	1.15	.088
Plant-based food products would not be tasty enough.	3.37	1.07	2.66	1.13	2.56	1.29	2.46	1.37	2.29	1.36	3.07	1.18	.102
I would need to eat a large quantity of plant-based foods to feel full.	3.08	1.03	2.58	1.06	2.72	1.22	2.44	1.27	2.31	1.29	2.87	1.09	.056
Plant-based food products look too unusual.	3.11	1.04	2.56	1.09	2.53	1.16	2.38	1.26	2.30	1.36	2.88	1.12	.067
There is not enough choice in plant-based food when I eat out.	3.20	1.01	3.22	1.08	3.27	1.20	3.12	1.25	2.95	1.46	3.20	1.06	.002
I don't know what to eat instead of lots of animal-based meat.	3.11	1.07	2.71	1.09	2.70	1.24	2.32	1.31	2.30	1.35	2.92	1.13	.047
Plant-based food products are inconvenient.	3.11	1.02	2.64	1.06	2.61	1.17	2.50	1.32	2.40	1.33	2.91	1.09	.051
My family/partner won't eat plant-based food products.	3.33	1.12	2.95	1.12	2.84	1.22	2.74	1.29	2.75	1.37	3.16	1.16	.034
It takes too long to prepare plant-based meals.	2.99	0.99	2.58	1.05	2.60	1.19	2.40	1.23	2.27	1.32	2.81	1.06	.045
Someone else decides on most of the food I eat.	2.48	1.20	2.24	1.15	2.51	1.32	2.32	1.32	2.23	1.34	2.40	1.21	.009
The plant-based foods I would need are not available where I shop or eat out.	2.86	1.01	2.76	1.06	2.79	1.16	2.66	1.25	2.65	1.33	2.82	1.05	.004
I don't know how to prepare plant-based meals.	3.09	1.10	2.70	1.14	2.65	1.21	2.38	1.27	2.41	1.40	2.91	1.15	.040
There is not enough iron in plant-based food products.	3.07	0.98	2.68	1.02	2.70	1.19	2.52	1.23	2.45	1.35	2.91	1.04	.040
There is not enough protein in plant-based food products.	3.08	1.02	2.61	1.04	2.61	1.25	2.36	1.24	2.31	1.30	2.88	1.08	.059
I would be worried about my health (other than iron and protein) if I was only eating plant-based food products.	3.20	1.08	2.72	1.11	2.59	1.26	2.34	1.23	2.16	1.31	2.98	1.15	.066
I would get indigestion, bloating, gas, or flatulence when eating plant-based food products.	3.01	1.00	2.58	1.08	2.64	1.26	2.42	1.28	2.33	1.35	2.83	1.08	.045
Plant-based meals or snacks are not available when I eat out.	3.11	0.97	3.10	1.01	3.16	1.10	2.98	1.19	2.99	1.33	3.10	1.01	.001
Plant-based food products are too expensive.	3.53	1.01	3.38	1.07	3.17	1.20	3.11	1.25	2.99	1.35	3.45	1.06	.016
I need more information about plant-based food products.	3.28	1.08	3.31	1.04	2.99	1.16	2.85	1.21	2.67	1.31	3.25	1.09	.015
I do not enjoy eating plant-based food products.	3.29	1.09	2.54	1.09	2.50	1.26	2.28	1.30	2.27	1.40	2.98	1.18	.113
It is not masculine to eat plant-based food products.	2.54	1.14	2.09	1.10	2.32	1.26	2.13	1.29	2.27	1.42	2.37	1.17	.031
Plant-based food products do not look appetizing or appealing.	3.14	1.12	2.53	1.11	2.61	1.30	2.25	1.26	2.28	1.38	2.88	1.18	.075

## Results

In total 7590 responses were obtained, 49,5 were women, 49,5 were men and the remaining classified themselves as “other”. Majority (56%) lived in urban areas, 24% in suburban areas and 20% in rural areas. Majority of respondents reported having a good health status (79,5%). According to their dietary lifestyle, 60% were omnivores, 30% flexitarians, 3% pescatarians, 5% vegetarians and 2% vegans. Scores of barriers were all statistically different by dietary lifestyle (See attached table, ANOVA,  $p < 0,001$ ) except for the statement “Plant-based meals or snacks are not available when I eat out”. Large effect sizes ( $Eta\ squared > 0,1$ ) were observed for the following barriers a) the lay belief that humans are meant to eat lots of animal-based meat ( $Eta\ sq, = 0,107$ ); b) the expectation that plant-based food products would not be tasty enough ( $Eta\ sq, = 0,102$ ); c) and the experience of not enjoying such products ( $Eta\ sq, = 0,113$ ). Medium effect sizes were observed for variables addressing nutrition related barriers “would not be filling enough” ( $Eta\ sq, = 0,086$ ) and “I would not get energy or strength from these products” ( $Eta\ sq, = 0,088$ ).

## Conclusions

Promoting a diet shift towards plant-rich diets requires addressing experienced barriers. Communication and behaviour change strategies should be targeted according to people's current dietary lifestyle. Future interventions should address the lay beliefs regarding the necessity of meat in a healthy diet, and the experience of plant-based foods, with special focus on their sensory characteristics and the pleasure obtained from their consumption.

## Acknowledgement

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# **Natural and healthy? Consumers' knowledge, understanding and preferences regarding processing, naturalness, and healthiness of food products.**

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## **Introduction**

When shopping for food, consumers often face a complex choice environment made up of dozens, sometimes hundreds of close alternatives to the same base product. This is especially true in the case of processed products, which are often available in wide ranges of quality-differentiated variations. Moreover, the characteristics of the alternatives are sometimes unfamiliar or unclear, causing some confusion or misinterpretation for consumers. Behavioral research suggests that, in this context of information and choice overload, consumers tend to rely on decision heuristics that gives disproportionate importance to the more salient and less complex information. These influences of the marketing context stand amongst current major challenges in promoting healthy and sustainable food decisions.

Recent years have seen a growing public and societal concern regarding the negative impacts of ultra-processed foods on health. In parallel, products marketed as "less processed", "natural", or "additive-free" have known a significant development in Canada. What do consumers really know and understand about these products characteristics, and what impact does this knowledge have on their representations of the products, and their responses to such information?

The scientific literature on the links between knowledge and food decision-making is dominated by works that examine the relationship between the level of food, health, and/or nutrition literacy and overall health or dietary outcomes. However, in Canada, there is very little data regarding what consumers know and understand regarding food products' ingredients and processing, and what their perceptions of, and preferences for those characteristics are. This research therefore considers a more specific focus on the knowledge, understanding and use of food information when making choices between close alternatives.

## **Objectives**

This research investigates Canadian consumers' beliefs, knowledge, and preferences for food products with regard to their naturalness, degree of processing, and healthiness, and explores their response to information regarding these characteristics.

More specifically, it addresses three questions :

- 1) What do consumers know and believe about naturalness, additives, ingredients and food processing?
- 2) How do consumers relate naturalness, degree of processing, and healthiness in food products?
- 3) How do consumers respond to objective information regarding food product properties associated to various degrees of processing, and what are the sources of information they trust?

## **Method & Design**

A representative sample of 1001 consumers from the Canadian province of Quebec, responsible for food purchases within their household, replied to an online survey. The survey instrument was developed on the basis of a literature review of previously validated questionnaires. The survey assessed the respondents' (1) level of knowledge and beliefs regarding food processing, food industry, and additives (2) perception of naturalness, degree of processing, and healthiness of selected food products (3) response to different choice scenarios in which information about products' additive content and subsequent properties was revealed (4) degree of trust in various sources of information regarding food ingredients and processing.

## **Results**

For most products, consumers perceive that the more natural products are those that are less processed and are also the healthier ones. However, this overall association may be nuanced depending on consumers' characteristics. Specifically, the results show associations between the level of knowledge of respondents, their beliefs and representations, and their purchasing decisions in the presence of objective information. There are, notably, significant contrasts around the representation of what is natural, transformed and healthy according to the level of knowledge and around decisions, and the results suggest that more knowledgeable consumers were less subjected by external sources of potentially contradictory information.

When faced with having to trade characteristics such as sensory or preservation properties brought on by additive with less intensive processing, consumers are divided: older consumers seem to favor the replacement of artificial additives by natural additives to the complete elimination of additives: in other words, they prefer to retain the initial properties of the products, even if it means paying a higher price. Younger, less educated consumers prioritize lower price over decreased degree of processing. Overall, the study highlights segmented preferences and disparities in the level of knowledge and in the willingness to pay more for less processed products. Moreover, the results reveal a generally low knowledge and understanding of food processing and ingredients. Faced with the abundance of unclear information, consumers report that they rely on simplifications in the criteria consulted: price, brand and short lists of ingredients. Respondents underline a need for more transparency and clarity on Canadian food markets. Public institutions, and independent scientific research, are the preferred vectors for such information.

## **Conclusions**

This paper examines the issues associated with differences in consumer knowledge levels, with regard to their representations, perception and behaviours towards ultra-processed food products and foods marketed as natural. The results sheds some light on the possible attention issues, confusion and mistakes induced by the use of decision heuristics at the point of choice when facing information overload. Perspectives for the industry in terms of future product design in response to consumer needs and preferences, as well as recommendations for policy makers to foster greater transparency, are also discussed.

SESSION 4: DYNAMICS OF FOOD CULTURES: HERITAGIZATION,  
TRANSFORMATION AND ACCULTURATION

# Awareness and perceptions of ethnic restaurant managers towards authenticity and sensory strategies – A case study of Persian ethnic restaurants in London

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## Introduction

The presence of ethnic restaurants is closely linked with the history of people's travel and immigration, and it is believed that the first-ever restaurant in history was an 'ethnic restaurant' around 1100 A.D. The story of ethnic food may have been started a long time ago, however, it was only in the recent decade that the concept of ethnic restaurants has grown in popularity and turned into a speciality in the restaurant industry (Tey et al., 2008).

Some of the main reasons that individuals visit an ethnic restaurant are known to be their willingness to explore the particular ethnic culture and to expand their knowledge (Lego et al., 2002; Molz, 2004; Ebster and Guist, 2005; Sukalakamala and Boyce, 2007). Authenticity, the state of being genuine and true to the represented ethnicity and culture, is one of the most prominent qualities in ethnic restaurants which has a significant impact on customers' overall experience and satisfaction (Sukalakamala and Boyce, 2007).

Scholars identified three different perspectives of authenticity: objective, constructive and post-modern. This study focuses on the constructive perspective of authenticity believing that, there is no absolute and objective definition for authenticity (Bruner, 1994) and instead, it is constructed socially or personally (Ebster and Guist, 2005; Kim and Jang, 2016) based on individual's experiences, perceptions or interpretation and therefore can be perceived differently from person to person (Robinson and Clifford, 2012; Youn and Kim, 2017).

Elements that satisfy senses and can convey authenticity to guests in ethnic restaurants are sensory strategies – the strategies which are directly linked with human five senses of vision, audition, gustation, olfaction and touch and are designed to communicate the desired outcomes to the recipient.

The existing literature regarding authenticity within dining settings is highly dominated by the consumer's perspective and only a few studies look at the supplier's (service provider) perspective (Le et al., 2019). Based on the findings of a systematic review (see poster presentation Sattarzadeh et al., 2022), the same applies to the literature on sensory strategies within dining settings, and once more the focus is on customers' experience, and the opinions, perceptions, experiences and awareness of the service providers as the creators of the experiences are not explored in depth.

The aim of this paper is to critically investigate the perceptions of Persian ethnic restaurant managers towards authenticity, and to explore and appraise their awareness and opinions toward the application of sensory strategies in regard to authenticity within their businesses.

## Method & Design

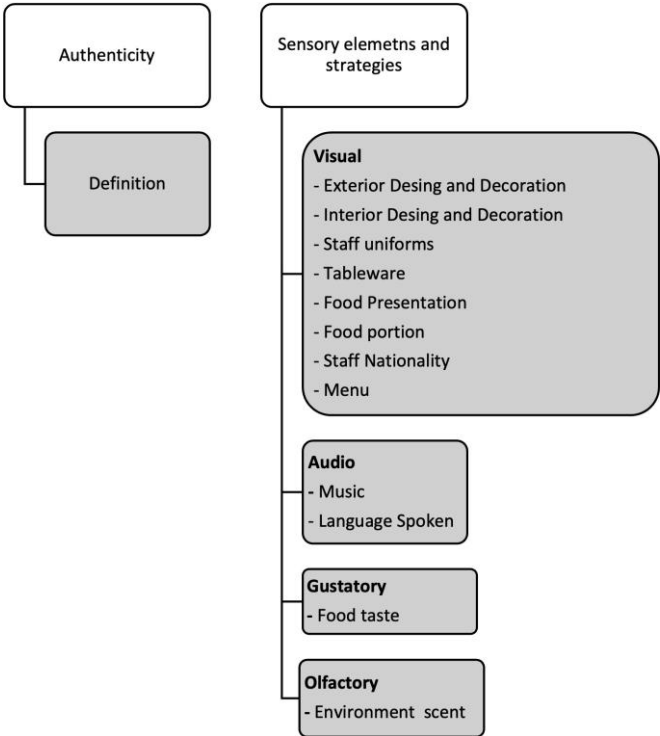
The research is based on interpretivist philosophy and inductive reasoning and uses qualitative research methods, specifically semi-structured interviews, to collect the in-depth opinions and perceptions of a sample of Persian ethnic restaurant owners and/or managers in London, UK in a naturalistic approach. The semi-structured interviews provide the opportunity to guarantee the collection of the relevant and necessary information by having predetermined questions but at the same time would give the interviewee the freedom to express any additional ideas or opinions out of the designed format (Altinay et al., 2016).



The research employed convenience sampling technique, the interviews took place at the sampled restaurants as it was more convenient for the interviewees and enabled the researcher to address tangible examples from the restaurants during the interview. The researcher faced a few challenges in convincing people to agree to participate in the study due to specific cultural beliefs and biases of some of the potential interviewees.

As the researcher is a native Farsi speaker who is also fluent in English, the interviewees were given the choice of having the interview in either language. The interviews which were conducted in Farsi language were translated into English. The data was analysed by manually coding each interview and identifying the emergent themes. Themes were initially divided into two groups of authenticity and sensory strategies and later subthemes were identified to break the themes further (see Figure 1).

Figure 1 - Identified themes and subthemes from the interviews with the Persian ethnic restaurant managers



**Findings**

The first section of the findings concerns the restaurateurs’ definition of authenticity in regard to their ethnic restaurants. The following section outlines restaurateurs’ opinions, perceptions and experiences regarding different sensory elements and strategies. The findings are from the themes and subthemes which were identified in the interviews and are based on preliminary results from the early number of the interviews with the restaurateurs. It is expected that further interviews will take place that will enrich the findings.

**Authenticity**

The definition and perception of authenticity vary between the restaurateurs, with some linking the authenticity concept with the origins and the culture of the human beings, while others judging it in a more objective manner and solely emphasising elements such as authentic food items and authentic food preparation methods.

Despite providing different definitions, the majority of the restaurateurs perceive authenticity as synonymous with quality. Here it is necessary to address the translation of the term authenticity in Farsi language, and the fact that in those cases when *authentic* means *original* (اصیل – Aseel) it is usually perceived as *traditional* (سنتی – Sonnati) in everyday Farsi language. Therefore, restaurateurs

with a more modern business model, believe that being *too authentic* (in this case traditional) will interfere with having a modern and *unique* establishment.

Another important point to address is the belief that being an ethnic restaurant far from the referent country, would make it challenging and sometimes impossible to maintain the authenticity as there is limited access to the *ideal* sources (e.g., ingredients, tableware, etc.). This once more highlights the partially objective perspectives of the restaurateurs towards authenticity.

### **Sensory elements and strategies**

*Visual elements and strategies:* There are contrasting ideas regarding visual elements like restaurant signage. Some restaurateurs believe that having the signage in the ethnic language would bring a sense of familiarity and comfort for their Persian customers and make their non-Persian customers curious and interested. Others, on the other hand, believe that there is no need to write anything in the ethnic language (e.g., signage, menu, etc) when you are an established business with regular customers, and you are located in an English-speaking country.

While discussing the staff nationality and whether the interviewees believed that the front of house staff, which are in direct contact with the guests, should be Persian or not, interviewees shifted their focus from visual elements and focused either on non-sensory elements like the quality of hospitality in general or communication challenges. One of the interviewees expressed that their front of house staff should be Persian to be able to deliver a fine experience of the Persian hospitality when serving the guests. Some of the other interviewees shared several examples of negative experiences that the Persian customers were dissatisfied when being served by a non-Persian member of staff, as they could not communicate in Farsi language. Despite the negative feedback, they still believed that just like Persian guests do not expect other restaurants in the UK to be able to speak the Farsi language, they should not expect it from their restaurant as well.

Based on the experience of the restaurateurs, interior design and decoration are believed to be the elements that attract the interest of the non-Persian customers more as Persian customers are already familiar with the elements due to their background. Regarding other visual elements such as staff uniforms, restaurateurs were only concerned with hygiene and cleanliness of the uniforms and expressed that they have not thought of having specific uniforms designed for them.

As expected, elements which are related to food such as food presentation, food portion, food names on the menu were very important elements to the restaurateurs. They emphasised the importance of serving authentic dishes but, at the same time, they opted for also including a few food items which are not Persian (e.g., Hummus, Baba Ghanoush, etc.) but are generally in high demand in Middle Eastern restaurants.

*Auditory elements and strategies:* The interviewees did not seem to have strict rules about only playing Persian music in their restaurants and were either flexible to accommodate the requests of their guests or were only concerned about a specific genre of music (e.g., classical music, soft jazz, etc.) regardless of the origin.

*Gustatory elements and strategies:* Like other food-related elements mentioned earlier, food taste was also a significantly important element for the restaurateurs, and they took pride in serving dishes with an authentic taste with some modification to the recipes to match the taste of their guests.

*Olfactory elements and strategies:* Scent and smell were the elements that the interviewees seemed to have not considered at all. One interviewee believed that being able to smell the food in the restaurant is actually a negative point and infusing specific Persian scents in the air would be pointless by completely ignoring the Persian guest and saying that non-Persian customers would not know what it is.

### **Conclusions**

Authenticity seems to be a new phenomenon to the managers of Persian ethnic restaurants and not something that is included in their definition of quality, and it is challenging for them to link authenticity to their businesses.

As expected, and also evident in the existing literature, among all the sensory elements restaurateurs are mainly concerned with and aware of visual elements, and have not explored the potential possibility of using other sensory elements. Even the visual and the other few elements which are applied are mainly present to serve their basic and original purpose and have not been thought through as business strategies, which in this case can have an impact on customers' perceived authenticity.

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# **Cultural distancing: Reflections on traditional food practices during the COVID-19 pandemic**

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Seminal and contemporary food scholars have been relatively consistent in the way they define or assess traditional food practices. These are shared activities connecting individuals within their cultural backgrounds. However, the recent evidence indicating changes in foodways during the COVID-19 pandemic gives attention to prospective present and future modifications among consumers' food shopping habits, preparation and eating behaviors.

This includes the rise in online shopping and the widespread consumption of manufactured food products. Scholars suggest that social disconnection and the consumption of globalized, processed foods by their very nature are the antithesis of the homogeneity of traditional group values. Foodways historically hybridize over technology and acculturation. Though, the recent pandemic may have given an unexpected jolt to this model.

The importance of food as a defining element of cultural identity, makes it vital to understand the effects of the current pandemic on culinary practices.

This article highlights scholarly models for defining food culture and cuisine, then compares these principles with contemporary evidence of global food practices during the pandemic.

The authors question the point at which traditional practices are discernible from a homologous proliferation of processed products; and, how the current pandemic contributes to the disassembly of established culinary borders.

# The transmission of food culture in China: between heritagization and mediatization

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In recent years, there has been an increasing interest in food culture and heritage in China. This can be illustrated by two notable phenomena: While the so-far unsuccessful attempts to inscribe elements of Chinese cuisine on the UNESCO Representative List of Intangible Cultural Heritage (hereinafter referred to as ICH) of Humanity, at the national-level lists of ICH, among total 1557 items, 167 food-related elements have been inscribed under the categories of “traditional craftsmanship (*chuantong jiyi*)” and “folklore (*minsu*)”; The proliferation of audiovisual production about food culture has been significant, particularly since the success of the Chinese documentary television series “A bite of China” gained internationally as well as nationally in 2012. Meanwhile, we also notice a diversification of the diffusion platforms of videos on the food theme, including video sites (bilibili.com, v.qq.com) and video-focused social networking (Tiktok, Kuaishou). This article seeks to examine the changing transmission models of food culture practices led by the processes of heritagization and mediatization in a new digital era.

In 2019, China’s two major video sharing platforms – Douyin (Tiktok is its international version) and Kuaishou have announced the launch of their campaign of ICH. The former aimed to select fifty “ICH partners” (*feiyi hehuoren*) to help at least ten of them to reach one million followers or one million yuan (around 136,000 euros) in revenue from the sale of contents, while the objective of the latter was to select “ICH leaders” (*feiyi daitouren*) for supporting them in training and promoting projects for the safeguard and the development of ICH. With a total of more than 200 million daily active users, every three seconds a video under the hashtag “# ICH (*feiyi*)” would be uploaded to Douyin or Kuaishou. According to the latest annual report of ICH issued by Douyin in June 2021, two newly inscribed food-related elements – “the cooking techniques of Sichuan cuisine” and “the cooking techniques of Liuzhou rice noodle” became the most-watched ICH food (*feiyi meishi*) content, which had earned more than 30 million and 70 million views respectively between 2020 and 2021. Lately, in particular during the lockdown period of the Covid-19 pandemic, what can be seen in the reports of Kuaishou is the sudden increase in the number of uploaded food content videos. For example, during the Chinese New Year in 2020, the campaign “New Year’s Eve dinner on Kuaishou” aimed at promoting traditional Chinese cuisine earned 11 billion views for 2 million uploaded videos under the campaign hashtag. And meal preparation tutorial is always included on the list of best-selling online courses on Kuaishou.

It is thought that the diffusion of the first Chinese TV program “at your service” concerning foodways in the late 1970s is considered as a starting point of the process of the mediatization of food cultural practice (Ding 2019), while its heritagization process could go back to 2003 when the first general survey concerning food cultural practices was conducted by the Chinese folk literature and art association, being part of the campaign for “salvaging Chinese folk cultural heritage” (Feng 2004; Xiang 2004). What stands out during the heritagization process since the 1980s is the changes of transmission models of cultural practices at the local level (Liu 2006; Zheng 2017). Then, what changes the recent union of these two devices – ICH and social media, precisely the intertwining of these two ongoing processes, would bring to the transmission of food culture in China?

We attempt to show the effects of the digitalization of food heritage on food culture practitioners and other relative stakeholders involved in the transmission of the practices. The current study is based on fieldwork conducted in Guangdong Province of China, mainly between 2016 and 2019, in parallel with the online ethnographic observation on following digital media platforms – bilibili.com, v.qq.com, Douyin and Kuaishou since 2018 concerning several traditional festival foods included in the national ICH list, such as *yuebing* (mooncake) of the mid-autumn festival, *zongzi*(sticky rice dumpling) of the dragon boat festival as well as the preparation of sacrificial food and banquet of local festivals.

In this article, firstly, we will review the changes of the transmission models of food cultural practices, which started initially during the heritagization process in the 1980s and then accelerated and deepened with the mediatization process through social media. We will then analyze the multiple roles that the practitioners play: chef (professional and amateur)/bearer of ICH/user of social media/content provider – as well as the changing relationship between the various stakeholders (practitioners, local associations, cultural administrations, researchers, digital platforms, producers of professional content, etc.) involved in the promotion of traditional food culture. Finally, we will look at how professional chefs adapt to the new transmission model in the digital era.

## SESSION 5: FOOD PATTERNS AND DIET CONTENT

# Food Preparation Patterns and Diet Quality in the Portuguese population

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## Introduction

Diet-related chronic diseases are a relevant public health problem that is spreading worldwide. To encourage consumers to eat healthier there is an urgent need to better understand dietary habits. Eating out has been pointed as responsible for inadequate dietary intake, but it is uncertain if this relates simply to the place of consumption or if the place of preparation is also involved. Although the consumption of food prepared away-from-home is increasing and time spent on cooking at home is decreasing, the potential role that eating homemade meals could have in health promotion is uncertain. Due to the lack of accurate, comprehensive, and up-to-date information about this subject, it was considered relevant to focus on if food and beverages were prepared at- or away-from-home.

## Objectives

To identify food preparation patterns and to study their associations with diet quality.

## Methods & design

Participants were taken from a representative sample of the Portuguese population (aged between 3-84 years old) (n=5005), from the most recent Nacional Food, Nutrition and Physical Activity Survey (IAN-AF 2015/2016).

Dietary data was collected by trained researchers with a background in Nutrition or Dietetics, using an electronic platform (“You eAT&Move”) and following European Food Safety Authority (EFSA) recommendations for dietary assessment. Interviews 8 to 15 days apart were conducted over 12 months (from October 2015 to September 2016), distributed over the four seasons, and included all days of the week (randomly selected). Food consumption data was collected by two non-consecutive days of 24-hour food diaries for children (<10 years old) and two non-consecutive 24-hour recalls for the other age groups. Food photos for portion size estimation and automatic intake conversion using databases with the nutritional composition of foods and recipes were applied.

The “eAT24” module, integrated in the electronic platform, enabled the description of food intakes by interviewers through various facets (divided in 3 groups: facets for “Foods”, for “Composite dishes/Recipes” or for “Food supplements”) and respective descriptors, if applicable, using the EFSA FoodEx2 classification system. However, this module does not include a descriptor variable that evaluates only the food preparation. For this reason, an alternative descriptor variable was used, the “Preparation/production/acquisition place” – a descriptor referred to the immediate food or recipe source (food supplements were not included) of a reported intake, i.e., the place where the food being consumed was prepared, produced, or acquired. This descriptor was first considered at the level of the “Recipes” facet (RF22) and, if the foods/beverages consumed were not part of a recipe, the “Preparation/production/acquisition place” was considered at the level of the “Foods” facet (F22).

For the purposes of the present study, both RF22 and F22 “Preparation/production/acquisition places” descriptors were grouped. Still, if food preparation/acquisition places (F22) had been classified as “Food industry”, “Street vendor/kiosk”, “Butchery” or “Fishery”, it was necessary to reclassify them through the analysis of the respective consumption place and type of food/beverage, as the exact place of preparation was unclear, namely whether they had been prepared at home or not. This



reclassification was informed by previous literature and carried out by the first author and another expert reviewer independently; resulting discrepancies were evaluated and solved by senior authors. Diet quality data was assessed by two different indexes, the Mediterranean Adequacy Index (MAI) and the Healthy Eating Index (HEI). MAI evaluates adherence to the Mediterranean diet – a healthy and sustainable dietary pattern and a proxy of high quality diet. Terciles of the MAI values were determined, allowing the classification of the participants' diet quality as "Low", "Medium" and "High". HEI is based on dietary recommendations proposed by the World Health Organization. The HEI final score ranges from 9 to 36, with higher scores translating in healthier and higher-quality diets. To derive food preparation patterns, food intake amounts of all individuals were cluster analyzed according to corresponding food preparation methods. Logistic and linear regression models were used to study the association between emerging food preparation patterns and diet quality indexes. Crude and adjusted – for energy, age group, sex, degree of urbanization and education level (or parent's education level in the case of children and adolescents) - models were used. Odds Ratios (OR) or beta coefficients ( $\beta$ ) and respective 95% confidence intervals (95%CI) were obtained. All statistics were performed by the R Software version 3.6.3 and the sample was weighted for the Portuguese population distribution. The significance level considered was  $\alpha=0.05$  for all analyses.

## Results

When grouping individuals with similar attributes, four food preparation patterns were identified:

- "Homemade by themselves" – with a prevalence of 15.0%, this pattern is characterized by the highest intake of foods and beverages prepared at home by him/herself (38.0%), when compared to the other patterns;
- "Homemade by family or friends" – the least prevalent of all (13.3%), is characterized by the highest intake of foods and beverages prepared at home by family or friends (44.7%), in relation to the other patterns;
- "Food retail (including *in natura* foods)" – with a prevalence of 26.3%, this pattern is characterized by the highest intake of foods and beverages prepared away-from-home by food retail (65.3%), relatively to the other patterns;
- "Restaurant, canteen or other away-from-home" – the most prevalent of all (45.4%), is characterized by the highest intake of foods and beverages prepared away-from-home by restaurant, catering, or takeaway/delivery (13.9%), away-from-home by school/work canteen (10.8%) and away-from-home by cafeteria, snack-bar, or bakery (9.6%), comparatively to the other patterns.

It is important to highlight that the name of each pattern reflects the most predominant(s) food preparation place(s) relatively to other patterns, meaning that individuals' consumption is distributed among other different food preparation places and not only the one(s) that contributed to the name of that pattern.

Compared with children and adolescents in the "Homemade" pattern – and after adjusting for energy, sex, age group, degree of urbanization and parents' education level – those in the "Food retail (including *in natura* foods)" pattern had lower odds of following a Mediterranean diet (OR=0.29, 95%CI=0.12, 0.68). The same was not observed for those in the "Restaurant, canteen or other away-from-home" pattern (OR=0.90, 95%CI=0.47, 1.73). Compared with all adults in the "Homemade by themselves" pattern – and after adjusting for energy, sex, age group, degree of urbanization and education level – those in all the other patterns presented lower odds of having high adherence to the Mediterranean diet. Those odds were reducing in sequence from the "Homemade by family or friends" pattern (OR=0.52, 95%CI=0.34, 0.79), the "Food retail (including *in natura* foods)" pattern (OR=0.48, 95%CI=0.36, 0.65) and the "Restaurant, canteen or other away-from-home" pattern (OR=0.39, 95%CI=0.29, 0.51).

Having the "Homemade" pattern as reference – and after adjusting for energy, sex, age group, degree of urbanization and education level – the association with the HEI score values revealed similar results. For children and adolescents, inverse associations of HEI mean scores were displayed for those who followed the "Food retail (including *in natura* foods)" ( $\beta = -1.8$ , 95%CI = -2.4, -1.2)

or "Restaurant, canteen, or other away-from-home" patterns ( $\beta = -0.7$ , 95%CI = -1.3, -0.2). For adults and elderly, inverse associations of HEI scores were displayed for those who followed the "Homemade by family or friends" ( $\beta = -0.5$ , 95%CI = -0.8), "Food retail (including *in natura* foods)" ( $\beta = -0.5$ , 95%CI = -0.8, -0.2) or "Restaurant, canteen, or other away-from-home" patterns ( $\beta = -1.2$ , 95%CI = -1.5, -0.9).

### **Conclusions**

In the Portuguese population, eating more meals prepared at home was associated with better diet-quality, both by higher adherence to Mediterranean food pattern and compliance with WHO recommendations, suggesting possible benefits to health. Therefore, home cooking promotion should be part of future public health interventions for population groups where this eating behavior is less predominant.

# Food Insecurities during the Covid-19 pandemic in the UK and consumption adaptation

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## Introduction

Covid-19 and Brexit have disrupted retail supply chains and led to economic uncertainty. This paper seeks to understand the experiences of consumers in terms of their food security and their emotion and practical responses. Our research maps how grocery consumption patterns and practices have changed and assesses the likely longevity of these behavioural shifts.

## Method & design

Consumers attitudes, perceptions and behavioural changes regarding grocery shopping through the pandemic were researched through inductive semi-structured interviews. Consumers, including those designated as clinically vulnerable, were sampled to highlight retail supply concerns; population level challenges and behavioural responses. Data was analysed thematically.

## Results

Food access experiences revealed the shortages experienced and the impact that this had. Impacts included, generating widespread anxiety regarding food insecurity and isolated instances of compromised physical health. A range of factors served to compound or temper this anxiety. Behavioural adaptations such as increased on-line shopping and local patronage emerged. Diversified food supply can encourage shorter, nimble supply chains. Local suppliers can stimulate markets, encourage community resilience and reassure consumers regarding access. Long-term behavioural changes are likely in response to the disruption and innovation.

## Conclusions

Findings reveal first insights into the consumer impacts from the disrupted retail supply chains and map behavioural changes and retail sector adaptations that may prove effective long-term strategies. Opportunities for businesses to expand direct routes to market reflecting retail displacement, and long-term significance regarding online and local shopping capacity are highlighted. Greater coordination and transparency of local supply to ensure access, provide additional routes to market and build supply chain resilience to reassure consumers is encouraged.

# Intermediate meals and the place of consumption - which relationship?

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## Introduction

The distribution of energy and nutrients in 4 to 6 daily meals may have beneficial health effects. The place where people have their meals is frequently identified as a determinant of food consumption.

## Objectives

To evaluate the influence of the place where university employees, have their meals on the adequacy of intermediate meals.

## Methods

Data collection was carried out face-to-face, by a nutritionist that inquired individuals about food consumption in the previous 24h. It was considered only food consumption from normal intake days. All ethical procedures was considered and an ethical committee approved the research. Statistical analysis was conducted using SPSS software.

## Results

It was observed a relationship ( $p = 0.004$ ), between the place where first mid-afternoon meal were eaten and the adequacy of its energy value. The same applies to second mid-afternoon meal ( $p=0.006$ ). Either consumption at home or food brought from home contribute to a better adequacy of the energy value of that meal.

## Conclusion

The place where intermediate meals were eaten seems to influence their adequacy, reason why it is important to carry out awareness actions related to the topic at workplace, to promote the health and well-being of employees.

SESSION 6: INNOVATIVE METHODS TO STUDY FOOD KNOWLEDGE,  
EXPECTATIONS AND EMOTIONS

# Evaluation of Port wine evoked emotions using a Rate-All-That-Apply approach

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Identification and characterization of food-elicited emotions have emerged as a competitive advantage in the marketplace for food product differentiation and development. This level of differentiation, beyond liking, may have an impact on better perceiving how consumers react to repeated exposure to different products and may affect the success of products in the market.

This work aimed to develop an emotional ballot from a previous list combining different emotion lexicons, to evaluate and differentiate Port wines.

A literature review on beverages evoked emotions, with a focus on wine, was performed. After selecting 25 emotion terms, a non-trained panel of 60 consumers evaluated four samples of Port wine (Dry White, LBV, 10 years old Tawny and Vintage 1985). For each sample, presented in balanced order, consumers rated overall liking over a 9-point hedonic scale. Then, a Rate-All-That-Apply (RATA) task was performed, and consumers scored on a 5-point scale how much each emotion term was evoked by the Port Wine.

The results from the RATA revealed that *pleased*, *comfortable*, *exuberant*, *rational* and *secure* emotions can discriminate the Port wine samples. For Vintage and Tawny 10 years old, the most preferred wines, these emotions were considered as most intense. For Dry White Port wine, the emotion profile is less evoked, which can be related to the lower liking score. However, other emotions as *good*, *relaxed*, *enthusiastic*, *merry* and *happy*, proved to be relevant emotions evoked by Port wine since they were scored higher and were identified to have a significant lift on overall liking. A significant penalty on overall liking was identified for *anxious* and *disappointed* emotions. However, since the average score is too low, this penalty should not be considered relevant.

This study allows the creation of an emotion lexicon able to differentiate and discriminate Port Wine samples.

## **Understand post-Covid food service innovation expected by chefs using @ home videos**

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In 2020, the Corona crisis forced governments to impose lockdowns, which led to restaurants being temporarily closed, chefs reducing their activities and rearranging their kitchen organisation. It resulted in less staff working in kitchens because of economical and safety reasons and therefore convenience became a prime attribute for chefs when selecting food service solutions. In 2021, even though restaurants reopened, this need for convenient solutions remained.

This paper highlights the use of chefs' @ home videos to understand challenges they faced during lockdowns, subsequent kitchen reorganisation they had to manage and food service solutions innovation that chefs are looking for to adapt to this "new normal".

A group of 24 chefs were interviewed via @ home videos in France, Russia, Italy, Germany and the UK to collect insights over 2 culinary projects. All chefs had different experience levels and current work activities.

During the first project, chefs described Covid related challenges and food service solutions they expected thereafter. Results highlighted that, for economic reasons, some had to start a new take away activity. They expected from the industry some food service solutions to help them make in an efficient manner new tasty take-away dishes with different formats and flavours.

During the second project, pizza chefs were interviewed. They highlighted that speed became an even more important factor to success and that they could not afford anymore, as an example, to cook tomato sauces from scratch. Hence they are looking for convenient solutions which would already have some long cooking richness & mixed herb notes to overcome this challenge.

@ home videos are a fast & efficient way to collect information from chefs. They enabled overcoming lockdown challenges and getting in depth insights to translate into innovative food service solutions.

# Using cartoons in adult focus groups to discuss ‘consumers feedback expectations in food service settings

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This communication was submitted as a paper for the special issue of the *International Journal of Gastronomy and Food Science*.

## Introduction

Focus groups are a common method of collecting qualitative research data (Greenbaum, 1998, Morgan and Krueger, 1998). A successful focus group is highly dependent on the group dynamic in order to achieve a free-flowing topic focused discussion. An important factor to running effective focus groups is getting the group and the discussion off to a good start.

Although much has been written about focus groups regarding their composition, size, environmental setting and similar, there is little research (if any) focusing on effective ways to get focus groups off to a good start. A focus group is generally seen as successful if everyone in the group is willing to share and build on each other’s views and opinions. In order to achieve this, a good shared understanding of the topic to be discussed is vital. General advice tends to suggest that a focus group should start with an introduction of each participant followed by an icebreaker exercise such as “tell us about your last holiday/favorite hobby” or similar. However, this is time consuming and there is no evidence to suggest that sharing information of once private life makes it easier for participants to discuss a completely unrelated topic afterwards.

Literature on traditional focus groups do not provide a clear strategy on how to quickly emerge participants into the topic to be discussed. It is encouraged to have a good dialogue between the participants, and managing both the active and passive participants to ensure an even contribution of all participants (Sim, 1998). And although Sherriff et al. (2014) focuses on many important topics related to focus groups, the research does not address how participants are introduced to the topic. There are examples of illustrations used in research to simplify information transfer, but this is mainly aimed at children. For instance Grootens-Wiegers et al. (2015) used comic illustrations to explain essential medical research to children. Looking at anything from IKEA assembly, corona hand washing or back of-pack cooking -instructions, pictures are used to aid quick and easy comprehension of information. The use of illustrations to convey information is widely used in educational literature, instruction manuals and even road signs, as it is generally understood that illustrations can aid understanding (Kirsh, 2002, Levie and Lentz, 1982).

## Objective

This paper aims to test an alternative method of introducing respondents to a focus group. Building on the CurroCus® group method developed by Hansen and Kraggerud (2011) this paper explores how these types of speed focus groups can be made even more effective. The aim is to start collecting valuable information from the start, by ensuring that respondents are introduced to the topic of interest in a quick and easily understandable manner.

The primary purpose of the focus groups was to collect data on the topic of food service feedback opportunities, current and future. The focus of this article however, is exploring the role cartoons can have in getting participants immersed into the topic quickly and ensuring a focused discussion during the groups.

The comics were illustrations of a hotel breakfast, take-away and canteen experience. Based on the theoretical role of pictures the hypothesis was that these illustrations would help respondents quickly get a common understanding of the objective of the research, as well a frame for the boundaries of the discussion.



## Method & Design

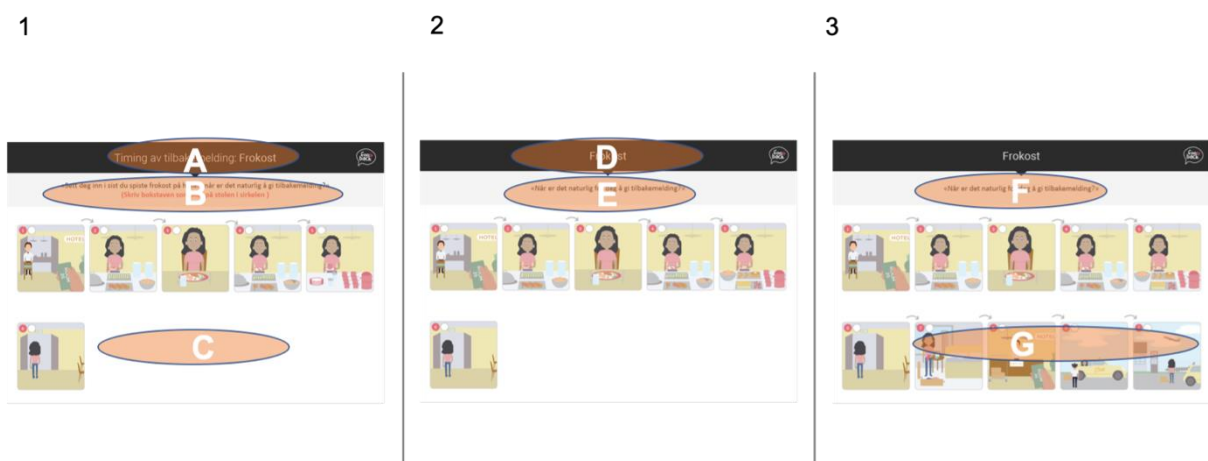
For this study we designed comics that were introduced at the start of the focus groups. The development of the cartoons was an iterative process to ensure clarity and avoid pictures which could be misleading or misinterpreted. The development of the cartoons was improved, adjusted, and tested over time until we were satisfied that they were all single minded and clear. Words were kept to a minimum.

Initially 4 different comic strips were prepared (hotel breakfast, take-away, home delivery, canteen). A pre-test of the interview guide and the comic strips revealed that take-away and home delivery, in the context of customer feedback, had many overlapping areas and was therefore treated as one in the subsequent groups.

Respondents in the groups were adults who were regular users of the setting to which they had been recruited. The focus groups were scheduled for 40 minutes. All 6 sessions lasted between 30-40 minutes. 10 participants were invited to each group with on average 6 respondents taking part. In total, 6 groups of 6 respondents took part in testing cartoons as a discussion starter, 2 groups dedicated to each scenario.

After a brief introduction by the moderator, respondents were asked to turn over the piece of paper, which was placed in front of them and depicted the cartoon specific for the group. Respondents were asked to answer a question related to the study by choosing one of the pictures in the strip.

The group discussion then started by each respondent explaining their reason for their answer. The cartoon style illustration was left in-front of the respondent for the remainder of the group discussion.



Sketch on the development of a cartoon scenario with changes. The three stages of development are numbered from 1 to 3

### Draft 1

1. First draft headline.
2. Complementary text for the respondent
3. There was a cartoon on 6 cartoon routes

### Draft 2 – After first draft

1. Headline reduced to a minimum
2. Explanatory text reduced to a minimum

### Draft 3 – Final draft

1. Explanatory text kept as in Draft 2

The comic is expanded with 4 more cartoon routes for clarification and create a complete understanding.

## **Results**

With speed and information gathering being an important factor in these non-sensitive focus groups we identified three key elements that proved valuable with this way of introducing respondents to the theme.

Firstly, the cartoons introduced all participants to the topic to be discussed quickly. The fact that the comics were free of words allowed participants to understand the situations described without further explanations from the moderator. Respondents quickly had a frame of reference which they all could relate to.

This contributed to the second benefit we saw using this tool. Respondents felt comfortable and confident to talk from the start, as the objective and intention of the study was clearly understood by all.

As soon as respondents had spent a 1-2 minute reviewing the comic, they were ready to start sharing relevant views on the topic.

### **Ref: FG Canteen group - 2**

*M: What is the reason why you chose that particular panel? If you do not remember the panel, just turn the sheet over.*

*Respondent A: Because I think it was a natural place to give feedback. At this point I have been through the canteen, I have eaten and left the waste and if you should have any feedback, that there is some mess or something then it is at this point. That's what I think.*

### **Ref: FG Hotel group - 2**

*R: So if I am satisfied, I would like to tell someone who works in the room. I think I will let them know while I am still in the breakfast room.*

The two sequences show how immediately after starting to share their views, relevant information for the study was obtained. Due to the illustrations, it was easy for the respondents to explain where in the customer journey it would be appropriate for them to give feedback on their experience. They then immediately continued to elaborate on why to them this felt like an appropriate time, and what type of issues that were important to give feedback on. Which, from the objective of our study was where the interesting findings were emerging. The cartoon gave the respondents a clear and common frame to work within.

The third benefit we identified was the groups' ability to stay focused on the task and on the topic of interest. As the discussion moved ahead respondents would refer back to the cartoon to explain and elaborate their views.

*Respondent: That's a good idea, I want to move to panel 8. 9 is more email. It was the first thought I had before I made up my mind.*

Importantly though, respondents were not constrained by the order in which the panels occurred and would suggest changes in order for the illustration to more closely represent their customer experience.

*Respondent: I would also like to swap the pictures, so that picture 4 becomes picture 3.*

*Respondent: We pay for the food before we get it.*

Our experience suggests that introducing a catalyst into a focus group at the start has a positive effect on start-up time, with less time needed to be spent on introducing the topic. The discussions got off to a good start quickly with very limited guidance from the moderator

## Conclusion

In previous studies using CurroCus® groups, starter questions have been used to start the session. Respondents have then answered questions individually in writing before starting the group discussion. However, this takes time and it is then up to the researcher to interpret the responses at a later stage, with no possibility to ask follow up questions or checking that the interpretation made is correct.

Since time is an important factor in these speed focus groups and a key reason for developing the CurroCus® method, introducing tools which allow for the same amount of learning in a shorter time is key. Not spending time on icebreakers and introductions of the participants allows for collection of topic relevant information from the start. There was nothing to suggest that the lack of such icebreakers negatively influenced the discussion. However, it is likely this more direct way of starting a focus group is particularly suited to research focused on non-sensitive topics.

Using pictures rather than relying on an explanation from a moderator reduced the time needed for the introduction section by several minutes. Leaving more time for the group discussion. The cartoon functioned as a useful tool to refer back to for both the moderator and the respondents during the discussion. The use of a catalysts, in this case a cartoon strip, proved to be a good method to quickly and effectively immerse the group members into the topic. In addition, it proved to be a great tool to help keep the discussion focused.

Much research has been done to understand how pictures can help children and people with learning disabilities to understand complex information. However, as can be seen from the many uses in commercial consumer setting (i.e. IKEA assembling guide) pictorial information eases and speeds up information transition for adults. Our initial study using comic strips to introduce focus group respondents to the topic of discussion proved to be very effective and was positively received by the respondents. In our case the scope was fairly limited and it was important that the respondents remained on topic, the “constraints” set by the cartoon strip functioned well for this. There may be cases where the subject allows for a wider discussion and where this artificial frame set by the cartoon may feel restrictive.

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# The Waiter's Craft Knowledge of Meal-design

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## Introduction

The way meals are designed holistically affects how they are experienced by those in attendance and often gives the prerequisites for communication and being together in several different contexts such as government and industrial representatives. Procedures such as table setting and serving are performed every day not only in the restaurant industry, but also, for example, in hospitals. A waiter's inherent skill in practical performance and situational judgements—their craft knowledge—needs to be communicated because it is more meaningful than is perhaps anticipated.

## Objective

The aim of this study is to investigate research methods that could be used for verbalising the waiter's craft knowledge which is needed in designing meal situations.

## Methods and design

Through my own long professional restaurant experience I seek research methods that help me to research my own practice and related craft skills. In this study I used the methodology of case study to collect material from a craft science perspective, with analysis methods from time geography (Hägerstrand 1970) and three-dimensional visual analysis (Akner-Koler 1994; 2007). A craft science approach means that the researcher who examines the craft has the skill and knowledge required to perform the work that is being studied (Sjömar 2017).

The case study presented in this paper draws on my experience as a meal event designer of an event entitled "A Forest Walk," hosted by the Ministry of Agriculture and the Federation of Swedish Farmers (LRF) in Sweden. It is my archival materials and my experiences from the meal which are gathered and analysed. (Table 1).

### Table 1: The material

- 7 photographs.
- A conference brochure entitled "Swedish Farmers Invite You to Dinner" produced by the host Federation of Swedish Farmers.
- My own work notes (70 pages of text, sketches, and furniture plans).
- An operational schedule. Information about the following: menu, drinks, serving procedures, number of guests, etc.

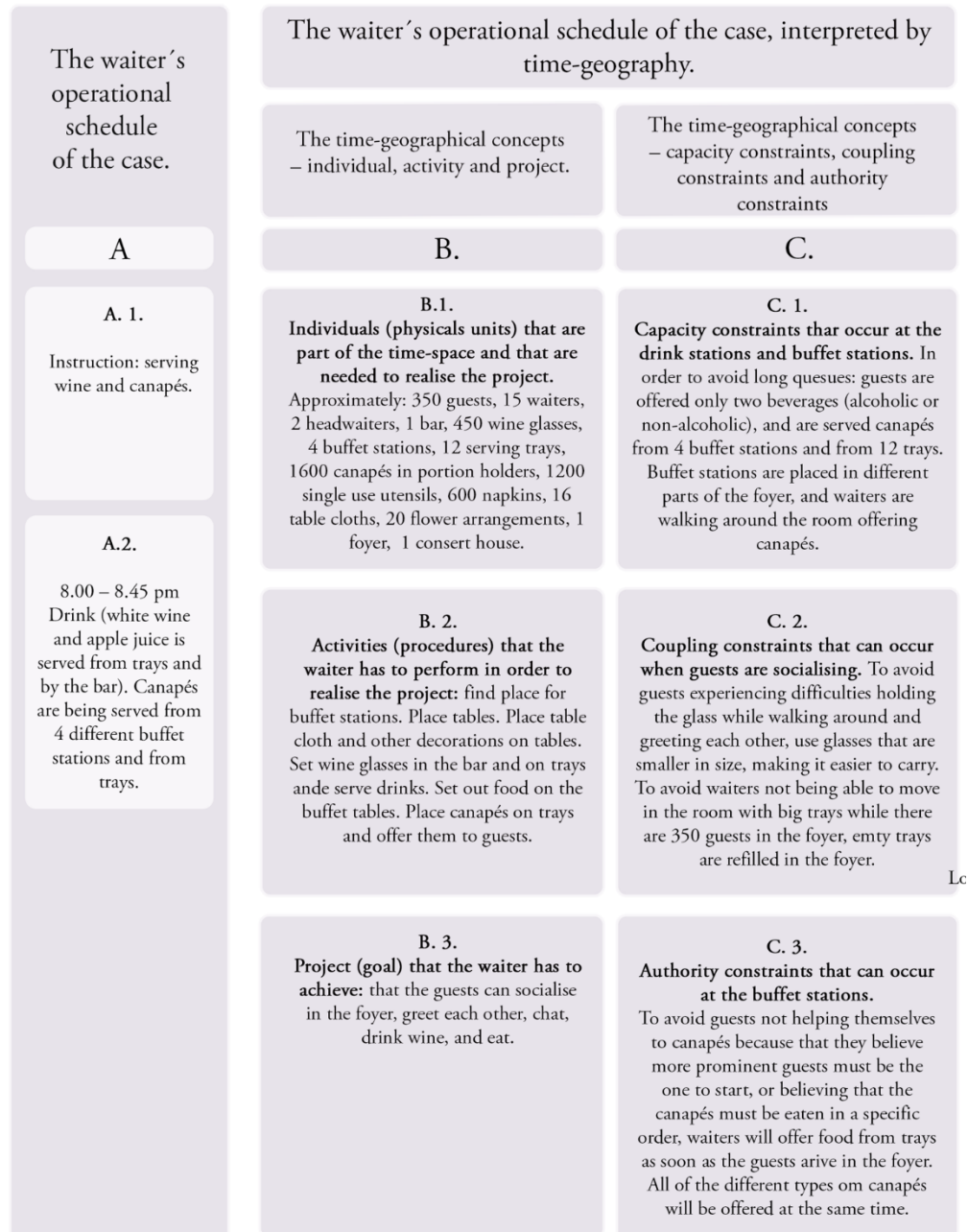
Time-geography is usually applied in interdisciplinary research in themes such as urban and regional planning, transportation, and communication (Hägerstrand 2009). Concepts from time-geography are here used to present the waiter's knowledge of time, room, and logistics. Time-geography illustrates that a craft procedure has been performed, as well as *where*, *when*, and by *whom*.

The formal-aesthetic dimension of the event is covered by the three-dimensional visual analysis which is a compositional taxonomy used in art and design education (Akner-Koler 1994; 2007). In her thesis, Akner-Koler presents a structure to distinguish form and room/space in our surroundings, and has since developed this in later work (1994; 2007). Her ambition has been to create a taxonomy that enables a dialogue about three-dimensional aesthetic composition on an abstract level. The three-dimensional visual analysis illustrates *how* the aesthetic dimensions appear in a single object or/and in a composition of several objects. A simplified version, under the name *aesthetic composition's concept*, has been used as a tool to describe how to create a meal design, including the food on the plate, the utensils on the table, and the furniture in the room.

## Results

I started the time-geographical investigation with the intention to detect the (for me) hidden information contained between the lines of the waiter’s operational schedule (Figure 1, section A). Through my experience as being responsible for the event, my extensive experience as a waiter, and the related practical knowledge within me, I began to reflect on the content of the procedures. Questions about where, when, and who are included in the examined procedures appeared before me through my interpretation of craft procedures to correlate with the following time-geographical perspectives: *Individual* (Figure 1, section B.1), *Activity* (Figure 1, section B.2), and *Project* (Figure 1, section B.3).

**Figure 1:** sections A, B, and C: The waiter’s operational schedule interpreted by time-geography.



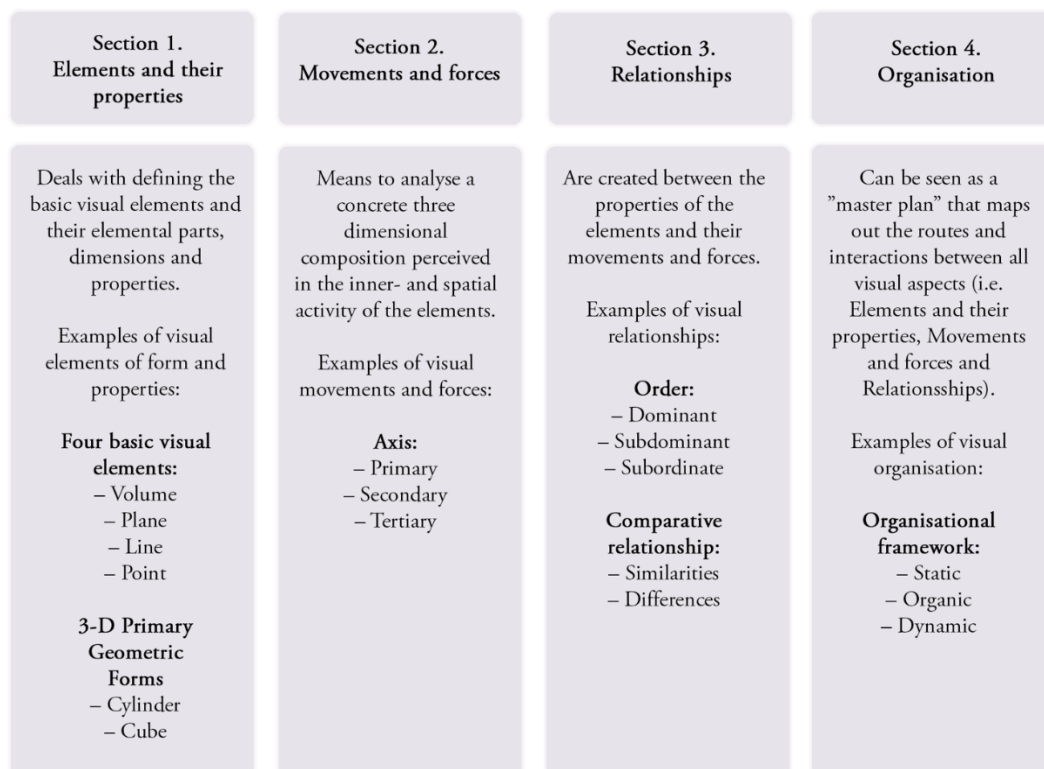
Under section A.1 in Figure 1, the “Instruction: serving wine and canapés” is a project created to achieve goals, which is the time-geographical definition of a *project*, thus I need to define which goals this project is supposed to achieve. One goal could be, for example, to allow the guests a chance to

socialise (Figure 1, section B.3). Information about goals is often unexpressed in an operational schedule but is part of the knowledge that I possess both as a waiter and as a designer of the meal event. By using the concept of *activity*, which defines what activities needed to be performed in order to realise the project, different craft procedures were visible, such as table setting and finding the right places for the buffet tables (Figure 1, section B.2). By using the concept of *individual* (Figure 1, section B.1), it was possible to visualise further aspects of the craft knowledge, for example managing 15 waiters, 450 wine glasses, and 48 wine bottles. Through this identification, further questions could be raised about that which is invisible and that which is taken for granted—for example, how to handle 450 wine glasses.

When the *individuals*, the *activities*, and the *projects* had been identified, it was possible to provide additional information based on the three terms of constraints—*capacity*, *coupling*, and *authority* (Figure 1, section C)—and how I as a waiter and as a designer of the meal event planned and executed the craft procedures. Risks about capacity can be prepared for by having a well-equipped *mise en place* station. When wine has to be served to 350 guests, my long experience as an expert waiter tells me that long queues can pose a capacity problem. In order to prevent such queues from appearing, I chose to offer only two types of beverage, alcoholic or non-alcoholic, with the hope that this will lead to a quick choice for the guests, as they stand in the queue.

The crafting procedures and the design of the physical space—such as the furnishing of a dining room, the setting of tables with utensils, and the placing of food on plates—all generate three-dimensional spatial context. The waiter’s craft and creativity can be compared to the sculptor’s, as both practice the skill and the ability to pay attention to the aesthetic dimension of an object. In the field of Culinary Arts and Meal Science (CAMS), practical skill is combined with science and working methods with an artistic content (Gustafsson 2004; Gustafsson et al. 2006). In this study, a simplified version of the taxonomy of three-dimensional visual analysis, with its four different sections, is used as a theoretical basis (Akner-Koler 2007). The four sections are: Elements and their properties; Movements and forces; Relationships; and Organisation (Akner-Koler 2007, 78–165) (see Figure 2).

**Figure 2:** A simplified version of the taxonomy of the three-dimensional visual analysis, with its four different sections (Akner-Koler 2007).





The investigation consisted of examining the photographs taken at the dining event. Pictures of the furnishings, table setting, and serving were analysed in order to test whether details or the holistic compositions of them could be described by the use of the concepts from three-dimensional visual analysis. For example, I tested whether I could find general forms, described by concepts, as visible objects/elements on the tables and if they may be interpreted as volumes with different properties such as cubes, cylinders, or rectangles. Below are examples.

The glasses from which the wine is served can be described, in a simplified way, as cylinders (Figure 2, section 1). The motif can be described as easy-to-read or it can be said that “not much is happening” in the composition of the table setting. This may be because the properties of the glasses (Figure 2, section 1) in terms of the form are similar (Figure 2, section 3) to each other. There is also no distinct hierarchical order (Figure 2, section 3) between the glasses. The composition, the setting, of the glasses lined up in parallel rows can be described as a static organisation (Figure 2, section 4). It is likely that a static setting of glasses will lead the guests to choose the glass closest to the table edge (Figure 3).

**Figure 3:** Wine glasses set on the drinks table. Photograph: Hans Lundholm.



The first part of this study showed that through time-geographical concepts it was possible to verbalise the waiter’s craft knowledge regarding time, space, and logistics of a meal event. The second part of the study showed that three-dimensional visual analysis may be used to describe the waiter’s craft procedures from an aesthetic perspective. In this third part, I test whether a combination of these two parts together with my autoethnographic perspective based on my collective professional experience can support a verbalisation of my craft knowledge applied in performing the craft procedures of furnishing, table setting, and serving. Thereby, I will try to verbalise the craft knowledge needed by a waiter in designing a meal event. Some examples will follow.

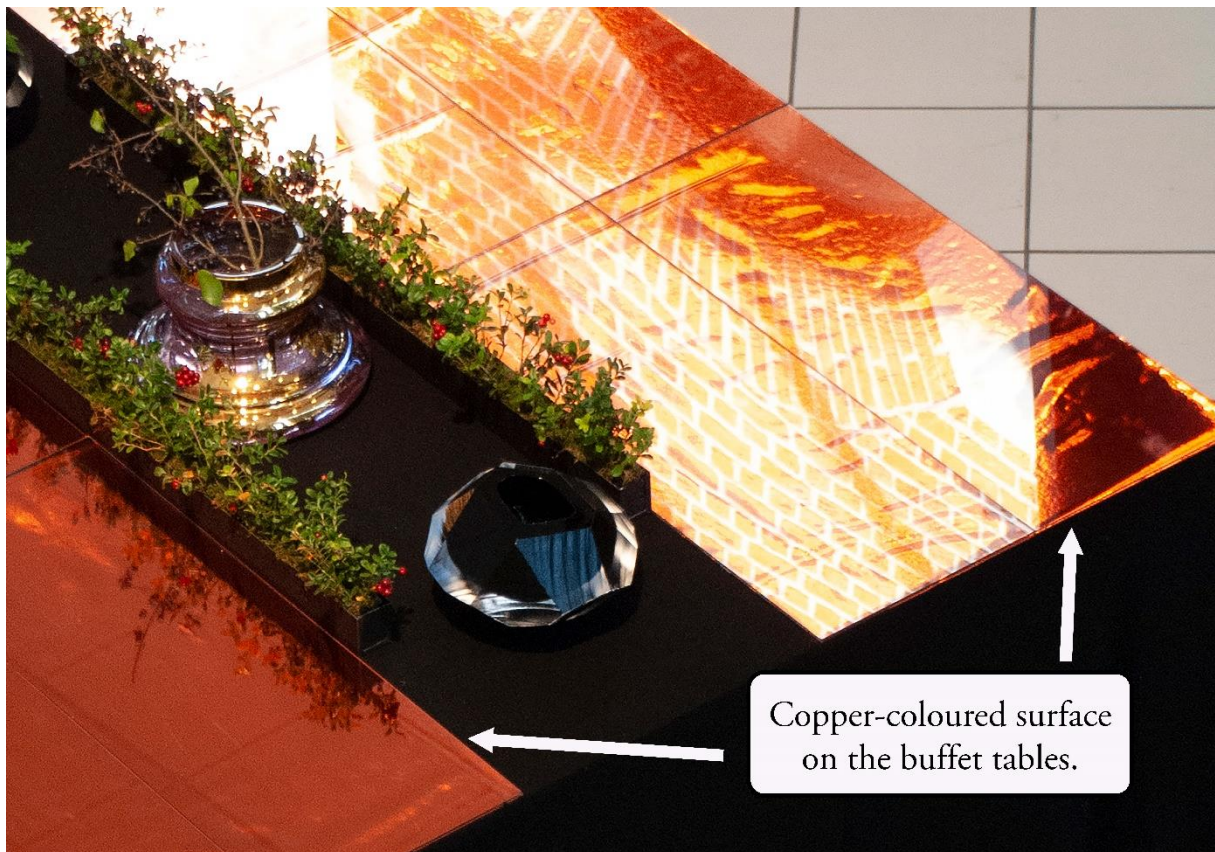
*In order to avoid capacity constraints that could result in the guests not registering the buffet tables among the 350 guests in the foyer, I chose an aesthetical approach to attract attention to the tables. The square surface of the buffet table was enhanced by long, black tablecloths placed over the entire table that draped down to the floor, giving an impression of a solid black cube. The contrasting white*

*floor surrounding the cube reinforced the bold contours of the cube, bringing the buffet tables to the attention of the guests.*

When the guests had registered the buffet tables, I wanted their attention to be directed towards the table surface where the canapés were located.

*To bring attention to the table surface, I placed two rectangular copper-coloured surfaces on the table top to create a contrast with the black sides of the cubic table. In the same way, the copper colour was similar in colour and shades to the canapés (Figure 4).*

**Figure 4:** The buffet tables. Photograph: Ragnar Lundgren.



My role as a designer of the meal event also included choosing the bowls for the canapés. I chose a diverse range of individual items to set on top of the buffet tables. Different forms of the bowls increased the clarity of the different types of canapés that were offered, and helped guide the guests to separate canapés from each other. For example, the bowls were distinct geometric forms such as cubes, triangles, and cylinders. Thereby, it was my intention that it would take a longer time for each guest to explore everything on the buffet table (Figure 5).



Figure 5: Canapés set on the buffet table. Photograph: Ragnar Lundgren.



## Conclusion

The waiter's craft procedures can be understood both as logistic organisations performed in order to avoid constraints between individual, activity, and project (Hägerstrand 2009), and as aesthetic dimension in order to distinguish and map out interactions between components (Akner-Koler 2007), i.e., furniture, utensils, and decorations. By linking perspectives from time-geography together with taxonomy of three-dimensional visual analysis it is possible to find both methodologies and terminologies in order *to verbalise* the waiter's craft knowledge.

The combination of research methods enabled a discussion about meal design performed through the waiter's choices of utensils, materials, and craft procedures. I want to point out that this study shows that it is possible to understand and link perspectives where logistics and aesthetic dimensions work together to direct the guests' attention. The *aesthetic compositional concepts* can be seen as a tool for students, waiters, and other professionals within the restaurant arena.

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## SESSION 7: TRENDS, CHOICES AND BEHAVIORS IN FOOD SERVICE

# An experimental food label applied to food served at a secondary school in Greater London and its influence on adolescent food choices.

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## Introduction:

Adolescent obesity is rising in the United Kingdom (UK), and it is more prevalent in older adolescents aged 15-19 years than in almost any other higher income nation. Obese children and adolescents are at a high risk of developing several chronic diseases (NHS Digital, 2021; Nuffield trust, 2021). Providing nutritional information (NI) in the form of a food label (FL) is one strategy that has the potential to reduce obesity. A FL allows consumers to compare the NI between similar food products which can theoretically guide consumers as to which are the healthier food choices. Since December 2016 all prepacked food in the UK was required to display mandatory NI on the back of a FL, presented per 100g/ml or per portion of the product. The NI includes energy in kJ, and kcal and the number of grams of fat, saturated fat, carbohydrates, protein, and salt. NI on the front of prepacked FL is voluntary and is predominantly assessed through a nutrient profiling model (NPM) which can be a nutrient specific or a summary system. The process of NP includes several stages dependent upon its purpose. To date, there are a plethora of different front of pack FL designs yet no consensus as to which design has the greatest influence on food choice behaviour (FCB).

School food can theoretically provide a third of an adolescent daily calorie intake, yet schools in England have no policies to inform pupils as to which food options are the healthiest. The UK government has announced that from April 2022 it will enforce all businesses with 250 or more employees in England including cafes, restaurants and take away food to display calorific information on non-prepacked food and soft drinks (GOV.UK, 2021) but this does not include school food. There are three known published studies (Hunsberger et al., 2015; Rainville et al., 2010; Conklin and Cranage, 2005), and one unpublished study (Fresques', 2013) that have provided NI in the form of calories and fat in a live school setting in America. Results did not concur as to the effectiveness of providing this NI and it can be suggested that due to possible adolescent vulnerability, a more overarching holistic FL is needed.

## Objective

The objective of this study is to design and apply an experimental food label (EFL) to the food on offer in a secondary school setting in Greater London and to explore if it influences adolescents to select the healthier food options. Using a questionnaire this study also intended to identify if adolescents consider other factors are more important in their FCB and to evaluate if these factors require greater attention and integration at policy level to reduce adolescent obesity.

## Method and Design

The study used a quantitative experimental design in which an intervention was implemented to evaluate if a change in FCB occurred. Several of the poorest borough councils in London were contacted to obtain a list of caterers who provide their school meals. One contract caterer agreed to take part in the study and nominated one school in Greater London in which to apply the EFL. The caterer provided the school's three-week menu cycle, and their dietician provided a standardised

recipe for each item on the menu. The information from the standard recipes was entered into the Diet plan 7 nutrition software package that created a breakdown of nutrients per 100g.

The Food Standards Agency developed a nutrient profiling model (NPM) for the Office of Communication (Ofcom). The aim of Ofcom's NPM was to score food products, if foods scored 4 or more points, and drinks scored 1 or more points, they were classified as 'less healthy' and these products were not allowed to be advertised on television. This research used the Ofcom NPM and modified it to score food from one to 100 with a score of one being the least healthy and a score of 100 the healthiest. When the breakdown of nutrients per 100g from Diet plan 7 were input into the modified NPM this generated a food score for each dish on the menu cycle. The food score was the basis of the EFL.

The caterer recorded daily sales for each dish on the menu cycle for the nine-week intervention. Weeks 1, 2 and 3 were recorded as pre-intervention baseline sales. No scores were visible to the pupils at this stage. The week (0) before the intervention began tutors received an 'awareness pack' which contained a standardised tutor sheet to read to their tutor group on how the food score worked and each pupil had a 'know your score' postcard. The message on the post card was 'the higher the score the healthier the food choices'. When the intervention commenced the food scores were placed in holders on the sneeze screen above each dish and A3 posters, identical to the pupils' postcards, were displayed in the school restaurant. Pre-intervention baseline sales were compared to a repeat of the three-week menu cycle at post-intervention phase one (weeks 4, 5 and 6) and post-intervention phase two (weeks 7, 8 and 9). Sales were analysed to establish if the intervention influenced food choice behaviour and to evaluate if any effect would be sustained. It was expected that the mean scores of the foods selected will increase after the application of the food score, that will indicate that pupils selected healthier food choices.

After the nine-week intervention pupils were requested to complete a four-part paper-based questionnaire. Part one requested sociodemographic data, part two asked lunch preferences, part three asked participants to rank on the five-point scale whether they noticed the food score, and their understanding of the food score. Part four asked participants to rank (using the same five-point scale) which factors from the combined food choice questionnaire (FCQ) (Steptoe et al., 1995 and Ooi et al., 2015) they felt has the greatest impact on their FCB at school.

## Results

Each dish on the menu cycle had a calculated food score. Each time a pupil selected a dish the food scores were recorded to provide a daily score for each dish. The daily scores were added together to provide a mean food score for each dish each week. If after the application of the EFL healthier food options (higher scores) were selected more frequently the mean food scores would increase. The differences in the mean food score before and after the application of the EFL would indicate its effectiveness.

From the nine week experiment the mean food score from pre-intervention baseline (weeks 1, 2 and 3) (43587.21) to post-intervention phase one (week 4, 5 and 6) (47473.93) increased by 3886.72 then decreased from post-intervention phase one (47473.93) to post-intervention phase two (weeks 7, 8 and 9) (46454.64) by 1019.29. The total increase in the food score from pre-intervention baseline to post-intervention phase two was 2867.43. Mauchly's test indicated significance at 0.002, so the Greenhouse Geiser adjustment was used, and an ANOVA indicated that, although the mean suggests an upward trend, no significant difference was present ( $F(2, 26) = 2.19, p > .05$ ).

Literature suggests that females are more interested in health and reading FL more than males. This research sought to detect if females reported noticing the food score more than males and if females self-reported that the food score affected their food choices more than males. In the FCQ pupils were asked to select (from a five-point scale) how much they noticed the food score from one, they did not notice to five, they did notice. Using the same scale, pupils were asked how much the food score affected their food choices from one, it did not affect my food choice to five, it did affect my food choices. From the 744 pupils' response to 'Did you noticed the food score' then removing the incomplete data for gender declaration, 674 responses remained. From the 346 female responses, 198

(57.2%) selected score 1 meaning they did not notice the food score and 54 (15.6%) selected score 5 meaning that they did notice the food score. From the 328 male responses, 186 (56.7%) selected score 1 and 61 (18.6%) selected score 5. There was a non-significant association between participant gender and noticing the food score  $\chi^2(4) = 1.46, p > .05$ . From the self-reported questionnaire fewer pupils responded to the question of whether the food score affected their food choices. From the 661 pupils' response to 'Did the food score affect your food choices' From the 339 female responses, 216 (63.7%) selected score 1 meaning it did not affect their food choices and 25 (7.4%) selected score 5 meaning that it did affect their food choices. From the 322 male responses, 216 (67.1%) selected score 1 and 19 (5.9%) selected score 5. There was a non-significant association between pupils' gender and pupils reporting that the food score had a perceived effect on their food choices  $\chi^2(4) = 1.36, p > .05$  which does not support the current literature.

The research aimed to ascertain which of the 21 factors on the FCQ adolescents score as the most (score five) and the least important (score one) regarding influencing their FCB at school. Results indicated that the highest percentage of pupils scored the following factors at score five, 64.9% 'tastes good', 32.9% 'keeps me full', 29.9% is cheap, 29.2% keeps me healthy, 28.9% looks nice, 26% smells nice, and 25.2% keeps me awake. The factor that was identified as the least influential (score one) was 66.5% 'is similar to foods chosen by my friends'.

The research sought to identify if there was an association between gender in food choice and the importance placed on health. Literature advocates that females are more influenced by health than males. Using the FCQ with the five-point scale 'health and nutrition' encompassed nine factors; contains vitamins and minerals, is nutritious, is high in fibre, is high in protein, is low in calories, is low in fat, helps me control my weight, keeps me healthy, and includes lots of fruit and vegetables. Results indicated that there was a significant association between gender and specific health and nutrition factors. From 689 participants (361 female and 328 male) females rate 'contains vitamins and minerals' significantly more highly than males  $\chi^2(4) = 10.4, p < .05$ . Females rate 'is nutritious' significantly more highly than males  $\chi^2(4) = 11.17, p < .05$ . Females rate the factor 'is low in calories' significantly more highly than males  $\chi^2(4) = 9.62, p < .05$ . Females rate 'is low in fat' significantly more highly than males  $\chi^2(4) = 11.09, p < .05$ . Females rate 'keeps me healthy' significantly more highly than males  $\chi^2(4) = 21.38, p < .05$ . It could be suggested that the word 'health' is used to promote or identify the healthier food choices which may appeal to females.

## Conclusion

A food score applied to food served in a secondary school in Greater London was not effective in influencing FCB. Only 15.6% females and 18.6% males noticed the food score and 7.4% females and 5.9% males stated that it influenced their FCB. There were no differences in gender as to noticing or self-reporting any effect on their FCB. Adolescents rated sensory aspects of taste, looks, and smell alongside satiation, keeping awake and financial aspects at score of five. Food choice and the importance placed on health was significantly associated more with females than males. The influence of friends was not considered to be a significant factor in adolescent FCB.

# Food waste in cafeteria services: how much food do consumers leave on the plate and why? A case study.

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## Introduction

According to the Food and Agriculture Organization of the United Nations (FAO) about a third of the food produced globally for human consumption is lost or wasted. This represents not only a loss of resources through the food chain, but also a threat to security (FAO, 2013). Due to rapid growth, increasing life expectancy and the resulting change in lifestyle, the demand for food and energy in the coming decades will put unprecedented pressure on the planet's natural resources.

In the management of a cafeteria service, the control of food waste is a key factor, dealing not only with an ethical issue, but also an economic one with political-social consequences for the manager (Borges et al., 2013). Food waste also works as an index of customer satisfaction, and its analysis is fundamental (Hwang et al., 2003).

Food waste (FW) from a prepared meal includes leftovers not served (LO,NS), that is, cooked food that is not distributed, and leftovers left on the plate (LO,OP), which is food that is distributed but not consumed. With the evaluation of LO,NS it is possible to measure the efficiency of meal planning, which usually result from errors related to the planning and management of the service. The evaluation of LO,OP essentially assesses the quality of the meal and the customer's preferences, appetite, and attitude towards food (Carvalho et al., 2015; Remini, 2018).

## Objective

The scope of this study focuses on FW (LO,OP and LO,NS) assessment having as a case study a selected public cafeteria, to understand it, minimize and reduce it. The reasons for this waste and the level of customer satisfaction were also analyzed aiming to identify possible improvements in the service.

## Method & Design

LO,OP data was collected in a public service cafeteria in Lisbon, Portugal, during lunch distribution for 5 consecutive days, in a diverse menu, with few repetitions throughout the year. The Selective Aggregate Weighing Method based on Carvalho et al. (2015) and Silvennoien et al. (2015) was used for the quantification of the LO,OP of 271 trays in total.

Also, 271 quality satisfaction surveys were applied to the cafeteria consumers. The survey consisted of ten questions divided into two groups, taking about five minutes to complete. Questions were adapted from several surveys relevant to the study in question (cited and used by Faria et al., 2010).

In the first part of the survey, there were questions for the sample characterization (gender; age occupation and educational qualifications) and those regarding the meal perception: meal quality, meal quantity, hygiene conditions of utensils, dish presentation, soup, dish and dessert temperature, menu variety and global appreciation to be categorically classified (five categories - very dissatisfied, dissatisfied, satisfied, very satisfied and without opinion). The "improvement suggestions" and the question about sustainability correspond to a qualitative variable. The second part of the survey consisted of an evaluation grid so that the customer could create a correspondence with the amount that was ingested (Ate everything, Ate  $\frac{3}{4}$ , Ate  $\frac{1}{2}$ , Ate  $\frac{1}{4}$  and Ate nothing), according to the meal component (protein, side dishes and vegetables/salad, soup).

## Results

Accounting for food waste in quantitative terms

The calculation in kilograms was carried out for 5 consecutive days where 893 meals were served during the lunch period, corresponding to 530.7 kg of food already prepared. In this amount of food, only 79.38% was consumed by customers, with the rest wasted.

About LO,OP, the meal component with the highest wastage rate was the side dish with 9.55kg total and the one with the lowest wastage was the dessert, with 2.45kg total. Over the 5 days of study, 26.15 kg of waste were recorded, corresponding to 29.33% of the production (Index of LO, OP) (average Index of 5,87% for the 5 days). Bread was also considered part of the meal representing a waste of 0.7 kg over the 5 days. Results for LO, OP for each day of data collection were also obtained (not described here).

### Quality Satisfaction Survey Analysis

In terms of the characterization of individuals surveyed, 58% were male, representing 156 men and 42% female, representing 115 women. In relation to ages, the average was approximately 52 years old (51.5 years old) and the predominant age group was between 22 and 32 years old and between 42 and 52 years old. In the professional category, the samples were defined as the active or retired population; active represented more than half, 72% - 194 individuals and retirees 28% - 37 individuals.

With the analysis of the quality satisfaction survey, it was possible to know, in frequencies terms, the level of customer satisfaction, whether there are differences between the various days under study (data not shown here), and also to know the reasons why the meal was not consumed in total, in short, the reasons that led to food waste.

The main results showed the for all 15 items of the customer satisfaction survey, the most frequent degree of satisfaction was "satisfied". This classification was scored by 56.8% for the food quality parameter, corresponding to 154 customers; by 51.3% (139 customers) for the food quantity parameter; by 59.8% (162 customers) for the presentation of the dish parameter; by 48% (130 customers) for the hygiene conditions of the utensils; by 53.5% (145 customers), for the soup temperature parameter; by 57.2% (155 customers), for the plate temperature parameter; 50.9% (138 customers), for the dessert temperature; 51.7% (140 customers), for the variety of the menu; 55.7% (151 customers) for the waiting time parameter; 55.4% (150 customers) for the global appreciation parameter (Table 6). The maximum value reached for all items was "very satisfied" and the minimum value "no opinion". Customers who answered "very dissatisfied" reached the maximum of 7.7% corresponding to 21 customers in the menu variety item. In the frequency "very satisfied" the maximum percentage was in the item hygiene conditions of utensils with 40.2% corresponding to 109 customers.

The amount of soup most frequently ingested was 75% (202 customers) for "ate everything", for the main dish was 81% (219 customers) for "ate everything" and for dessert it was 86% (234 customers). Regarding the reasons for not having eaten everything, it was soup with 33% (7 customers) "too much" followed by "option" by 19% (4 customers), "no quality" and "I don't like" with 10% (2 customers), "not too hot", "too much potato", "I don't like cooked carrots", "I never eat the whole soup", "very watery" and "not enough potatoes" with 5% (1 customer).

In the dish item, the reason for not having eaten everything more frequently was "too much" with 61% (22 customers), followed by "a lot of rice" and "too much accompaniment" with 8% (3 customers), "soft broccoli", "poor preparation/Poor quality of products", "no appetite", "personal taste (rice)", "too many cabbages", "I had breakfast too late", "over-ripening", "vinegar sauce" with 3% (1 customer).

In the dessert item, the most frequent reason for not having eaten everything was "option" with 33% (4 customers), followed by "no quality" and "too much" with 17% (2 customers) and "poor quality fruit", "slightly sweet grapes", "does not justify the price" and "pre-made mousse" with 8% (1 customer). It is noteworthy that 9% (25 customers) did not order the dessert item.

The totality of the data obtained will still have to be processed to obtain the crossing of data based on the analysis of the menu on each study day and the relationship with waste and the satisfaction survey.

### **Conclusions**

Some authors state that for collective food services, there is no exact definition for food waste, which may vary according to the characteristics of the food unit and the target population. Even though, the Index of LO of 5.85% found in this study is considered acceptable according to several classifications, such as Aragão (2005) (destined for the healthy adult population), which suggests 10% as an acceptable maximum limit. This value is going to be analyzed together with the satisfaction of quality by customers, considering that the Index of LO allows evaluating a collective food establishment in terms of processing errors and integration with the consumer, intending that its value is as close to zero. In this specific study, it was found that for all ten items of the customer satisfaction survey, the most frequent degree of satisfaction was “satisfied”, which may, therefore, justify the low value of leftovers. It was possible to measure one of the components of the FW in the unit under study, contributing to a future implementation of measures for planning, waste reduction and optimization of productivity in the future.

**keywords:** Food Waste. Food Services. Leftovers; Food planning

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# Food trends in food service in Portugal

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## Introduction

The eating habits in the food service sector have been changing as a result of the change of consumer needs, expectations and lifestyles. Consumer food choices are affected by many determinants and can influence the arising of new food trends in the food service sector, associated with a modification in food consumption behaviour.

## Objective

Characterize food trends in the food service sector in Portugal, in a sample of Portuguese consumers.

## Method & design

An interview guide and a questionnaire online were developed. Questionnaire was applied to a sample of the population resident in Portugal, aged over 15 years. The individuals, interviewed by videocall, were selected by convenience. The behaviour and expectations of food consumption in the food service sector in Portugal were some of the dimensions evaluated. Qualitative and quantitative results were analysed using qualitative data coding software and IBM SPSS Statistics 27, respectively.

## Results

Interviews were conducted with 30 adults and 1399 responses were obtained from the online survey. 86.3% of respondents identified bars and cafeterias as the most used services for eating away from home, with fast-food restaurants being mentioned by 85,0%. It was found that food consumption away-from-home is characterized by a greater intake of energy-dense products, with 49.1% reporting taking soft drinks and 65,0% consuming fast-food products. When choosing the places of consumption, aspects related to hygiene and food safety, sustainability, convenience, socialization and food variety were valued. 37.2%, 32.2% and 25.7% of participants identify, respectively, "Healthy snacks", "Vegetarian and/or vegan recipes" and "Low sugar recipes" as the most researched concepts, on the previous year, that influenced their eating behaviour.

## Conclusions

The identified trends refer to a diet based on the consumption of more nutritious meals more convenient and sustainable.

## PART II - POSTERS

# Trafficking Food and Data: The Ethics of Online Food Delivery

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## **Introduction**

Online technology-enabled food delivery platforms (OFD) enjoy rapid growth, although profits remain low. Market value has more than tripled since 2017. OFD strategy is aimed at capturing markets, efficient delivery and cost effectiveness. Operations are driven by a technology ecosystem connecting restaurants, drivers, customers and advertisers and enabling various functions: food choice, order taking, payment, delivery, navigation and tracking. OFD is an on demand technology and profits from Covid-19 restrictions.

OFD threatens to run over small size restaurants and alter the food service and retail landscape, by leveraging its ownership of customer data, brand equity, logistics and price. Increasingly, ethical questions are raised with respect to the disruptive effects of OFD. Economic, social and environmental impact studies show negative effects on health, job satisfaction, public traffic, plastic waste and carbon footprint. There are unclear effects on consumer relations with food, as convenience and safety advantages of OFD encourage consumers to abandon buying and preparing meals.

## **Method & design**

The ethical issues surrounding OFD are explored in a dialogue by students and professionals from the hospitality industry, using the Ethical Readiness Check. The purpose of this ethical assessment method is to generate multi-sided ethical reflection with regard to goals and potential (side-)effects of new technologies, and to help people to anticipate on potential ethical issues so that they feel ethically ready with regard to new technologies. Sustainable Development Goals are used as an ethical reference. The discussion will be recorded and analysed.

## **Results**

Results will include a multi-sided ethical assessment of OFD in a Dutch city. The results will also include a critical analysis of the contribution of OFD to sustainable development goals 8 and 11.

## **Conclusions**

Conclusions will reflect on the use of the Ethical Readiness Check and its value to stakeholders of OFD in hospitality businesses and local communities.

# Cross-border heritage: Friesland tea culture

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## Introduction

People in Frisia (West Frisia & Fryslan in The Netherlands, East & North Frisia in Germany) have been enthusiastic tea drinkers for centuries developing similar habits. As such this poster is analysing and presenting cross-national tea traditions as symbols for a specific consumption culture, the regional pride, social binding effects and a consequent entrepreneurial spirit.

## Objective

The poster offers cultural insights into cross-border Frisian tea habits along tourist routes and in tea-related attractions, e.g. tea museums. Furthermore, applicable recommendations for a specific transfer of culturally anchored tea habits into gastronomic offers are presented creating opportunities for cross-border culinary mapping.

## Method & Design

In 2020, nearly 50 semi-structured or in-depth interviews were carried out with different cultural, touristic and heritage representatives in Frisia. The interviews were coded and critically analyzed to provide the initial recommended opportunities for culinary mapping preserving the regional tea culture.

## Results

Tea is used for culinary offers and touristic marketing, based on long-term traditions. This big potential for Frisia for joint culinary mapping and cultural preservation based on the uniqueness of the Frisian tea culture and confirmed by international awards, have to be communicated more intensely supporting support the positive regional reputation. The proper regional pride of this culinary heritage as well as the quality of hundreds of years of cultural anchoring can be developed as an incomparably culinary brand.

## Conclusions

The Frisian tea culture is unique. Therefore, this opportunity should be used to optimise cultural and social activities as well as including the traditional Frisian tea companies into the tourism infrastructure of the region. And, it should be analysed how the tea region Frisia can create innovative culinary products and services for the regional gastronomy and the branding of the region. Finally, cross-border tea trails should be developed as symbols for border crossing culinary cultural heritage and its preservation.

# Promoting healthy eating environments: the role of public catering in the areas surrounding educational establishments

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## Introduction

Food consumption outside home is an important health determinant for population in general and, particularly, for students, who resort frequently to public catering in the areas surrounding educational establishments.

## Objectives

To characterize the food offer included in the student menus in the Portuguese catering establishments.

## Methodology

This is a cross-sectional observational study was design in the Portuguese public catering establishments. It was collected information about the composition of foods and beverages that compose the Student Menu.

## Results

138 student menus were analyzed with an average of 3.4 options per menu (standard deviation = 3). Only 10% include soup and none of them include fruit. The vegetarian option is rare (11%) and only 20% include the fish option, contrasting with 35% that include the white meat option and 73% that include the red meat option. In 68% of the menus french fries are served, as a side dish. Regarding to drinks, 31% of the menus include sugary drinks and 42% include water. Allergen information is presented in 3.6% of the menus.

## Conclusions

The Students Menus' options show a lack of variety and the food supply is inadequate in most of the analyzed menus. It's important to adopt national strategies, to promote healthier eating habits in the young population, considering the offer outside the home.

# Design thinking for food: remote association as a creative tool in the context of the ideation of new rice-based meals

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Design thinking (DT) is a user-centered approach that uses design tools and methods to solve ill-defined problems. DT as a method, can be organized in a three-spaces system - inspiration, ideation and implementation. The ideation phase makes use mostly of divergent thinking, characterized by the use of creative cognitive processes. Remote association is the process of creative thinking in which one makes unusual associations rather than common ones.

The aim of this study was to accelerate the creative process in the context of developing a new rice-based product, making use of two layers of direct association.

A group of nine cooking and pastry chefs followed a face to face semi-structured interview and were asked to associate words or expressions linked to the elaboration of rice-based recipes, including: concepts, ingredients and recipe types. The words/concepts were analyzed following content analysis, grouped and transformed into game cards, each with a single written concept. A group of 13 students divided into three groups, played the card game consisting of shuffling and picking at random five cards (two concept cards, two ingredients cards and a recipe type card) and writing down all ideas of recipes using the information on the cards. The exercise was repeated for an hour, with new cards being picked at each cycle. Following that exercise, the students have selected a set of recipes which were further evaluated by a professional chefs' jury.

The culinary chefs generated 108 words (31 concepts, 47 ingredients and 30 recipe types). The students have drawn on average six sets of cards and generated 77 ideas. From these ideas eight main dishes and eight snacks were selected and rated by the jury, yielding high rates of workability and clarity.

In general, the selected recipes were considered feasible and the process was considered adequate.

# Understanding the motivations and barriers of culinary students to introduce legume-based foods in menus

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In the context of a continuous world population growth, one of the possible ways to meet the food needs while preserving the planet, consists of promoting diets rich in plant proteins. Legumes are important sources of plant proteins, rich in vitamins, fibers, minerals, and amino acids while being low in saturated fat. Despite their health and environmental benefits, the share of legumes in the diets of many developed countries remains low.

To support eaters towards rebalancing animal and plant proteins in their diet, catering professionals, chefs and cooks, have an important role to play. Indeed, the food service industry, which represents almost 20% of meals eaten in France, reflects our eating habits as much as it defines them.

Thus, the aim of this study was to identify and analyse motivations and barriers of students in culinary art and restaurant managers school to integrate legumes into commercial restaurant offers.

A quantitative survey was developed to determine the motivations to include legumes in restaurant menus of 103 international students. We observed two groups of students according to their meat attachment level. However, overall students consider that offering legumes in restaurants is positive for the image of the restaurant, the health of the customers and the environment. If students had control over the composition of a restaurant's dishes and menus, 88% would consider offering pulses. The results of the study help to understand motivations of young chefs and restaurant managers to rebalance the sources of plant-based/animal-based proteins in our diets.

# Restaurant Portuguese traditional menus – Analysis of the food portions adequacy and ecological footprint

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This communication was submitted as a paper for the special issue of the *International Journal of Gastronomy and Food Science*.

## Introduction

Public catering is a sector with an impact on the population's food intake. 23% of European citizens and Portuguese eat out at least once per week. There is an association between the consumption of meals outside the home and excessively food portions, with higher intake of energy, lipids, salt and sugar and lower intake of vitamins, minerals, and fiber. These are determinants of non-communicable diseases. Excessive food portions in addition to the nutritional impact, have an environmental impact. The study of this relationship can help to demonstrate to consumers the need to accept food changes towards a plant-based diet.

## Objective

Analyze a restaurant menus composition in terms of portions and nutritional adequacy and the food print

## Method & design

We selected 7 different menus from one restaurant. For 8 days we collect data from all the menus ingredients (raw edible weight in grams) and we calculated the energy, salt and macronutrients composition of each menu considering the Portuguese food composition table. For food print calculation we used the Greenhouse GF Calculator (TUCO).

## Results

In general, the menus exceeded energy, protein, lipid and salt requirements, with carbs below the recommended range. The menus more balanced included adequate portions of starches (cereals and potatoes) and fruit. The menu with the most food print index was the one with 3 types of meat and sausages and the menu with the highest sustainability index was the menu consisting of a starter with vegetables and a main course with adequate portions.

## Conclusions

Our result probably represents the most restaurants reality. It is extremely important to intervene in restaurants and make them health-promoting spaces. The intervention on food portions adequacy in restaurants can lead to a reduction on the daily energy intake average and can reduce the environmental impact.



# The Road to Brand Awareness: positioning food brands on the B2B-market, so an increasing demand of their products will be generated

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The world's population is growing fast. However, it is possible to feed the entire population in a nutritious and healthy way. The demand for food, water and raw materials will increase and without a radical transformation of the global food system, the world will suffer from degradation and malnutrition.

Sustainable food production of local and plant-based food is already growing in popularity. Increasing consuming plant-based foods will have a positive impact on the transformation of the global food system. To accelerate this development, B2B-marketing can contribute.

The aim of this research is increasing brand awareness regarding plant-based foods so an increasing demand will be generated. Research has been performed by using a quantitative and qualitative approach as part of a case study regarding creating brand awareness of *Nederlandse Quinoa* for GreenFood50's target groups: retail, wholesale, catering and hospitality services. A questionnaire (n=141) is used to gain information from consumers. Interviews (n=10) for gathering information from the B2B-sector and professionals.

These research methods have led to results and argumentation to position *Nederlandse Quinoa* on the Dutch market.

The wants, needs and expectations differ for each target group, especially regarding packaging and design.

Market and customer expansion will be possible by creating awareness of the products and by attending (future) buyers in how to prepare dishes with the ingredients. The market can be expanded by appealing to consumers but also by expanding the product ingredient assortment in the existing target groups.

To maintain current customers and attract new target groups regarding local, plant-based food brands, companies must know the needs, wants and expectations of (future) customers. Brand awareness can be created by using effective promotion tools, based on following actions: set companywide KPI's, marketing objectives, determine marketing budget and mental- and visual brand identity, create homestyle, design packaging and increase visibility.

# Perceptions And Attitudes About Eating With The Fingers -A Study Among Older Adults With Motoric Eating Difficulties, Relatives And Professional Caregivers

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## Introduction

Difficulties of managing cutlery, manipulating food on the plate and transporting food to the mouth may negatively influence the ability for self-provision and nutritional status among older adults with motoric eating difficulties. Foods that are easy to grip, hold and transport from the plate to the mouth using the fingers may be a strategy for maintaining autonomy, food intake, nutritional status and subsequently quality of life. However, little is known about the acceptability of such foods among older adults.

## Objective

The purpose of this study was to explore perceptions and attitudes about eating with the fingers among older adults >65 years with motoric eating difficulties, and among relatives and professional caregivers.

## Material and design

Qualitative data was collected through individual interviews with older adults >65 years (N=14) with motoric eating difficulties and focus groups with relatives (N=15) and professional caregivers (N=15). Data was analysed using both deductive and inductive content analysis.

## Results

The older adults had normative ideas about proper eating and culinary rules but consumed several foods with their fingers regularly without reflecting upon this. Using bread to grip or wrap foods and inserting skewers into foods may increase the acceptability of eating with the fingers. The relatives and professionals caregivers recognized the importance of their own attitude for obtaining a sense of normality and belonging among those with motoric eating difficulties. However, the importance of the disease causing the motoric eating difficulties, how it was perceived, and its severity were crucial in understanding how eating with the fingers was perceived.

## Conclusions

Finger foods may be suitable for older adults with major eating difficulties as the acceptance of finger foods is related to severity of eating difficulties and that self-acceptance is developed over time in relation to their condition.

# Characterization of behaviors and practices related to household food waste in Portugal

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## Introduction

The Food Waste Index Report 2021 estimates that about 570 million tons of wasted food occur in the households. The characterization of food waste in the households will enable the development of strategies focused on raising consumer awareness and reducing food waste.

## Objective

Characterize the behaviors and practices related to food waste in a sample of households in Portugal.

## Method & design

Data were collected by an online survey available between April 1 and 31, 2021 responded by 637 individuals, representing 637 families. Data collection tools included questions about habits and behaviors related to the acquisition, storage and preservation of food and the preparation of meals, self-reported food waste and sociodemographic data.

## Results

The most wasted foods by the participants were fruits, vegetables and leftovers. The estimated average amount of food waste over a one-week period was about 370 g per family. The main determinant for food waste was food deterioration. Most participants reported that leftovers are planned and used in subsequent meals. The influence of sociodemographic characteristics on food waste and sociodemographic characteristics were not relevant, being significant in families with children, who showed high waste for fish ( $p=0,038$ ), pulses ( $p=0,021$ ) and pasta/rice ( $p=0,023$ ) and for age, with less waste of dairy products ( $R=-0,079$ ;  $p=0,045$ ), and high waste of potatoes ( $R=0,110$ ;  $p=0,005$ ) for older consumers. Habits and behaviors related to food acquisition and meal preparation proved to be the most significant factors in preventing food waste.

## Conclusions

Fruits, vegetables and leftovers were identified as the most frequently food wasted by households. Good practices carried out by families related to purchase of food, storage and conservation, meal preparation and leftover management, influenced the prevention of food waste, demonstrating that is already an awareness of the issue of food waste among the participants.

# Constructing the hospitality superstar – a document analysis of job advertisements in Sweden

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The need of competent dining room professionals, hereafter named as hospitality workers, is significant for a sustainable development of the restaurant industry. However, the challenge of recruiting and retaining a competent workforce is a recurring issue. As a consequence, the application requirements are generally low and almost no formal qualifications are required to work as a hospitality worker in the restaurant industry. This gives support to the argument that hospitality work is a job that anyone can do. This implies that there is a need for understanding how employers portray and communicate hospitality work in the recruitment process. Therefore, this study examines how employers construct the image of the hospitality worker, by analysing what job advertisements signal and communicate to the applicants. Through thematic analysis of 100 job advertisements in Sweden, we found that the ideal hospitality worker is an *individualised team player with occupational passion*. This means, that social capacities and commitment to hospitality and gastronomy are of relevance to get an employment. The hospitality worker is characterized as a person who is constantly dedicated to all aspects of the profession in which the distance between work and leisure is diminished. Hospitableness as a social capacity is a necessity to be employed which in turn is challenging to measure. Moreover, the findings implicate that the ideal hospitality worker must ignore own innermost feelings, while creating an ambient work environment and satisfying guests. Additionally, they contribute to a successful restaurant business which creates the image of the hospitality worker as a commodity. In contrast to the common picture that hospitality work is a job that anyone could do, we conclude that the results show that the qualifications of becoming a hospitality worker in the restaurant industry are more complex than that.

# Food Fraud Prevention through Traceability within the Food Supply Chain. A Scoping Review

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Food fraud is a form of intentional adulteration of a product, usually for the purpose of an economical gain. Food fraud is committed regularly and may vary in form, depending on the nature of the product or target. This research work investigates the effectiveness of various food supply chain traceability methods in combating fraud by reviewing the literature in a systematic way (scoping review).

The scoping review was carried out in accordance with the Joanna Brings Institute methodology which includes three steps search. The review was carried out using 4 different search engines. Only peer reviewed journal articles were included, grey literature was excluded from the review. A set of key words was used with the application of Boolean operators. Screening commenced in two separate stages: (1) title & abstract screening and (2) full text screening. Data has been presented in written and tabular formats.

The initial search resulted in 486 articles, after removal of duplicates the figured decreased to 306. First screening stage led to further exclusion of 248 articles. Another 31 were excluded after second screening leaving 27 peer reviewed journal articles for data extraction.

Main findings indicate that increased traceability has a positive impact on the security of food supply chains in relation to adulteration. However, 'fraudsters' seem to stay ahead of the game as new technologies are constantly developed to mask adulteration and falsify test results. 'Blockchain' analysis has been outlined as the most popular traceability system used across modern food supply chains. The disadvantages of increased traceability can be attributed to high costs and problems with integrity where human motivation plays a crucial role.

Despite the extensive costs and technical difficulties, application of modern traceability assessments is key to food safety. To help to combat fraud, businesses must focus more on vulnerability assessments.

# Correct Application of Colloquial Plant Terminology May Help to Combat Food & Nutrition Insecurity

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Genetic diversity in commercial food crops is decreasing, leading to a higher exposure to food & nutrition security threats, mainly: (1) diseases, (2) climate change (3) soil depletion. Reversal may occur through identification and supply chain reintroduction of underutilised edible plants with unaltered genotypes, from the pre-war era. Feasibility of the assignment is dependent on the correct application of specific definitions in archival literature research and the possibility of commercial exploitation of the definitions in supply chain diversification. The aim of this research is to quantify and define colloquial terminologies for 'forgotten edibles' to provide practical application across the food industry.

A linguistic corpus search and a systematic literature review were applied using the 5 key terms related to 'forgotten edibles', these were: *traditional*, *heirloom*, *heritage*, *landrace* and *orphan*. This search allowed for quantitative data generation on the frequency and context of the distinct lexical items. The data was presented in numerical and tabular formats.

Results from academic data bases indicate that heirloom, heritage, landrace and orphan are terms used to describe 'naturalised' & 'indigenised' food crops with strong affiliation to selective plant breeding by farmers. On the other hand, findings from colloquial resources led towards the use of 'traditional' as an overarching term. Contextualising the terms was found as 'arbitrary' and 'undefinable' due to their continuing evolvement in the socially accepted form of language.

More frequent application of the above terms in all sectors of the food industry would lead to an increase in agrobiodiversity, resulting in higher level of food & nutrition security. Current consumers' trends towards 'planet health' can be exploited using these terms, to impose new sustainable practices across the industry.

# Food@work: adequacy of food consumption according to the Portuguese food guide

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## Introduction

Food consumption presents a key pillar in terms of health promoting and healthy eating, combining the quality of the food eaten, the quantity and variety. These principles are included in national food guides.

## Objective

To analyse the adequacy of food consumption according to the Portuguese food guide and the association between sociodemographic characteristics, such as gender, function and academic qualifications and food consumption among employees of a Portuguese University.

## Methods

Data collection was carried out face-to-face, by a nutritionist that inquired individuals about food consumption in the previous 24h. It was considered only food consumption from normal intake days. All ethical procedures were considered and an ethical committee approved the research. Statistical analysis was conducted using SPSS software. A critical significance level of 5% was considered.

## Results

It was observed an inadequate consumption of all groups of the Portuguese Food Guide, except in the groups of 'Cereals, Tubers and Derivatives' and 'Oils and Fats'. Individuals with a higher level of education tend to consume more "Fruit", "Vegetables", "Meat, Fish and Eggs" and "Dairy Products". Males had a higher consumption of "Meat, Fish and Eggs" and "Cereals, Tubers and derivatives" than females.

## Conclusions

Sociodemographic characteristics are associated with food consumption but varied according to the food group. In general, the eating habits of the employees of a Portuguese University do not comply with the recommendations from the Portuguese Food Guide.

# Management in dark kitchens projects in the covid-19 pandemic

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## Introduction

Due to the pandemic, problems in research emerge: What are the characteristics regarding restaurants and other food businesses with no dining rooms (dark kitchens), considering social distancing guidelines?

## Objective

The main purpose of the present work is to analyze management aspects of dark kitchens during the COVID-19 pandemic.

## Method

Based on bibliometrics results, a structured survey was outlined with questions related to the sociodemographic profiles and businesses performances from managers' perspectives. After identifying dark kitchen facilities located in the city of Rio de Janeiro, information was gathered from distance, obtaining answers from 36 dark kitchen managers.

## Results

For the most part, businesses have been classified as small-sized enterprises (65.71%) whose personnel include 2 to 5 employees (66.67%), and (88.9%) of them act in accordance to suggested food safety and hygiene practices. Food delivery applications are the most prominent in dark kitchen businesses' sales (80.6%), and (94.3%) of their owners agree that the fees charged by delivery applications platforms are considered high. Regarding the respondents' sociodemographic profiles, customers' age predominance is between 21 and 40 years old (91.2%), and (85.29%) of those belong to middle class. Content management on social networks leads (91.4%) of sales management practices. Around (45.7%) stated that dark kitchen costs are lower, which requires lower implementation investments (52.90%). Product packaging is a way to attract customer attention (94.4%), and the location of facilities allows for greater logistical optimization (88.9%).

## Conclusions

The research discoveries contribute to the service quality management performance provided to customers through the development of competitive advantages of dark kitchens in times of pandemic.



## Circular gastronomy. A new concept in connecting food, eating and sustainability?

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In the Agenda 2030, environmental, economic and social/cultural aspects of sustainability are emphasized, all important in striving for sustainable production and consumption of food and meals. When talking about sustainable development the terms *circular* and *cycles* are often used, as for example in a circular economy, stating the importance of recycle, recreate, and repair. Food can play an important role in implementing the central principles of a circular economy, and is a relevant field to test new approaches and understandings of a circular thinking.

A concept related to food is *gastronomy*, representing the interdisciplinarity of food and eating, and the acts of eating and drinking, defined as “food and meal designs with a high knowledge content in order to stimulate pleasure in the meal consumer”. The aim of this study is to explore the concept of *circular gastronomy* and to find out how it can be understood and applied, as well as opportunities and challenges related to the concept. Furthermore, the aim is to provide a preliminary definition of the concept. Data collection was conducted in two phases of explorative mixed-methods, using focus groups followed by a web-based survey.

The results revealed the complexity in the concept of *circular gastronomy*, both in what might be included and how it could be understood and applied. The concept was found relevant, interesting, trendy and useful, but also challenging in how to understand circularity and gastronomy as a compound concept. Circular gastronomy was perceived to be most applicable in restaurant settings, but also useful in public meals, within food companies and in education.

A preliminary definition of circular gastronomy will be presented at the conference. The exploration provides knowledge and understanding on how food, eating and sustainability can be conceptualized in a new, innovative, and creative way.

# Antecedents of consumer evaluation and consumption of sea cucumber foods: A cross-country comparison

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## Introduction

Sea cucumbers are marine echinoderms with some very specific biological traits (e.g. form, size, color and environment-related adaptations), which are traditionally harvested by the coastal communities in Europe, America, and the Arctic. Sea cucumbers are mainly a by-catch from commercial fisheries, and no industrial production or food value chain have yet been established in Europe. Contrarywise, in Asia, consumption of sea cucumbers has a significant traditional outreach. Knowledge about Western consumers' perceptions of sea cucumber as food is scarce. Therefore, in the framework of the HOLOSUSTAIN project ([www.holosustain.no](http://www.holosustain.no)), we aim to i) learn more about European and Canadian consumers' level of knowledge about and experience with sea cucumbers as food and ii) assess consumers' beliefs and attitudes towards the consumption of sea cucumbers, including the identification of sea cucumber foods (SCF) that consumers evaluate most favorable. A preliminary study ( $N = 25$ ) found a strong association ( $r = 0.7$ ) between attitude toward the consumption of (food containing) sea cucumber and intention to try or buy such food. The association implies that consumers who believe the consumption of SCF will be favorable, also express stronger intentions to engage in consumption. Although most consumers express having some experience with sea cucumbers (e.g., know about their existence), very few have actually tasted such foods. The preliminary study's main objective was to establish a link between attitude and intention to try, and further to uncover consumers' level of knowledge about and experience with SCF. Having gained some initial understanding about consumer evaluation and behavioral tendencies, the next stage was to further develop the conceptual model and conduct a larger, cross-country survey. The extended consumer survey will cover food-related traits and values (e.g., cooking creativity, food neophobia, health and food technology consciousness and eating values[i]), level of knowledge and experience with sea cucumber, consumer attitude toward the consumption of SCF, and consumers' intention to and willingness to try SCF. Consumer evaluation of different SCF will be used to inform product development processes: How can SCF become attractive as an alternative protein source for the sustainable and healthy diets of the future? A recent review (Tuorila & Hartmann, 2020)[ii] identified food neophobia and disgust sensitivity (among other factors) to pose significant barriers to the acceptance and consumption of novel foods. To Western consumers, SCF is suggested to represent novel foods and hence are food neophobia and disgust sensitivity considered key constructs to assess in the current research. Acceptance of novel food is further influenced by the food's [sensory properties](#), the cultural and societal context, individual personal traits and values, and beliefs about the food's impact on health, to mention only a few (e.g., Menozzi et al., 2017[iii]). In general terms, antecedents of food choice behavior can be grouped into three broad categories: i) properties with the food product, ii) properties with the person engaged in the decision making and consumption process, and iii) external and environmental factors (e.g., Chen & Antonelli, 2020; Köster, 2009)[iv].<sup>[v]</sup>. Key antecedents for explaining consumer evaluation and behavioral tendencies regarding the consumption of SCF are assessed and their relative importance will be outlined in the final study results.

## Objectives

The overall project goal of HOLOSUSTAIN is to provide sea cucumber-based research and innovation guidance to both authorities and the industry in the North Atlantic region (NORA), in a more specific context, and, in Europe and Canada in a broader context.

As subtask in the project, the consumer survey is designed with the intention to i) increase the involvement of consumers in the Novel Food “co-creation” processes, ii) potentiate the availability of a broader range of alternative protein products on the market in the near future, iii) establish which consumer traits and values influence evaluation and consumption behavior.

Finally, the study will help gain a deeper understanding of the psychological mechanisms involved in consumers’ evaluation of and behavioral tendencies regarding the consumption of sea cucumber foods across countries.

### Methods & Survey Design

Consumers’ evaluation of and behavioral tendencies regarding the consumption of SCF are in process of assessment through an online survey of consumers in Norway, Iceland, Canada, and France. Two main analytical approaches have been considered: i) Structural equation modeling (SEM) using RStudio[vi] with the *lavaan* package and ii) hierarchical k-means clustering, using the packages *cluster[vii]* and *factoextra[viii]* in RStudio, followed by one-way analysis of variance (ANOVA). SEM, a multivariate technique to explain relationships among multiple variables or constructs by estimating separate, but interdependent, multiple regression equations simultaneously[ix], is used to establish the relationships between the antecedent constructs (e.g., food neophobia) and outcomes (i.e., attitude and intention), and to investigate structural differences between consumers from the different countries. Cluster analysis is widely used as a classification tool in market segmentation[x].<sup>[xi]</sup> and applied here to divide consumers into homogeneous subgroups based on food-related traits and values (e.g., food neophobia and health concern). The cluster analysis profiles consumers by their attitudes and intentions toward consuming sea cucumbers, their consumption experience or habits, and socio-demographic characteristics. All constructs are measured by validated scales and inventories.

### Results

HOLOSUSTAIN’s extended consumer survey is a work in progress which will be finalized by May 2022. Novel insights into *why* consumers either embrace or reject SCF have important implications for an upcoming industry. The results will demonstrate associations between key food-related personality traits and personal values on the one hand, and consumers’ evaluation and behavioral tendencies regarding consumption of SCF on the other hand, which is paramount for a better understanding of how sea cucumber can be incorporated in the Western diet...

The SEM will reveal the relative importance of the various antecedents hypothesized to influence consumer evaluation and behavioral tendencies toward SCF.

The cluster analysis will allow us to identify consumer segments, both within and across countries, that are more vs. less inclined to consume SCF and enable a description of the segments’ key characteristics. Knowledge about what drives consumption is important to better position and market SCF[xii].

### Conclusions

The current research makes a significant contribution to the scarce consumer behavior literature on sea cucumbers, especially concerning “Western” consumers. The newly acquired consumer preference data together with the high-quality protein, unsaturated fatty acid profile and high mineral content of sea cucumbers[xiii],[xiv], could support inclusion of newly developed SCF products into the future modifications of the Food Based Dietary Guidelines for Europe[xv], for promoting a personalized and more sustainable dietary shift.

### Acknowledgements

We thank NORA ([www.nora.fo](http://www.nora.fo)) for the financial support of this work (Holosustain Project 510-194).

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# 5 senses at the dining table – A systematic literature review of human five senses within dining settings

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## **Introduction**

The rise of experience-centred dining has urged the service providers in the restaurant industry to evolve and improve their businesses in order to accommodate the new needs of their guests. As a result, the study of the human five senses, the leading drivers of human experience, has also attracted increasing attention in recent years. This systematic review is aimed at critically investigating the current state of multisensory research within dining settings. More specifically, it identifies the different sensory elements that have been studied so far, investigates the employed methods of research, addresses the geographical distribution of research on the topic and highlights the gaps and limitations of the literature.

## **Method**

The systematic literature review was conducted from the earliest possible data through to September 2020. Seven sets of keywords were searched in four major databases (EBSCOhost, Sage, ProQuest and ScienceDirect) and after several rounds of screening, 120 peer-reviewed journal articles met the selection criteria and were included in the review.

## **Findings and Conclusion**

The focus of the existing literature is mainly on the visual elements such as interior design, tableware and staff physical appearance, and other less tangible sensory elements have not received enough attention. The findings also indicate that the literature is mostly focused on the experiences, perceptions or satisfaction of the customers and very few studies have taken a step back and have addressed the awareness or opinions of the service providers. Finally, there is a significant lack of qualitative research resulting in a very limited rich and in-depth data regarding this topic.

# Monitoring the food environment of a Brazilian public university

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Instituto de Nutrição Josué de Castro / Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil

## Introduction

The environment can influence food choices and behaviors, encouraging or discouraging a healthy lifestyle.

## Objective

To monitor the food environment at the Federal University of Rio de Janeiro (UFRJ), Cidade Universitária campus.

## Method & designs

Audits of all commercial food establishments that sold foods for Immediate Consumption in the university were conducted in 2015, 2017 and 2019. The reliability and content validity of the instrument were evaluated. Establishments were grouped by the types of food most sold frequently, according to the extent and purpose of the foods' processing. Four indicators were applied, based on the availability of unprocessed/minimally processed foods (MPF) and ultra-processed foods (UPF) in the establishments. The classification of establishments and the indicators showed good discriminatory power in a previous study. Descriptive analysis were performed using SPSS 19.0. The study was approved by the Ethics Committee (approval numbers CAAE 49988015.6.0000.5259; 63579717.8.0000.5257; 26522519.4.0000.5257).

## Results

In the three years investigated, there was a greater proportion of mixed establishments (those in which there was no predominance of MPF or UPF availability), followed by those that offer more UPF. Establishments that predominantly offer MPF represented between 15% and 23% of food services. The Healthiness Index or summary score (expresses the availability of MPF and the unavailability of UPF) was lower than 43 in the three surveys (the closer to 100, the more the establishment is a health promoter). The healthiness indicators for commercial establishments that sell foods for immediate Consumption applied summarized the dimension of food availability at the university.

## Conclusion

The food environment evaluated was mostly composed of commercial establishments that discourage healthy food choices. This study served as the basis for the formulation of intervention actions that will be implemented in the university food environment.

# Cooking workshops as strategy of health promotion of patients with inflammatory bowel diseases

*Letícia Tavares<sup>1</sup>, Maria Eliza Dos Passos<sup>1</sup>, Cyrla Zaltman<sup>2</sup>, Ariadne De Oliveira<sup>1</sup>, Caio Marcelo Padula<sup>1</sup>*

<sup>1</sup>Instituto de Nutrição Josué de Castro / Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil. <sup>2</sup>Faculdade de Medicina / Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil

## Introduction

Diet can be a successful part of treatment plan to improve the quality of life of patients with inflammatory bowel diseases (IBD). Practical cooking workshops are effective educational strategies that can improve participant's health and can be applied in different contexts as a low-cost public health intervention.

## Objective

The goals of this study are perform cooking workshops for IBD patients as a strategy for developing cooking skills, promote healthy eating and improve quality of life.

## Method & design

The target population was patients recruited at the IBD outpatient from Clementino Fraga Filho University Hospital, Rio de Janeiro, Brazil. From September 2014 to November 2019, in the university experimental kitchen, were conducted cooking workshops, with five hours each. The educational activities were planned and carried out by nutritionists and gastronomy professors and graduate students. The workshops' took into account the characteristics of the diseases, nutritional needs and cultural/ socioeconomic aspects. Tested questionnaires and focus group were used to evaluate the educational program. A hedonic scale with five items was used ("hated", "did not like", "indifferent", "liked", "loved") to evaluate the overall appearance, texture, smell and taste of the executed recipes.

## Results

44 cooking workshops were performed totaling more than 550 participations. Approximately 230 recipes were taught. The recipes had at least a 94% "liked" and "loved" response for all items evaluated. Participants emphasized that the interaction between patients, students and teachers was important to the success of activities, with no recommendation of changes in the methodology.

## Conclusions

The cooking workshops were well accepted and the recipes were praised. This study indicate that cooking workshops for patients with IBD are innovative public health educational strategy to promotion quality of life. Our cooking workshops methodology is inspiring other IBD outpatient in Brazil.

# Sauces and seasonings: Uses and attitudes in community-dwelling UK older adults

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## Introduction

Flavours, as provided through condiments, seasonings and sauces, can encourage healthy food intakes in older adults. Adding flavours thus, may offer a straightforward, practical recommendation that improves the health of many older adults, but positive attitudes towards flavoursome foods will be fundamental to the success of any recommendation.

## Objective

This mixed-methods study aimed to understand uses of and attitudes towards sauces, seasonings and other flavoursome foods in a sample of community-dwelling UK older adults.

## Methods & Design

Twenty-two participants: 15 females, mean age = 72.3 (SD = 5.2), range 65–83 years, from Bournemouth, UK; took part in an interview with two questionnaires on their uses and opinions of sauces, seasonings and other items that add flavours to foods.

## Results

Our sample used sauces and seasonings for cooking and eating, from 0 to 17 times/day. They agreed that it was important to them to consume foods that were pleasant, tasty, familiar and healthy, and that sauces and seasonings could add flavour, make foods more pleasant and more tasty, and do not cause discomfort or pain. Reasons for adding flavours to foods largely centred around 'meal enhancement', where added flavours were reported to enhance, increase or improve the smell and/or taste of a meal. Reasons for not adding flavours focussed on 'the product itself': concerns that related to food processing and the ingredients in commercial products; and 'characteristics of the meal', where added flavours were not considered appropriate for all meals. Much 'variation' and many 'individual differences' were also found.

## Conclusions

These findings suggest a benefit to adding flavours to foods for older adults, an increased advantage for naturally flavoursome foods, such as herbs, spices, onion and garlic, and a preference for individual choice over their use.



# Evaluating the nutritional status of children that follow a lacto-vegan Hare Krishna diet in a primary school

*Corina Ujeniuc<sup>1</sup>, Amalia Tsiami<sup>1</sup>, Maddie Ohl<sup>1</sup>, Arpita Jain<sup>2</sup>*

<sup>1</sup>University Of West London, London, United Kingdom. <sup>2</sup>Govindas, Avanti Trust Group, London, United Kingdom

## **Introduction**

This research investigated the diet and its nutritional value of the pupils at the Hare Krishna primary school in London who follow a plant-based (lacto-vegan) diet. A systematic literature review revealed that there is no previous research investigating the Hare Krishna diet in a primary school in London. Therefore, the aim of the current research is to nutritionally evaluate the diets of the children and engage with the parents and school in order to improve provision. Furthermore, this research will bring valuable data about the obesity rate in Hare Krishna children (children that followed the diet since birth) based in London and will raise awareness about the importance of a planned lacto-vegan diet to the parents from the Hare Krishna community.

## **Methodology**

Post Systematic review, there are 3 stages to the study. Stage One Pre-intervention baseline anthropometric data will be collected as well as review of a 3-day diet plan (one weekend day and two weekdays) reported by parents. Nutritional knowledge of the parents will also be evaluated through a validated general nutritional knowledge questionnaire (GNKQ) to evaluate their understanding of food, nutrition and food choices. Stage Two - the intervention stage, nutritional workshops will be delivered to the parents and a sensory food education programme (Flavour School) will be delivered to the children in order to inform them about nutrition. Stage 3 Post intervention; the same data gathering steps will be followed as at Stage one in order to follow up the data.

## **Conclusion**

The preliminary data suggests that students are motivated to eat more healthily after the nutritional sessions and are more mindful about their choices of being a vegetarian. The overall outcome of the research is to support plant-based nutritionally balanced diets for children that could lead to reducing obesity and to engage with the stakeholders in order to improve the nutritional provision at schools where plant-based diets are followed.

# Knowledge, leadership and sustainability in the restaurant industry

*Lotte Wellton*

Department of Culinary Arts and Meal Science, Örebro University, Örebro, Sweden

This abstract addresses the growing expectation of hospitality businesses to implement sustainability strategies. By using the theoretical framework of professional knowledge cultures, as discussed by Nerland (2012), together with concepts of leadership and management (Wellton et al, 2019), this study presents a novel approach. The objective is to show how the knowledge culture and the processes of learning and leadership formation in the restaurant industry impact sustainable decision-making (Kramar, 2014) in restaurants. Through a narrative method (Johnstone, 2015), a typical industry career was illuminated, which mirrored the route to becoming a leader while adopting sustainability strategies. A podcast interview was used as research material and, the sampling considered the relevance of the narrators' knowledge and, experience of the chef's profession and is therefore representative of a naturally occurring data (Silverman, 2011). The analysis, based on knowledge culture, leadership practices, and sustainability, shows that the size of the restaurant matters for financial and socially sustainable decision-making. This is explained by the production flow in large organizations, which depends on calculated and effective work methods. Environmental sustainability strategies appear as a personal concern and are thereafter transformed into the knowledge culture, identified as a normative leadership.

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# Body Composition, Nutritional Intake and Perception of Food Influence on Sports Practice Among Futsal Athletes: an Exploratory Study

*Sílvia Zambujo<sup>1</sup>, Bela Franchini<sup>2</sup>, Ana Pinto de Moura<sup>3</sup>*

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Indoor soccer is a relatively recent growing sport, although there are no nutritional recommendations for athletes. However, it is known that food affects sports performance.

The aims of the present investigation were to assess body composition, nutritional intake and sleep and training habits of senior male indoor soccer athletes from the National Championship of the II Futsal Division - Azores Series, as well as to assess these athletes' perception regarding the influence of food on performance.

Body composition was assessed by anthropometry (n = 68) and food intake by three 24-hour recall questionnaires (n = 20). Intake data were transformed into energy and nutritional intake using Nutrium<sup>®</sup> software.

The perceptions about food influence on performance were assessed by interview (n = 20) and analysed, using a thematic analysis procedure and a qualitative data analysis software – the QSR Nvivo 10<sup>®</sup> software.

A high prevalence of overweight was observed and was higher among athletes that participated in nutritional intake and perceptions assessments (44.1% vs. 70%) and BMI (24.7 vs 26.8 kg/m<sup>2</sup>,  $p=0.003$ ) and Body Fat (14.2 vs 15.6,  $p=0.045$ ) was also higher in that group. Nutritional intake was overall inadequate: low energy and carbohydrates intake and high fat and alcohol intake.

Thematic analysis showed that the athletes understood the concept of healthy eating, although most admitted being able to improve their diet. Lack of time and difficulty in abandoning preferred foods were the main barriers identified to the practice of a healthy eating.

Regarding performance, the athletes reported being able to improve performance by changing food habits and through the avoidance or promotion of certain foods.

The results highlight the importance of dietary advice for athletes, as food habits influence sports performance.

# ICCAS PROGRAM

2<sup>nd</sup> June 2022

9:00	<b>Welcome / Official Opening</b>
9:30	<b>Keynote speaker Corinna Hawkes</b> <i>Professor Food Policy City, University of London</i>
10:15	<b>Coffee Break &amp; Posters session</b>
10:45	<b>Session 1: Food adaptation to health concerns and consumer preferences</b> <ul style="list-style-type: none"> <li>• <b>Arif Ahmed</b>, Amalia Tsiami, Hafiz Khan. <i>Effects of Dietary and lifestyle management on type 2 diabetes development among Ethnic minority adults living in the UK: A generational shift.</i></li> <li>• <b>Filipa Saloio</b>, Adriana Cartaxo, Cláudia Viegas, Vânia Costa, Rute Borrego. <i>Development of a healthy version of a Burger with “Fries”.</i></li> <li>• <b>Philip Lavin</b>, Viktoria Olsson, Betty Collin, Stina-Mina Ehn Börjesson, Kimmo Rumpunen. <i>How does different indigenous yeast strains influence aroma development and flavour during fermentation of apple juice?</i></li> <li>• <b>Cornelia Witthöft</b>, Teija Rautiainen, Sari Ranta, Niina Rantakari, Lise Justesen, Mohammed Hefni, Kai Victor Myrnes-Hansen, Anna Sandgren. <i>Bridge Builders Network – a Nordic multidisciplinary research network on healthy aging viewed from a food and nutrition perspective.</i></li> </ul>
12 :15	<b>Lunch &amp; Posters session</b>
13 :30	<b>Keynote speaker Davy Tissot</b> <i>MOF 2004, Winner Bocuse d’Or 2021</i>
14 :15	<b>Session 2: Chefs and contemporary food issues</b> <ul style="list-style-type: none"> <li>• <b>Bruce McAdams</b>. <i>Chef’s knowledge and perceptions of farm-raised fin fish and how it impacts menu decisions.</i></li> <li>• <b>Ariane Lengyel</b>. <i>Celebrity chefs: Jamie Oliver and Gordon Ramsay as arbiters of taste and custodians of culinary capital.</i></li> <li>• <b>Arnaud Lamy</b>. <i>Reducing meat consumption in restaurants. How chefs perceive the place of meat in relation to sustainability issues?</i></li> </ul>
15 :15	<b>Coffee Break &amp; Posters session</b>
15 :45	<b>Session 3: Consumer’s knowledge and attitudes toward healthy and sustainable food</b> <ul style="list-style-type: none"> <li>• <b>Julia Bengtsson</b>, Karin Wendin. <i>Insects as food – the impact of information, sustainability, and physical activity on consumer attitudes.</i></li> <li>• <b>Miroslava Atanassova</b>, Ingebrigt Bjørkevoll, Margareth Kjerstad. <i>Nutritional, sensory quality and general processing trends for the “Western” consumer in the case of sea cucumber species <i>Parastichopus tremulus</i>.</i></li> <li>• <b>Giulia Negro</b>, Amalia Tsiami. <i>Animal-based vs plant-based protein quality. A survey of millennial students nutritional knowledge and food preferences.</i></li> <li>• <b>Federico J.A. Perez-Cueto</b>, Morten Arendt Rasmussen, Ilona Faber, Kai-Brit Bechtold, Listia Rini, Joachim Schoulteten, Hans De Steur. <i>Barriers towards plant-based food consumption are experienced differently according to dietary lifestyle: Results of a Consumer survey in 10 EU countries.</i></li> <li>• <b>Laure Saulais</b>. <i>Natural and healthy? Consumers’ knowledge, understanding and preferences regarding processing, naturalness, and healthiness of food products.</i></li> </ul>

### 3rd June 2022

<b>9:00</b>	<p><b>Keynote speaker Krishnendu Ray</b>  <i>Food Studies Departement Chair,  Steinhardt New York University</i></p>
<b>9:45</b>	<p><b>Presentation of a students' project from the Anthropology Departement of the Lyon 2 University.</b>  <i>Next destination: the restaurant. Ethnography of Lyon eating establishments.</i>  <a href="#">Click here to access the website</a></p>
<b>10:00</b>	<p><b>Session 4: Dynamics of food cultures: heritagization, transformation and acculturation.</b></p> <ul style="list-style-type: none"> <li>• <b>Neda Sattarzadeh</b>, Amalia Tsiami, Cristina Maxim, Elitza Iordanova. <i>Awareness and perceptions of ethnic restaurant managers towards authenticity and sensory strategies – A case study of Persian ethnic restaurants in London.</i></li> <li>• <b>Charles Feldman</b>, Shahla Wunderlich. <i>Cultural distancing: Reflections on traditional food practices during the COVID-19 pandemic.</i></li> <li>• <b>Shanshan Zheng</b>. <i>The transmission of food culture in China: between heritagization and mediatization.</i></li> </ul>
<b>11 :00</b>	<b>Coffee Break &amp; Posters session</b>
<b>11 :20</b>	<p><b>Session 5: Food patterns and diet content</b></p> <ul style="list-style-type: none"> <li>• <b>Mariana Rei</b>, Daniela Correia, Duarte Torres, Carla Lopes, Ana Isabel Costa, Sara S P Rodrigues. <i>Food Preparation Patterns and Diet Quality in the Portuguese population.</i></li> <li>• <b>Jeff Bray</b>, Heather Hartwell, Katherine Appleton, Jodie Lacey. <i>Food Insecurities during the Covid-19 pandemic in the UK and consumption adaptation.</i></li> <li>• <b>João Lima</b>, Mafalda Eulálio, Marisa Rodrigues, Ada Rocha. <i>Intermediate meals and the place of consumption - which relationship?</i></li> </ul>
<b>12 :20</b>	<b>Lunch &amp; Posters session</b>
<b>13 :10</b>	<b>PhD. Session "Pitch My Thesis"</b>
<b>14 :10</b>	<p><b>Session 6: Innovative methods to study food knowledge, expectations and emotions</b></p> <ul style="list-style-type: none"> <li>• <b>Daniel Rocha</b>, Célia Rocha, Rui Costa Lima, Pedro Braga, Luís Miguel Cunha. <i>Evaluation of Port wine evoked emotions using a Rate-All-That-Apply approach.</i></li> <li>• <b>Christelle Michon</b>, Basak Oker. <i>Understand post-Covid food service innovation expected by chefs using @ home videos.</i></li> <li>• <b>Kai Victor Myrnes-Hansen</b>, Heidi Victoria Skeiseid. <i>Using cartoons in adult focus groups to discuss 'consumers feedback expectations in food service settings.</i></li> <li>• <b>Lars Eriksson</b>. <i>The Waiter's Craft Knowledge of Meal-design.</i></li> </ul>
<b>15 :30</b>	<b>Coffee Break &amp; Posters session</b>
<b>16 :00</b>	<p><b>Session 7: Trends, choices and behaviors in Food Service</b></p> <ul style="list-style-type: none"> <li>• <b>Joanne Tucker</b>, Amalia Tsiami, Rosemary Stock. <i>An experimental food label applied to food served at a secondary school in Greater London and its influence on adolescent food choices.</i></li> <li>• <b>Joana Rodrigues</b>, Andreia Oliveira, Cátia Morgado, Carlos Brandão, Maria Manuela Guerra. <i>Food waste in cafeteria services: how much food do consumers leave on the plate and why? A case study.</i></li> <li>• <b>Ana Beatriz Alves</b>, Ada Rocha, Margarida Liz Martins. <i>Food trends in food service in Portugal.</i></li> </ul>
<b>17 :15</b>	<b>Departure to Cité Internationale de la Gastronomie</b>
<b>17 :30</b>	<b>Visit of Cité Internationale de la Gastronomie</b>
<b>18 :30</b>	<b>Closing cocktail of the ICCAS conference</b>

## LIST OF POSTERS

- **Arcaro Bez Batti Érika**, Lazzarin Uggioni Paula, Bagolim do Nascimento Amanda, Gines Geraldo Ana Paula, Fernandes Ana Carolina, Luci Bernardo Greyce, Pacheco da Costa Proença Rossana. *Notification of the 'whole' term on the labels of processed and ultra-processed food formulated based on cereals and pseudocereals.*
- **Bernasco Bastienne**, Siebrand Egbert. *Trafficking Food and Data: The Ethics of Online Food Delivery.*
- **Bohne Prof. Dr. Hartwig**, Vink Lysbeth, Kappert-White Dr. Annette. *Cross-border heritage: Friesland tea culture.*
- **Campos Mariana**, Teixeira Beatriz, Rocha Ada, Viegas Cláudia, Poínhos Rui, Afonso Cláudia. *Promoting healthy eating environments: the role of public catering in the areas surrounding educational establishments.*
- **Castanho Ana**, Guerra Manuela, Brites Carla, Oliveira Jorge C., Cunha Luís Miguel. *Design thinking for food: remote association as a creative tool in the context of the ideation of new rice-based meals.*
- **Cosson Audrey**, Dougkas Anestis, Lamy Arnaud, Michaud Maxime, Sebbane Maxime. *Understanding the motivations and barriers of culinary students to introduce legume-based foods in menus.*
- **Costa Vânia**, Bexiga Eunice. *Restaurant Portuguese traditional menus – Analysis of the food portions adequacy and ecological food print.*
- **De Graaff Margot**. *The Road to Brand Awareness: positioning food brands on the B2B- market, so an increasing demand of their products will be generated.*
- **Forsberg Sarah**, Westergren Albert, Wendin Karin, Rothenberg Elisabet, Bredie Wender, Nyberg Maria. *Perceptions and attitudes about eating with the fingers. A study among older adults with motoric eating difficulties, relatives and professional caregivers.*
- **Freitas Isabela**, Rocha Ada, Liz Martins Margarida. *Characterization of behaviors and practices related to household food waste in Portugal.*
- **Hult Kajsa**, Lainpelto Jack, Walter Ute, M Jonsson Inger. *Constructing the hospitality superstar – a document analysis of job advertisements in Sweden.*
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These conference proceedings provide a permanent record of the papers and posters given, demonstrating the international variations of the conference and the different angles and diversity of subjects covered.

Papers have been grouped under the following sessions:

FOOD ADAPTATION TO HEALTH CONCERNS AND CONSUMER PREFERENCES

CHEFS AND CONTEMPORARY FOOD ISSUES

CONSUMER'S KNOWLEDGE AND ATTITUDES TOWARD HEALTHY AND SUSTAINABLE FOOD

DYNAMICS OF FOOD CULTURES: HERITAGIZATION, TRANSFORMATION AND ACCULTURATION

FOOD PATTERNS AND DIET CONTENT

INNOVATIVE METHODS TO STUDY FOOD KNOWLEDGE, EXPECTATIONS AND EMOTIONS

TRENDS, CHOICES AND BEHAVIORS IN FOOD SERVICE

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