



INTERNATIONAL CONFERENCE ON MEDITERRANEAN DIET AND GASTRONOMY

Linking Innovation, Sustainability and Health

15-16 October, University of Évora

Book of Abstracts

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Introduction

The International Conference on Mediterranean Diet and Gastronomy: Linking Innovation, Sustainability and Health

The Mediterranean Diet is the theme that brings together in Évora many renown national and international experts on many different domains and research topics. UNESCO's classification as Intangible Cultural Heritage of Humanity attests the relevance of a nutritional model that remained "constant over time and space", but, more importantly, it asserts it as much more than a simple diet.

In order to grasp the true essence of this conference, one question stands in the foreground: what is the Mediterranean Diet?

It's tradition. The customs and practices of communities of the Mediterranean basin are the base for this diet and cement the identity of this territory. In this conference, we want to talk about the past, but also about the future. We wish to reflect on how, in a context of pervasive change, tradition and innovation can coexist and give origin to new products and services that transform the old into the new.

It's socialization. Beyond food, this diet is about a way of being and living. Based on the values of sharing and caring, the Mediterranean Diet tells us about the identity of people. In some respects, each person is like all other people, some other people, and no other people. In this continuum between personal identity and cultural belonging, there is a world of factors affecting feeding behaviour.

It's health. Characterized by diversity and balance, the Mediterranean Diet is a rich and harmonious conjugation of highly nutritious food. International research has been documenting its benefits for health promotion and for preventing some of the most widespread chronic diseases of the XXI century.

It's sustainability. Valuing endogenous products and respecting biodiversity and seasonal cycles of produce allow for a more efficient and clever use of natural resources. To that extent, one cannot talk about Mediterranean Diet without mentioning sustainability. In a time when preservation is one of the

most pressing concerns of our collective conscience, sustainable practices of production and consumption are a necessary topic of discussion.

It's experience. The Greek root word "*diata*" means a way of life. Thus, we need not only to address the questions of "what", but also of "how": the act of eating. The experience with food is part of the essence of the Mediterranean Diet, making sensory science a necessary topic for this conference.

For all these reasons, we believe this conference is for you. From body to mind, from biology to culture, from history to innovation, from knowing to doing, there are multiple perspectives on eating.

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Plenary Sessions

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1. Eat well, sleep well – The Mediterranean way

PEDRO MOREIRA

Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto

Professor Pedro Moreira is a nutritionist and full professor of Human Nutrition and of the Faculty of Nutrition and Food Sciences, University of Porto (FCNAUP). Member of the Research Centre in Physical Activity, Health and Leisure and of the Institute of Public Health, both from the University of Porto, Prof. Pedro Moreira is consultant at the Directorate-General of Health, Ministry of Health. He is editor of the Journal of Nutrition and Metabolism since 2013 and author of numerous scientific articles and books.

ABSTRACT

The Mediterranean diet in the 1960s could might include any of the following characteristics:

- High intake of fresh fruit, dried fruits, vegetables, green leaves, garlic and onions, bread (without butter), pasta, couscous, polenta and other cereals, potatoes, legumes, olives, nuts, almonds and pistachios;
- Fresh food, eaten seasonally and locally;
- Fresh fruit as a main meal dessert, while sugary foods were consumed only a few times a week;
- Almost exclusive and preferential use of olive oil for seasoning and cooking;
- Dairy foods were mainly cheese and yoghurt, consumed daily but in low to moderate amounts;
- Fish and poultry consumed on low to moderate basis, and several times a week;
- Red meat consumed in low amounts and a few times per month;
- Simple cooking, with the use of herbs, garlic and onions; and
- Wine, particularly red, consumed in low to moderate amounts.

Data also point to the existence of a very active lifestyle, which could also explain the high life expectancy and low frequency of chronic diseases when consuming this healthy dietary pattern. Furthermore, there was also: a strong social support between individuals that included the sharing of

food with family and friends; a meal environment favoring leisure and relaxation of daily stress; savory meals, stimulating pleasure in healthy eating; and naps after lunch which provided rest and relaxation. Given that food patterns can be defined as the quantities, variety, combinations, frequency of consumption, and culinary processing of different foods, there are numerous combinations of foods, bioactive components or components and their mechanisms to potentially investigate. Furthermore, considering the importance of adopting a Mediterranean dietary pattern to prevent major chronic diseases while decreasing the consumption of foods rich in sugar, saturated fat and salt, future research should address the critical periods in the formation/breaking of food habits; the key learning mechanisms, their relative impact in the short, mid and long term and their importance according to the different critical periods; and the most effective strategies for breaking food habits (i.e. for changing from poor to healthy eating habits).



2. Mediterranean Diet: Good sense and good taste

ISABEL DO CARMO

Faculty of Medicine, University of Lisbon

Endocrinologist and associate professor at the Faculty of Medicine of the University of Lisbon, Dr. Isabel do Carmo was head of the Endocrinology service at the Santa Maria Hospital, until 2013, and coordinator of this hospital and of the Lisboa Norte health centers, from 2005 to 2013. She founded the training course in Eating Disorders at the Faculty of Medicine, of which she is currently part of the teaching staff and member of the scientific board. Dr. Isabel also founded the Portuguese Society for the Study of Obesity (Sociedade Portuguesa para o Estudo da Obesidade) and the Center for Eating Disorders (Núcleo de Doenças do Comportamento Alimentar). She was president of the Scientific Board of the Platform against Obesity of the Directorate-General for Health (Portugal), until its extinction in 2011.

ABSTRACT

In preparation...



3. As the twig is bent, so is the tree inclined

(“De pequenino se torce o pepino”)

ANNA LINS

Estoril Higher Institute for Tourism and Hotel Studies

Professor of World Cuisine and Dietary Cooking at the Estoril Higher Institute for Tourism and Hotel Studies. Executive chef of the restaurant chain “Go Natural”, as well as “Miss Japa” and “The Cut”. Former chef at “QB Essence” and “Bica do Sapato Sushi Bar”, Anna Lins is the first Portuguese woman to be certified by the All Japan Sushi Association.

ABSTRACT

It is to the young future chefs, in training, that we try to instil the nutritional, technical and operational principles that they will use as a reference for the future.

It is difficult to pass this message when the vast majority of the young people, who come to us, bring with them some erroneous and already deeply rooted eating habits. Moreover, they have inculcated many of the food myths present in our society, which make it difficult to change the food culture.

Based on this, the project “De pequenino se torce o pepino (As the twig is bent, so is the tree inclined)”, where our “little” chefs must understand the foundations of correct food habits to understand their own errors. Moreover, it will be them who will develop new cooking recipes to other children from 6 to 10 years. With this, we expect to create the possibility of children introspection and involvement with food in a more lasting way.



4. Why we eat what we eat: Psychological determinants of food choice

CRISTINA GODINHO

ISCTE - University Institute of Lisbon, Portugal

Cristina Godinho, PhD in Clinical and Health Psychology, is currently post-doc researcher at the Faculty of Human Kinetics of the University of Lisbon, member of the National Program for the Promotion of Physical Activity of the Directorate-General of Health (Portugal) and visiting professor of the Masters' programme in Social and Health Psychology of the University Institute of Lisbon (ISCTE-IUL). Cristina Godinho's research is focused on the change of health-related behaviours, namely, promoting healthy eating and physical activity, and is published in various international journals in the fields of Nutrition, Public Health and Health Psychology. International collaborations include the Freie Universität of Berlin and Kent State University (Ohio, USA) as well as the University College of London, where she collaborated as associated researcher for two years. She's scientific referee of various journals and associated editor of "Psychology, Community & Health".

ABSTRACT

In preparation...



5. Salivary signatures of taste perception and diet

MARTINE MORZEL

The Centre for Taste and Feeding Behaviour

Based in the research unit Centre des Sciences du Goût et de l'Alimentation (The Centre for Taste and Feeding Behaviour). Martine Morzel is conducting research on the links between chemosensory perception, dietary habits and saliva composition in human subjects of various ages and health conditions. She is currently coordinating a European project entitled SALAMANDER (SALivAry bioMarkers of mediterranean Diet associated with long-tERm protection against type 2 diabetes mellitus).

ABSTRACT

The role of saliva in taste perception has long been recognized, and the role of specific constituents (e.g. sodium, carbonic anhydrase 6) has been established decades ago. However, advances in various analytical methods have revealed the complexity of saliva in terms of proteins, metabolites or microorganisms content. Salivary signatures (the combined consideration of many constituents) may therefore be useful to either serve for diagnostics purposes, or to help formulating hypotheses on biological mechanisms related to events in the oral cavity. Our own research on saliva markers of taste perception will be presented, together with the new hypotheses and research directions this has led to. In a second part, evidence on how salivary signatures may be shaped by diet (intake of specific foods or food groups, or whole diets) will be reviewed before presenting the application to a project focusing on salivary biomarkers of adherence to the Mediterranean diet.



6. Interactions between saliva, mucosae and flavor compounds

FRANCIS CANON

The Centre for Taste and Feeding Behaviour

Francis Canon is a researcher, working for the Institut National de la Recherche Agronomique (INRA), at the Center for Taste and Feeding Behavior (CSGA) in Dijon, France. He received his PhD in biochemistry from the Centre international d'études supérieures en sciences agronomiques at Montpellier in 2010. Afterwards, he was a postdoctoral researcher at the synchrotron SOLEIL using mass spectrometry coupled to synchrotron radiation to study proteins. The focus of his current research is the interaction between salivary proteins and flavor compounds and their impact on perception. Currently, he is coordinating a French national project entitled MUCosal salivary Film and Flavour INTERactions (MUFFIN). This project aims at gaining a deeper understanding of the role of the oral mucosa in astringency and aroma persistence.

ABSTRACT

Flavor perception is one of the factors guiding food consumption. Flavor is mainly perceived by the chemical senses of taste and olfaction (aroma retro-nasal perception), but also by the “trigeminal senses”, which can detect for example astringent molecules. The effect of saliva and salivary proteins on flavor perception is increasingly recognized. More specifically, recent studies suggest that the mucosal pellicle, a layer of salivary proteins bound to oral mucosa, could be involved in flavor perception.

Our own research on the impact of the interactions between salivary proteins and flavor compounds on food perception will be presented. The talk will more specifically focus onto two flavor modalities, aroma perception and astringency. It will present our vision on the molecular mechanisms involved in astringency and aroma persistence.



7. Sensory and hedonic responses to foods: highlights from the Italian Taste study

SARA SPINELLI

University of Florence & Italian Sensory Science Society, Italy

Sara Spinelli is Post doc researcher at the University of Florence. She received her PhD from the University of Bologna, and continued her career with postdoctoral studies in sensory and consumer research at the University of Bologna and at the University of Florence, where she has currently a Young Researcher fellowship focussed on individual differences in food preferences. Her research interests include emotions, personality traits, context and language in food experience, innovation and new product development. On these topics she authored several scientific papers published in peer-reviewed journals and invited book chapters. Sara is member of the editorial board of the journal Food Quality and Preference and of the Scientific Committee of the Italian Taste research project coordinated by the Italian Sensory Science Society.

ABSTRACT

Food choice is influenced by many interacting factors in humans. The selection of a given food depends on the interplay of its intrinsic and extrinsic characteristics with person-related dimensions that are biological, physiological, psychological, and socio-cultural. Cultural traditions, social organizations and conditions, shared values and beliefs tend to determine common experiences, while still allowing for individual differences in food preference. There is increasing evidence for a number of underlying factors that contribute in a consistent manner to variations in the ways in which consumers experience foods and beverages. These include genetically determined variations in taste responsiveness. In addition to genetic, biological, and physiological variables, personality may play a large role in determining food perception, preferences and behaviours. This was shown not only for food-related personality traits such as neophobia but also in the case of more general personality traits not explicitly related to food, such as sensitivity to reward and to punishment and disgust.

Italian Taste is a large scale multidimensional and multidisciplinary study which involved data collection on 3300 individuals. The presentation aims at exploring the associations among a number of measures – biological, genetic, physiological, psychological and personality-related, sociocultural– describing the dimensions of food liking, preference, behaviour and choice, and their relevance in determining individual differences within a given food culture framework

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8. How nutrients, neuronal circuits, and gut bacteria shape nutritional decisions

CARLOS RIBEIRO

Champalimaud Center for the Unknown, Portugal

*Carlos Ribeiro is a principal investigator at Champalimaud Research in Lisbon, Portugal and a member of the FENS-Kavli network of excellence. His laboratory works at the interface of behavior, metabolism and physiology and studies how nutrients and internal states act at the level of neuronal and physiological systems to generate the correct nutritional decisions needed for the survival and reproduction of organisms. The powerful genetics of *Drosophila melanogaster*, allows them to manipulate circuits and molecular mechanisms, survey neuronal function using activity imaging, and query behavioral outcomes using novel automated, quantitative methods. These approaches are complemented with precise nutritional and microbial manipulations to reach an integrated understanding of nutrition. He has contributed to our understanding of how nutrients and reproductive states act at the level of neuronal circuits and molecular mechanisms to control nutrient selection. More recently he has become interested in understanding how specific gut microbes regulate food cravings.*

ABSTRACT

In preparation...



9. 'Gastrophysics' Meets 'The Mediterranean Diet'

CHARLES SPENCE

Head of the Crossmodal Research Laboratory, Oxford University

Professor Charles Spence is a world-famous experimental psychologist with a specialization in neuroscience-inspired multisensory design. He has worked with many of the world's largest companies across the globe since establishing the Crossmodal Research Laboratory (CRL) at the Department of Experimental Psychology, Oxford University in 1997. Prof. Spence has published over 800 articles and edited or authored, 10 academic volumes including, in 2014, the Prose prize-winning "The perfect meal", and the recent bestseller "Gastrophysics: The new science of eating" (2017; Penguin Viking). Much of Prof. Spence's work focuses on the design of enhanced multisensory food and drink experiences, through collaborations with chefs, baristas, mixologists, perfumiers, and the food and beverage, and flavour and fragrance industries. Prof. Spence has also worked extensively on the question of how technology will transform our dining experiences in the future.

ABSTRACT

In this talk, I want to take a look at some of the latest findings from the emerging science of gastrophysics (*gastronomy + psychophysics*). In contrast to the traditional sensory science or neurogastronomy approaches, gastrophysics primarily combines well-controlled laboratory-based research with large-scale online research, and real-world testing. Chefs and food and drinks companies are already starting to deliver products to market incorporating the latest insights from gastrophysics research. In this talk, I will take a look at the latest findings regarding the art and science of plating and packaging design. I will review the emerging science of 'sonic seasoning' – showing how one can accentuate specific sensory attributes in actual foods and drinks by the presentation of music/soundscapes designed around the latest crossmodal correspondences research. I will show the emerging art- and neuroscience-inspired approach to the design of food/beverage experiences is changing the dining landscape. While this first happens at high-end modernist dining establishments, there is now increasing uptake by global brands for delivery in the home environment, often mediated

by the latest in technology (think sensory apps). Ultimately, the hope is that some of these insights may also help address, in some small way, the various big issues around food facing society today. I will also consider how gastrophysics, the emerging new science of dining, links to 'the Mediterranean diet'.

Spence, C. (2017). *Gastrophysics: The new science of eating*. London, UK: Penguin.

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10. Communicating Food: Design in the Culinary Arts

RICARDO BONACHO

Estoril Higher Institute for Tourism and Hotel Studies

Ricardo Bonacho is an Assistant professor in Food Design at the Estoril Higher Institute for Tourism and Hotel Studies in MsC of Innovation in Culinary Arts, an Assistant Professor in Design Applied to Culinary Arts at the School of Tourism and Maritime Technology at the Higher Institute of Leiria, an Invited Professor at the University of Beira Interior and a researcher at CIAUD - Research Center for Architecture, Urbanism and Design of the Faculty of Architecture - University of Lisbon. His main research interests are the relationship between Design and Gastronomy and the possible contributions to the teaching of Design in Culinary Arts. He is the coordinator of Design and Communication of the academic and cultural meetings from the Receiving / Perceiving English Literature project, based at the School of Arts and Humanities - University of Lisbon. In 2015 he earned the title of Specialist in the Scientific Area of Audio Visual and Production Media, while working as a senior designer for national and international entities and developing his own projects on Design, Gastronomy and Communication.

ABSTRACT

In preparation...



11. Promoting the Mediterranean Diet: Importance of Marketing, Innovation and Consumer

MARIA RAQUEL LUCAS

University of Évora, Portugal

Maria Raquel is a professor of Management at the University of Évora, visiting professor at the Warsaw University and researcher at CEFAGE in the domains of food marketing, consumer behaviour, value chain and sustainability. She has extensive research in the area of management and marketing and has participated in diverse projects, including transnational studies with Latin America, Asia and Africa. She is a book editor and the author of several book chapters, papers in international refereed journals and other publications.

ABSTRACT

In preparation...



12. For the diversity of the Mediterranean Diet – the hidden role of the small family farmers

TERESA PINTO CORREIA & MARIA RIVERA MENDEZ

H2020 SALSA

Teresa Pinto Correia is full professor in the department of Landscape, Environment and Planning of the University of Évora and director of the Institute for Mediterranean Agrarian and Environmental Sciences of the same university. Her research interests include management of rural landscapes, assessment of policy instruments, analysis of the rural space processes and dynamics and farm systems and farm transition processes.

María is an environmental scientist specialized in sustainable development. She is currently working as a postdoctoral researcher at the University of Évora. She also works as a rural and livelihood specialist in Environmental and Social Impact Assessment projects for 5 Capitals. Most of her ESIA experience is in African countries. Teresa and María are developing SALSA, an Horizon2020 project aiming at providing a better understanding of the current and potential contribution of small farms and food businesses to sustainable food and nutrition security.

ABSTRACT

In preparation...



13. Mediterranean species: nutritional, bioactive and new ingredients development potential

ISABEL FERREIRA

Polytechnic Institute of Bragança

Full Professor at Polytechnic Institute of Bragança (Portugal) and Director of the Mountain Research Centre (CIMO). President of the Scientific Council of Natural and Environmental Sciences of the Portuguese Foundation for Science and Technology (FCT), Portugal and member of the Steering Committee "Strategic Basic Research" of Foundation Flanders (FWO). She is also the Coordinator of the National and Iberian Mountain Research Networks. She was awarded by different institutions such as Calouste Gulbenkian Foundation (2001), ISPROF (2013) for the achievements in helping the Portuguese Science to progress, COTNH (2014) for international cooperation, Women in Science (2016) by Ciência Viva and merit medal of Bragança (2017), and has supervised several post-doc, PhD and master students. She is associate editor of Food & Function (a journal of the Royal Society of Chemistry), principal investigator of several national and international financed research projects, and evaluator of international research projects (e.g., Eurostars, ERA-NET ARIMNet 2 and LEAP-Agri from EU and National Science Foundations of Austria, South Africa, Chile, Croatia, Denmark, Czech Republic, Poland, Switzerland, United Arab Emirates and Argentine), and national projects and post-doc and PhD grants from FCT. She is the editor of two international books and of the topical collection Bioactive Compounds in Molecules Journal, and has published several patents, 30 international book chapters and over 480 papers in refereed journals.

ABSTRACT

In preparation...



14. Valorisation of by-products and resources of the Mediterranean diet

MANUELA PINTADO

Católica University, Portugal

Manuela Pintado is a Professor of the College of Biotechnology of the Portuguese Catholic University since 2005. In 2017, she became director of the Chemistry and Biotechnology Center – State Associate Laboratory, as well as Associate Director of The College of Biotechnology of the Portuguese Catholic University. Her research interests include Biotechnology and Biochemistry, namely, in a range of key technologies for the production, characterization, and preservation of industrially/traditionally processed products.

ABSTRACT

In preparation...



15. The Mediterranean and the Roman Food Supply: grain, wine, olive oil and salted fish

SÓNIA BOMBICO

University of Évora, Portugal

Sónia Bombico, PhD in History and Archaeology, is currently researcher and responsible for the Science Communication at the Interdisciplinary Centre of History, Cultures and Societies – CIDEHUS/University of Évora. Her research is focused on roman maritime economy, navigation in Ancient Times, production and trade of food products and underwater cultural heritage. She finished her postgraduate studies in Mediterranean Maritime Archaeology at the University of Barcelona in 2008 and holds a Master's degree in Management and Valorisation of Historical and Cultural Heritage from the University of Évora. She is part of the UNESCO Chair team in Intangible Heritage and Traditional know-how linking Heritage and Executive Director of the UNIMED (Mediterranean Universities Union) Office at University of Évora.

ABSTRACT

The ancient Mediterranean diet relied on some essential products: cereals, vegetables, olive oil, wine and fish. The Romans practiced some food processing and preservation, such as salted fish and fish sauces.

Our knowledge of Roman food comes to us through ancient texts, wall-paintings and mosaics, the remains of the food itself from some archaeological sites, and from the containers that transported the food products.

It's precisely these indirect sources, the containers, that reveal to us the roman's food supply system. The production and distribution of grain and olive oil was under the direct control of the state which controlled its distribution to the army and to the city of Rome. On the other hand, wine was essential for the maintenance of the legions on the borders of the empire.

Wine, oil and fish products transported in amphorae were the basis of the Roman maritime trade. The roman shipwrecks are the testimonies of the navigation routes of the Mediterranean.

We will see beyond the Mediterranean diet, focusing on the production and distribution of these products whose evidence comes to us through archaeological vestiges. And we will know more about the production of salted fish, in which the Roman province of Lusitania played an essential role.

The Mediterranean diet was the basis of the roman economy, society and culture.

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Oral communications

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OC01. Local Production: A renewed approach in the region of Alentejo

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ABSTRACT

At the global level, there are increasingly more consumers seeking to know the origins of their food, looking for a more environmentally-friendly and at the same time healthier diet, based on the seasonality and freshness of the food products. In Portugal, the Mediterranean diet, based on the agri-food production in each region, along the seasons of the year, has been the diet of the majority of the population until recently. With the globalization of the agri-food sector and of lifestyles, this diet is changing.

In the Alentejo region, in the South of the country, production of fresh vegetables and fruits has been based mainly on small scale producers in the farm mosaic around towns and villages. Those tend to disappear as production units in the recent decades, as the small farm plots become attractive for residential use, both for locals and for urban dwellers. At the same time the construction of the Alqueva dam finished in 2002, water for irrigation has become widely available, in farmland until then only rain fed.

We have implemented a survey to family farms, aiming to assess the potential of horticultural production in the Évora region directly linked to the regional market, in short supply chains. We aimed to make a characterization of the sector and to assess market potentialities and constraints, at regional level.

It was found that in the region of Évora, there is an important territorial expression of fruit and vegetables, with the productive capacity installed and new people, with high education levels, more open to innovation and to new ways of production (organic), starting to farm. The main problems identified, transversal to all of them are: lack of organization in the sector, poor capacity to add value to local products with regional origin and lack of technical support.

KEYWORDS: Local production, Horticultural production, Short supply chains



OC02. Perceptions about the concept of Mediterranean Diet, its evolution and potential abuse: Perspectives of professionals from Algarve-Portugal

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ABSTRACT

Objectives: To understand the perception of various experts about the concept of Mediterranean Diet (MD), its evolution, its eventual abuse and perspectives to explore it.

Methodology: Thirteen semi-structured face-to-face interviews were conducted with selected representative personalities on the MD area from South of Portugal Region - Algarve. Interviews were audio-recorded, transcribed, thematically coded and analyzed.

Results: "Lifestyle" was the most important marker indicated in the definition of the MD's concept. Interviewees consider that the concept is very broad and includes health, food (food processing, conservation, commensality), anthropology, history, agriculture, fisheries, physical activity, culture (gastronomy, heritage, traditions, handicrafts), tourism (hospitality, catering), environment (sustainability), politics, economy.

The concept's evolution milestones identified were linked to a health model and the cultural model related to the distinction by UNESCO, focusing on the lifestyle.

Regarding to abusive use, it was mainly related to food industry, gastronomy and food advertising, motivated an excessive the commercial vision.

Concerning future exploration, it was suggested: education and communication of the concept; agronomy and sustainability; certification and regulation of MD concept's use; culture and tourism; and food, health and economic policies.

Conclusions: The perception of MD's concept was less focused on health and closer to the broad definition pointed by UNESCO. The interviewees also consider essential an evolution of the concept

linked to a cultural model. Food products and gastronomy were appointed to have potentially more abusive use of the concept. These conclusions may be used to a more effective way of preserving MD concept.

KEYWORDS: Mediterranean Diet, Concept, Evolution, Abuse

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OC03. As we eat, so shall we be? Socialization, well-being and food in the transition to adult life

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ABSTRACT

Practices around food are total social phenomena, the result of cultural experiences and producers of multiple meanings. This research aims to contribute to increase and deepen the existing knowledge around this theme. We are interested in understanding the experience of young adults, called "digital natives" and the aim of this particular presentation is to present the project and receive feedback.

These young people, born in the 90's of the twentieth century, have a strong influence of technology, which they use in various areas of daily life. On the one hand, the contexts of exit from the family of origin and transition to adult life have changed profoundly in the last decades; on the other, technology coexists with traditional socializing instances in the transmission of knowledge, values and meanings. The field of food is no exception, and it is therefore important to understand, in the context of the transition to adulthood, which discourses and practices are holding by young people.

After the consequences suffered by the previous generation due to the effects of malnutrition, with results such as obesity, metabolic syndrome and chronic diseases, "digital natives" are more demanding with gastronomic choices. The Mediterranean diet has regained the trust of this new generation, since it meets quality criteria and is a sustainable model. On the other hand, new technologies can contribute to spread the riches of this inherited food that supposes a way of life classified by UNESCO, in 2010, as Intangible Cultural Heritage of Humanity.

Methodologically, it is proposed the development of a qualitative, sociological investigation, operationalized through a mixed model that combines semi-structured, comprehensive interviewing technique with indirect observation. Subjects will be invited to make use of a technological application to record notes and images about their eating practices over a determined period of time. The content of the speech obtained through the interview and the practices observed through the food diary will be

the analysed by qualitative analysis of content using the QDAS. It is hoped that this study may serve to increase multidisciplinary scientific knowledge and debate about an anchor area.

KEYWORDS: Gastronomy, Family heritages, Transition to adulthood.

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OC04. Redesigning Food Experience

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ABSTRACT

This research aimed to develop a methodology that allows companies in the agro-food sector to evaluate the return on investment in design, because in general companies feel the advantages of design collaboration, but if they do not have the means to measure cost/benefit, it will be difficult to understand design as an investment that adds value.

In this sector because it has a huge influence on society, on the way food conditions the quality of life of the population and the impact that this has on the economy, but also on the fact that Portugal has sustainable resources of excellent quality. We began this research with a literature review by Design Council, European Union, which has supported programmes and studies to encourage the invest in design and focus as well on literature review about healthy eating habits and on Portuguese SMEs competitiveness. All this complemented with visits to fairs and conferences on this theme.

To work on this case study, we applied the Direct Observation method with mechanical support and Survey for data collection.

The **cards system** begins by definition of an action to improve eating habits, a project that should reflect the purpose of informing the society about the benefits of adopting a healthy diet within the recommendations of the Mediterranean Diet or focus on a subject where the food has a decisive role in preventing disease such as cancer, oral health, type 2 Diabetes, obesity and cardiovascular disease or alert to inequalities and social problems. The design investment assessment system – **card system** consist of a set of 24 cards, divided by 6 suits, where each card poses a question that implies a response and so on until the process is complete. A process of cause effect that allows to create a narrative that underlies what is believed and valued. The first four phases of the process imply a reflection on the aspiration (vision), how to make reality (mission) and the values (social responsibility) that sustain the activity: Project, Objectives, Targets and Initiatives. Phase 5 e composed of the Indicators to evaluate the performance and phase 6 by the Process Results.



OC05. Audio-visual to promote Mediterranean Diet and Health

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ABSTRACT

The MEDITA Project - "Mediterranean Diet Promotes Health" is funded by the European Regional Development Fund. This project has the collaboration of four partner organizations, including the Commission for Coordination and Regional Development of the Algarve, the Regional Health Administration of Algarve, IP, the University of Algarve and the Andalusian Health Service.

In the Algarve, this project is developed in all secondary schools in the region and one of the interventions is to increase the literacy of adolescent students, aged between 15 and 18 years, the role of the Mediterranean diet on health promotion. These activities involve the production of three short videos:

- The 10 principles of the Mediterranean Diet in Portugal;
- The Wheel of Mediterranean Food;
- Mediterranean diet, an aromatic resource to reduce salt.

These audiovisual materials will be a tool to visually promote healthy food habits and will be featured through several channels, from the social media to formal presentations in schools and workshops. Showcasing the famous Mediterranean ingredients as well as the related eating habits and routines in stunning images, will be more appealing not only to the eyes, but to all senses, and a powerful way for youngsters to be more aware of local food culture and their stories, as well as their advantages for the present and in the future.

In our presentation, we would like to show a teaser of the three videos along with the project concept.

KEYWORDS: Mediterranean Diet, Health, Literacy, Videos, Algarve



OC06. Sensory characterization and evaluation of sweet miso-like fermented grass pea products: construction of a preference mapping

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ABSTRACT

Grass pea (*Lathyrus sativus* L.) is a robust grain legume with high nutritional value. In Portugal it is a part of the traditional heritage of dryland communities, representing an important source of revenue for some local economies.

However, as a result of minimal breeding efforts, grass pea's potential has been underexploited and is presently endangered. There has been a great reduction in consumption over the years. This is a result of a lack of innovation of its food products, the emergence of a new consumer and consumption habits, finding current grass pea based foods unappealing.

The aim of this study was to trace a preference mapping of samples of miso-like fermented grass pea products and soy-based products, using Flash Profile correlated with an overall liking evaluation. ~

The sensory profile and consumer perception of five different miso-like samples were assessed (one grass pea-based sample, two soy-based samples, three rice and soy-based samples), using, Flash Profile, performed by 16 semi-trained judges, complemented with the evaluation of overall liking, over a 9-point scale by a panel of 60 naive judges.

Results show a pronounced preference for the grass pea-based sample and its similar soy-based samples. The Flash Profile revealed that these samples are characterized by their brown colour, saltiness, oily and fatty properties, sweet, soy and meat-like taste, by the balance between the sweetness and saltiness, and taste of oriental spices.

Plotting both results on a preference map, one can conclude that the preference tends towards the grass pea-based miso (innovation product) and soy-based miso (homemade and market reference),

meaning that consumers of this product category are looking for the abovementioned characteristics, and that perceive the grass pea-based miso as similar to the soy based miso.

KEYWORDS: Sweet miso, Sensory Analysis, Liking, Grass pea, Preference mapping

Acknowledgments: This work was supported by national funds from Fundação para a Ciência e a Tecnologia through the research project QuaLaty - PTDC/AGR-TEC/0992/2014 and UID/AGR/04129/2013 (LEAF). Maria Carlota Vaz Patto was supported by Fundação para a Ciência e a Tecnologia (FCT Investigator 2015 contract IF/01337/2014). Author C. Rocha acknowledges Industry Doctoral Grant No. SFRH/BDE/100483/2014, funded by the Portuguese Foundation for Science and Technology (FCT) and Sense Test



OC07. Promoting home cooking as an integral part of the Mediterranean diet: results of the PRIMEMEAL project

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ABSTRACT

Beyond the type and quantity of foods consumed, distinct culinary and social eating habits are a hallmark of the Mediterranean diet with important effects on health. Particularly, the preparation and consumption of home cooked meals is associated to greater nutrition resilience, better diet quality, lower prevalence of overweight and obesity, improved health status and a wide range of psychosocial benefits in varied socio-demographic groups.

[PRIMEMEAL](#) is an FCT-funded project applying consumer psychology knowledge in the promotion of healthier meal choices, with the ultimate goal of supporting the design of social marketing messages and public policy that successfully stimulate healthy eating and help fight obesity. Among others, it studied the motivational processes behind the self-regulation of home cooking with the aim of stimulating this behavior among European adults. To this end, one country-level survey, three laboratory and two online experiments involving 1235 participants were conducted to test the effects of differently framed messages about the benefits of home cooking on behavioral change and food demand.

Results show that providing benefit information effectively changes beliefs about home cooking and raises current and intended frequency of preparing meals at home. Importantly, it also increases demand for organic fruits and vegetables, whole grain foods and cooking classes. This process is mediated by changes in perceived self-discrepancy and the consequent activation of personal norms, which in turn act as a cognitive and an emotional trigger for behavioral self-regulation. Important moderating effects of chronic norms, health goals and self-control traits were equally identified.

KEYWORDS: Mediterranean Diet, Home Cooking, Behavioral Change, Message Framing, Personal Norms



OC08. Study about the use of edible flowers for gastronomic purposes in Portugal

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ABSTRACT

Presently there is a growing interest in the use of edible flowers for gastronomic purposes, and hence, this study was carried out to verify to what extent some factors like sociodemographic characteristics, studies or social factors influenced the knowledge and consuming habits related to edible flowers. A questionnaire survey was undertaken in a sample of 247 Portuguese adults. The results showed that edible flowers were familiar for the majority of the participants who were aware of some aspects related to their consumption, although edible flowers are consumed only sporadically. The forms of utilization include cooking or incorporation into salads, and their taste is their most valued characteristic. The results further showed that gender as well as the area of work or studies influenced somehow the participants' level of knowledge and consuming habits in relation to edible flowers. However, the risks associated to the consumption of edible flowers still pose some challenges, because an important number of participants still lack knowledge about this.

KEYWORDS: Edible flowers, Food security, Gourmet kitchen, Knowledge, Questionnaire survey



OCog. Alentejo Eating Habits vs Mediterranean Diet

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The Alentejo is full of traditions and traditional Alentejo cuisine is an art. For many centuries, recipes have been imagined, created, and made available over the course of generations. Alentejo gastronomy is a gastronomy linked to the earth, having today a series of products of recognized excellence and that serves as base to some of our most consecrated dishes.

The use of olive oil, bread, wine, fish and pork as well as the use of aromatic herbs and spices are such a rooted matrix that, over the years, these flavors are still felt in game recipes, in the "pot kitchen" and in the river or sea fish broths.

Although we do not have the Mediterranean as the sea, our gastronomic culture is very similar to the Mediterranean diet. The climate, the soils and the products that we cultivate give us the possibility of being able to say that the Mediterranean Diet is present in the Alentejo gastronomy.

Today we begin to learn to recover these flavors, to choose the seasoning according to the food, to use the raw olive oil in the soups and the "migas[CV1]". Other times olive oil was also used to preserve sausages, cheeses and nuts, thus giving rise to an oil flavored with new tastes and flavors and that in our days is used for commercial purposes.

The practice of healthy eating is indicated for all who value health. It is a fundamental pillar in the prevention, control of some pathologies, such as obesity, type 2 diabetes, among others. Eating healthy is not only diversifying the method of confection, but also respecting the region's gastronomic traditions and other physical and social characteristics of the population.



OC10. Acceptance of exotic beverages with health benefits in Europe: a cross-country comparison of hibiscus products

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ABSTRACT

Hibiscus beverages are rich in organic acids, phenolic compounds and polysaccharides, which have been demonstrated to be linked to important health benefits. Their consumption is widespread in Africa and tropical and subtropical Asia and North-America, but they are still quite unknown amongst European consumers. Recently, due to the rising number of health-conscious consumers, along with the growing consumer's interest of Europeans in beverages made from unique or exotic ingredients, new mainstream market opportunities for high quality hibiscus beverages have been created.

This study sought to compare acceptance and perception of hibiscus beverages by familiar African consumers and mostly unfamiliar consumers in Europe (France, Portugal). Closer patterns of liking and product perception of hibiscus beverages were observed among consumers in European countries than in Africa. Liking of hibiscus beverages appeared to mostly depend on familiarity, exposure and innate or cultural acquired preferences. African consumers favored higher intensities of red color and sweetness whereas in Europe fruity and floral character constituted important drivers of liking. Consumer segments were found, with differences rooted on individual reactions to the color and flavor of beverages, socio-demographic characteristics and consumption patterns of hibiscus and red fruit beverages (in Europe) being uncovered. Findings suggest that exotic hibiscus beverages might be more likely to be consumed in new markets if they share some similar attributes to existing products. Consumer profiling techniques were used to establish sensory profiles and preference maps. Additionally, the chemical composition of the drinks was evaluated and a conjoint analysis was held to determine how consumers valued the composition and African origin of the drinks.

KEY WORDS: Sensory, Hibiscus, Consumer preference, Conjoint analysis, Exotic beverages



OC11. EATMOT Project: Eating motivations in different parts of the world, and particularly in countries from the Mediterranean Area

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ABSTRACT

The EATMOT Project is a multinational study about different eating motivations, and that is being carried out in 18 countries. The project addresses several types of factors that are related to food choice and consumption patterns, and that may in some extent condition the eating motivations, namely health related factors; economic and availability aspects; emotional determinants; social, cultural and religious influences; marketing and advertising campaigns and finally environmental concerns.

The study is based on a questionnaire that was prepared purposely for the project, and therefore adequate to evaluate the aspects that determine the objectives highlighted. The study is coordinated by Portugal and involves a team of about 70 researchers from 16 countries, distributed as follows: Argentina, Brazil and United States in the American continent; Egypt in African continent; and the remaining countries in Europe: Croatia, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Serbia, Slovenia and Romania.

The collected results surpass 12 thousand cases and allow, among many other studies, characterizing the eating motivations in different parts of the world, including the Mediterranean surrounding countries or countries which are typically linked to the Mediterranean diet, specifically: Croatia, Egypt, Italy, Greece or Portugal.

KEYWORDS: Psychology of eating, Questionnaire survey, Healthy diet, Traditional food.



OC12. The impact of the organic and gluten free claims on food perception

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ABSTRACT

Nowadays, in addition to objective nutritional data, food packages often include a myriad of information such as claims regarding how and where that food was produced (e.g., “organic”) as well as claims about the presence/absence of specific substances (e.g., “gluten free”). Based on these claims, consumers often infer food attributes that are not necessarily supported by the claim. This work presents findings from a set of experiments that examine how the organic and the gluten free claim influence the perceived healthfulness, caloric content and expected taste of a variety of food products. Overall, we found that the advantage of the organic claim such that organically produced foods were perceived as more healthful, tastier and less caloric than those produced conventionally. These effects were stronger for whole foods (e.g., fruits and vegetables) than for processed foods (e.g., meals, desserts). Likewise, we found that products (e.g., bread, rice) identified with a gluten free claim are perceived as more healthful and less caloric, although no main effect emerged for expected taste.

Altogether, our findings show that both organic and gluten free claims constitute a potential source of bias, modulating how consumers perceive food and thus may hinder the choice of healthier options.

OC13. Knowledge about the benefits associated with the ingestion of dietary fibre: Comparison between Mediterranean and Non-Mediterranean Countries

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ABSTRACT

It is well known that dietary fibre (DF) is recognized as very important to maintain health and prevent some chronic diseases. Therefore, the objective of the present study was to evaluate the level of knowledge about the effect for the human body derived from ingesting DF. For that purpose, a descriptive cross-sectional study was carried out on a sample of 6010 participants, from 10 countries. The results obtained were compiled into a variable that accounted for the general level of knowledge, and this showed that globally the level of information about the benefits of DF was acceptable (average score of 3.54 ± 0.5 , on a scale from 1 to 5). Some of the variables considered for the study were gender, level of education, living environment and country, for which significant differences were found between groups. The highest level of knowledge was found for women, with university degree, from Portugal and living in urban areas. As a conclusion, it was possible to see that, in general, the participants in the study were quite well informed about the benefits of DF for the improvement of human health.

KEYWORDS: Dietary fibre, Health effect, Cardiovascular disease, Diabetes, Obesity, Survey



OC14. Using by-products and non-valuable natural products as flour source to produce gluten free bread

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ABSTRACT

Nowadays the importance of using waste, by-products and wild products that haven't been used or valued in the last decades, is really important once food resources are a well known problem all over the World, that FAO had been alerting in different studies. Besides that, a perspective of Circular Economy is also an important future solution for some of the resources scarcity. In addition, is important to highlight the growing concerns with Environment and pollution, in the last years, and specifically EU rules about effluents and waste treatment, where the valorisation of by-products can be one of the answers for part of the problem and also a way of adding value to the production chain. In the other hand, introducing innovative food in the market is difficult and expensive, once requires a huge investment in marketing and also consumer's habit changes, so is really important to study characteristics and benefits of the new product and how to use it, to convince consumer.

In the last few years Gluten Free (GF) products have increased its consume not only for Celiac Disease, but also as a new tendency of the market. Consequently, GF ingredients are improving its performance in the market, what facilitate the introduction of new GF flours.

Considering traditional Portuguese products and also two of the most important AgroIndustries in our country, we have decided to use by-products from wine and olive oil production. In addition, we also have chosen original raw materials from Portugal that are under-exploited. This way, the flours to be studied in the resent work are: grape stem, olive bone, acorn, apple (Portuguese variety) and nettle (wild herb), and it will be performed the following analysis for each flour: nutritional profile, health benefits (bioactive compounds), capacity to bake bread - food technological and sensorial/organoleptic limits, rheological behaviour of the dough, nutritional analysis of bread obtained with different GF flours and assessment about each flour as a potential GF ingredient.



Posters

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Po1. The role of taste sensitivity and lifestyle in food preferences in Portuguese primary school children

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ABSTRACT

Food palatability, preferences and choices are influenced by oral food perception. The association between sensitivity for the bitter compound 6-n-propyl-thiouracil (PROP) and food acceptance has been reported by different authors. Besides oral perception, food choices are also influenced by economic, social and psychological factors.

In this work we aim to evaluate the relationship between sweet and bitter tastes sensitivity and the preference for different foods in children. Furthermore, the possible influence of factors such as socioeconomic situation and food related habits in food preferences and obesity development has been evaluated.

Caucasian children, with 8-9 years old, were volunteers in a study comprehending anthropometric parameters, bitter and sweet taste sensitivity evaluation and evaluation of lifestyle parameters and food preferences.

In this work it was observed that overweight children have lower preferences for several of the vegetables analysed and a higher preference for dairy products compared to normalweight children. Moreover, girls sensitive to sweet taste presented higher levels of preference to bitter vegetables and lower levels of preferences for dairy products, compared to not sensitive girls, suggesting that the bitter taste is not directly related to the preference for vegetables, being the ones mainly influenced by the sweet taste. The influence of socioeconomic factors on the development of obesity was also observed

in this study, with a higher percentage of overweight children associated with a lower social position. Behaviours related to eating habits are also a factor in the development of childhood obesity.

KEYWORDS: Taste sensitivity, Food preferences, Obesity development



P02. Health nudge-based interventions in a retail setting: Evidences from a field experiment

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ABSTRACT

Despite widespread healthy eating campaigns, obesity levels remain high in developed countries, highlighting the need for better and more efficient public health interventions. Implicit methods seem to produce higher changes in consumer behavior, and nudge-based interventions are especially addressed as a promising tool to increase the campaigns efficiency (Thaler, 2008). However, although this type of interventions tend to produce good short-term results, it is still unclear how they impact unhealth product purchases (Tal, 2015; Wilcox, 2009). In addition, the literature is still sparse regarding the best implementation design, particularly for a prolonged effect after stimuli removing (Allcott, 2014; Sunstein, 2017).

Our research will respond to these questions by using a large-scale (randomized) field experiment in a retail setting. We partner with a Portuguese retailer to implement two, already validated, health nudge-based interventions (both focused on shopping carts alterations) (Wansink, 2017; Allcott, 2010). By comparing treated and control stores we will be able to observe the causal impact of both interventions, in the short and in the long-run (i.e, a few weeks after), in the overall purchase quantity and value spent in targeted healthy products. Moreover, we will also be able to evaluate heterogeneous effects on different consumer-segments by using detailed historical client-cards information.

We believe that our contribution will help to optimize implementation methodologies as well as to identify targeted buying behavior patterns with the final aim of improving health food consumption.

KEYWORDS: Food, Retail, Nudge, Consumer-behavior



P03. Sea lamprey (*Petromyzon marinus* L.), a delicacy in several Mediterranean countries: unlocked the chemical composition benefits behind the success of the high gastronomic impact and traditional usage

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ABSTRACT

Sea lamprey is considered a delicacy and intensively captured during spawning migration being its fishery an important source of income for inland commercial fishermen in Mediterranean countries (Portugal, Spain) and France, providing hundreds of thousands of sea lamprey to restaurants every year. Consumption of fish as an integral part of the Mediterranean diet is crucial because seafood it is a particularly important source of high-quality protein, whilst being high in vitamins and minerals, low in saturated fat and cholesterol and the best global source of ω_3 longchain poly-unsaturated fatty acids particularly eicosapentaenoic acid and docosahexaenoic acid (EPA and DHA). These fatty acids are derived mainly from diet because humans have a limited capacity to synthesize them. This work characterizes for the first time its nutritional profile, providing the fatty acid profile (omega-3, omega-6 and omega-9 families), protein, total cholesterol, gross energy contents and lipid healthy indexes obtained from 30 sea lampreys captured during early spawning migration in Guadiana (Mediterranean region) and Mondego river basins, Portugal. The results revealed that the muscle of sea lamprey presents a high lipid content (50,7g/100g, dry weight), a high gross energy (684,5Kcal/100 g, dry weight), a low total cholesterol (0.056g/100 g, dry weight) and a very high ω_3/ω_6 ratio (11,2).

KEYWORDS: Sea lamprey, Nutritional profile, Healthy lipid indexes



Po4. Comparison between semi-intensively and intensively grown beef

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ABSTRACT

Extensive production system of beef is sought for improved animal welfare but there are environmental sustainability issues^{1,2}. This work was developed in the framework of a project aiming to create a decision support service for integrated sustainability management in extensive livestock production. The goal of this work was to chemically characterize beef from extensive, semi-intensive and intensive systems to identify nutritional differences between production systems. A total of more than twenty samples of meat, from both production systems, were collected from controlled producers through a retailer that guarantees traceability of the samples. Analysis to total fat content, fatty acids profile, cholesterol and α -tocopherol content have shown that there are variability along the year in meat from the same producer as expected. Comparing means, semi-intensive meat have higher amount of PUFA (polyunsaturated fatty acids) in percentage of total fatty acids, and equal amount of SFA (saturated fatty acids) than intensive meat. However, semi-intensive meat have lower amount of total fat. α -tocopherol content varies as well along the year for both production systems, with intensive meat presenting a tendency to have higher values in average, although this difference is not significant. Cholesterol is the component with less variation along the year as well as between samples with values around 300 $\mu\text{g/g}$ of fresh meat for both production systems. Thus, apparently besides the fat content and profile there are no significant nutritional differences between production systems, although it is necessary to increase the number of samples to achieve a more constant quality level for each type of system.

KEYWORDS: Meat production systems, Beef quality, Portuguese beef

Acknowledgments: The authors would like to thank to Clube de Produtores Continente – SONAE for actively participate in this work, being the retailer supplying the meat.

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P05. The use of acorns in Portugal – lessons from the past

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ABSTRACT

The holm oak montado has suffered a reduction in its area of distribution, over time, related to changes in land use but also with a growing disinterest in the use of acorns for both human and domestic animals. Unlike the cork-wooded areas whose cork alone justifies a large investment in the montado, the territories through which the holm oak expands find, as an exclusive way for their valorization, the livestock, with the use of the acorn and that of the natural pastures. However, it is not clear that the acorn plays a significant role in this cattle use and many of the farms have been specializing in the exclusive use of pasture.

There were times when the holm oak was highly valued both by its owners and by residents in the neighboring areas due to the firewood produced by them, but mainly due to acorn production. Both in later periods and in more recent times the acorn has been used by man. It is this description of older and newer uses of the acorn, ways of picking, preserving, and cooking, that will be addressed in this paper.



Po6. Cherry storage using Chitosan edible coatings and essential oils

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ABSTRACT

To maintain fruit quality during post-harvest period is a constant goal of the producers. It is necessary to prevent fruit decay and fungus pathology, inducing minimum changes and maintaining the organoleptic characteristics of cherries. The constant search for new technologies that responded to these objectives gave relief for the use of edible coatings based on Chitosan. This polysaccharide, obtained from the deacetylation of chitin, has shown a promising preservation capacity, with satisfactory results in fungal control and maintenance of sensory and nutritional quality during the post-harvest period. On the other hand, the use of Essential Oils (EOs) obtained from aromatic plants is recognized nowadays as an effective tool to control fungus.

The present study was carried out to evaluate the conservation effect of Chitosan based edible coatings and Essential Oils on cherry. During this trial cherries were evaluated for 21 days. The analyzed parameters were weight loss, total soluble solids, color, texture, acidity and a sensory analysis was performed. Based on the results obtained, it is noteworthy that the Chitosan based coatings had a noticeable positive effect in terms of fungus control; the control samples were always worst in terms of fungus presence than all the other samples with chitosan, independently of the modality of the edible coating. Also, the cherries from the control group showed a deeper decay, considering color and texture, and that was observed in control samples before it happened in the other modalities.

KEYWORDS: Quality, Shelf-life, Fungus, Decay.

Acknowledgments: This research was partially supported by National Funds through the FCT – Fundação para a Ciência e Tecnologia, project UID/AGR/00115/2013.



P07. Cold storage of table grapes 'Sugraone'

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ABSTRACT

The consumption of fresh grapes, as well as their use in wine production, played an important role in feeding the populations of the Mediterranean basin from ancient Egypt until the present days. Table grapes are thus indispensable commodity in the Mediterranean diet, thanks to their sensory and nutritional characteristics, mainly by their richness in phenolic compounds that have a great antioxidant capacity.

The grapes are non-climacteric fruits, and their shelf life under natural conditions is very limited, so the adequate ripe stage at harvest is very important to reach the best sensory, nutritional and functional properties. To extend shelf-life, cold storage chambers (0 °C to 2 °C and 90% RH) are often used and also chemical treatments that prevent the arising of microorganisms that may contaminate the fruits.

The objective of the present trial is to observe the influence of the maturity stage on the shelf life of seedless table grapes of the variety Sugraone, harvested at two different maturity stages and stored in a cold room at a temperature of 2 ± 1 °C and 95% of relative humidity. The main conclusion is that these conditions allow the maintenance of the berries of these table grapes during for 21 days with good quality, concerning Soluble Solids Content, Titratable Acidity, Maturity index and texture. However, raquis belonging to different maturity stages bunches behave differently.

KEYWORDS: Ripeness stage, Decay, Shelf-life

Acknowledgments: This work integrates the Project “Criação de um Núcleo de I&D para a geração de novo conhecimento relacionado com a uva de mesa sem grainha Vale da Rosa”, Portugal 2020. This research was partially supported by National Funds through the FCT – Fundação para a Ciência e Tecnologia, project UID/AGR/00115/2013.

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Po8. Evolution of 'Jonathan' apples during cold storage

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ABSTRACT

Apples (*Malus domestica*) are very popular fruits available through all the year due to their ability to cold storage during long periods without losing their nutritional value. The apple is a climacteric fruit, i.e. its respiratory activity increases during ripening coinciding with their organoleptic maturation. These fruits can be stored at a temperature of -1 °C to 4 °C, relative humidity of 90 to 95%, for 4 to 32 weeks, with differences caused by variety, place of production, date of harvest, ripe stage and other conservation conditions. The use of simple methods of cold storage, allows the consumption of these fruits during long periods of time and in larger areas.

Apples of the cultivar Jonathan were randomly harvested at commercial ripeness in "Região Oeste", in September, and cold stored until November. The objective of this work was to study the evolution of the fruits along the time of conservation in normal atmosphere chamber at 2° C and R.H. 90%. The main conclusions are: 1) conservation under these conditions is possible up to 45 days with typical characteristics of consumption; 2) the texture clearly expresses the changes occurred during cold storage; 3) the smaller fruits presented greater firmness of the pulp, due to a high percentage of their volume occupied with materials of the cell wall.

KEYWORDS: Shelf-life, Texture, Consumption

Acknowledgments: This research was partially supported by National Funds through the FCT – Fundação para a Ciência e Tecnologia, project UID/AGR/00115/2013.



Pog. Quality evaluation of Strawberry using NIR

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ABSTRACT

Ripe strawberries are extremely perishable. Strawberries are considered ripe when a bright red colour covers all the surface of the fruit. Fully ripe fruits are sweeter and more aromatic. Strawberries behave as non-climacteric fruits as they don't achieve their potential best quality if they are picked before their final ripe stage. Usually the techniques used to define maturity stage and quality of strawberries at harvest are subjective, eg color, or destructive, eg. Soluble Solids Content (SSC). It should be very useful for producers, stakeholders and consumers to dispose of a technique to evaluate maturity on a fast, accurate and non-destructive way.

Near-infrared spectroscopy (NIRS) is nowadays considered as a fast and reliable non-destructive technique that has been often used with success for the analysis of fruits, such as strawberries, and many other food products. This work intends to study the feasibility of NIR as a method to evaluate the most important characteristics of strawberry quality and ripening stage.

Strawberries var. Sabrina were harvested in the Alentejo region at "Sudoberry". The acquisition of NIR spectra and in addition, their SSC (°Brix) and colour (Chroma C*) were determined. The obtained data were analyzed with the Unscrambler software in order to find a model capable of predicting the content of soluble solids and colour. The correlation coefficients (r) for predicting were respectively 92.7 and 97.3.

KEYWORDS: Colour, SSC, Spectrophotometry.

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P10. Texture evaluation of two Cachena bovine muscles during storage

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ABSTRACT

Texture is a primary attribute determinant of meat quality and strongly influencing consumer acceptance. One of the instrumental tests for evaluating the most important meat texture parameters is the Texture Profile Analysis (TPA) that allows to understand the relation of physical/rheological properties with a dynamic perception of texture by consumers. The TPA mimics the mastication process and is commonly used in meat evaluation.

Cachena is one of the cattle breeds, part of the Portuguese genetic heritage, with high interest for the region of south Alentejo due to high rusticity of these animals. Animals are small and the meat is known by its excellent characteristics of texture and flavour.

The purpose of this research was to evaluate the texture of two bovine muscles, *Longissimus dorsi* (LD) and *Psoas major* (PM), at two and eight days *post-mortem*. The results obtained through the performance of TPA test, and the study of some of the parameters lead us to conclude that there are no differences in texture changes between the two muscles during the storing. Considering instrumental parameters, PM muscle meat is tender, less elastic and has different chewing values when compared to the LD muscle. This statement is not accordance with the previous results of sensory evaluations (data not shown).

KEYWORDS: *Longissimus dorsi*, *Psoas major*, TPA, tenderness.

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P11. Aqueous extracts of *Origanum vulgare* and *Thymus* spp. from Alentejo: Anti-inflammatory and Antioxidant Screening

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ABSTRACT

Mediterranean diet, intangible cultural heritage of Humanity, is a fundamental pillar for sustainable development of populations. Alentejo is rich in indigenous aromatic plants in Montado cork oak forests, many of them used in traditional Medicine as well as food flavours in Mediterranean diet. Moreover, medicinal, aromatic and flavouring plants (MAPs) and their extracts are rich in phenolic compounds and play an important role in prevention of pathologies related with oxidative stress, such as neurodegenerative, cardiovascular and cancer diseases.

For this study, three autochthonous flavouring herbs from *Lamiaceae* family, widely distributed throughout Iberian Peninsula and used in Mediterranean cuisine, have been selected: *Origanum vulgare* L., *Thymus capitellatus* Hoffmanns & Linkand and *Thymus mastichina* L.

Freeze-drying decoction water extracts were prepared to evaluate their chemical composition, antioxidant and anti-inflammatory potential. These proprieties were evaluated by several mechanisms including DPPH radical, reducing power and β -carotene/linoleic acid methods, as well as the ability to inhibit catalase activity in hepatic homogenates and to inhibit lipoxygenase activity.

Aqueous extracts presented high contents of phenolic and flavonoid compounds. They exhibited high antioxidant proprieties, with ability to act as radical scavengers, ferric reducing agents as well as protectors of lipid substrates and inhibit catalase activity. Moreover, extracts showed anti-inflammatory potential, able to inhibit LOX activity. Results of *Artemia salina* lethality assay point out their very low toxicity.

Results highlight the potential of these aqueous extracts in the prevention of oxidative stress, suggesting their use in food industry.

KEYWORDS: antioxidant, anti-inflammatory, *Origanum vulgare*, *Thymus capitellatus*, *Thymus mastichina*

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P12. Phenolic characterization and antioxidant assessment of *Vitis vinifera* L. grapes produced in Alentejo

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ABSTRACT

Wine is part of the Mediterranean diet and it's also known by its benefits in human health when consumed with moderation due to the presence of some phytonutrients. During ripening process, red wine grapes naturally develop these compounds, namely polyphenols, which evidence the organoleptic properties. In this study, varieties commonly produced in Alentejo (Syrah, Tempranillo, Touriga Nacional and Trincadeira) were selected to evaluate the evolution of the phenolic content and the evolution of antioxidant activity during vérasion. Total phenolic compounds content¹ and total flavonoids¹ were evaluated by UV/Vis spectroscopy. Anthocyanins content was determined by HPLC-DAD². Antioxidant activity of grape extracts was quantified using DPPH³ method, total reducing power³ and β -carotene/linoleic acid system³.

During ripening, the varieties presented an increasing of phenolic content, flavonoids and anthocyanins, except Tempranillo. Monoglucoside-anthocyanins have a higher content in grapes during all maturation process and Malvidin-3-*O*-glucoside is the most prevalent anthocyanin. Grape extracts from the harvest date presented a high radical scavenging capacity (DPPH radical method) and the ability to protect against lipid peroxidation (linoleic acid / β -carotene system). Besides, grape extracts also presented the ability to protect heme iron (reducing power assay).

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P13. Regional olive oil food systems from a small producer's perspective: similarities and differences in 4 Mediterranean regions – Castellón (Spain), Lucca (Italy), Ileia (Greece) and Central Alentejo (Portugal)

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ABSTRACT

Food system analysis is gaining importance within the EU, mainly regarding issues related to food and nutrition security. Food systems comprise their own properties and outcomes, which are influenced by the intrinsic relational configurations developed among each system's actors. Small farms contribute in shaping such dynamics and are engaged in food systems through significant market and extra-market relations. It is generally acknowledged that small farms contribute to food production, conservation and protection of natural resources and landscapes and to diversifying rural economies. However, the role of small farms is being stymied by unaccommodating agricultural support policies under a productivist paradigm, which has been supporting and enhancing large-scale farming and intensive food production.

Therefore, this study aims at examining the contribution of olive oil-producing small farms (OSFs) through a comparative analysis in 4 Mediterranean regions: Castellón (Spain), Lucca (Italy), Ileia (Greece) and Central Alentejo (Portugal). The four regions are highly differentiated in terms of olive farming systems, quality of the olive oil, scale of operations, as well as interlinkages between food systems actors. Olive oil systems in the four regions are mainly export oriented, with an high inter- and intra-regional diversity. OSFs are related to multiple food systems (domestic, local, regional, agri-industrial, differentiated quality). OSFs present a high degree of self-provision in quality olive oil, accompanied with extended non-market exchanges, as well as own networks of customers, in the context of on-farm diversification strategies, or inter-personal relationships.



P14. Extracts from two Mediterranean wild edible plants, *Helichrysum picardii* Franco and *Calamintha nepeta* (L.) Savi subsp. *nepeta*, as a source of natural antioxidants

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ABSTRACT

Wild edible plants have represented an important food source for the communities of the Mediterranean basin, providing a relevant role in Mediterranean diet. The habit of eating spontaneous plants is increasing nowadays because they are considered a healthy way of diversifying and enriching the modern diet with distinct colours and flavours. Furthermore, some wild edible plants have been recently considered as interesting functional foods since they provide health benefits. The aim of this study was to investigate the total phenolic contents (TPCs) and antioxidant activity of aqueous extracts (infusions and decoctions) from *Helichrysum picardii* Franco and *Calamintha nepeta* (L.) Savi subsp. *nepeta*, two wild Mediterranean plants used as condiment, and evaluate their potential for yogurts fortification. Total phenolic contents (TPC) were determined by Folin-Ciocalteu assay, and the antioxidant activity by the ABTS and FRAP assays. The infusion from *H. italicum* showed higher TPC and antioxidant activity than the decoction, while no significant differences were observed between extracts in the case of *C. nepeta*. Infusions from both species improve the antioxidant activity of homemade yogurts being the activity stable for a week. Our findings suggest the studied extracts as a rich source of natural antioxidants and a good alternative to improve the functional properties of food products.

KEYWORDS: Antioxidants, Food products, Phenolics, Wild plants



P15. Variability in consumption and knowledge about edible flowers according to country

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ABSTRACT

Food habits are deeply linked to tradition and therefore it is expected that country of living might influence the dietary patterns. Hence, the purpose of the present study was to compare the habits and knowledge related to the utilization of edible flowers (EF) in gastronomy among different countries, namely Brazil (in South America), Portugal (in the Iberian Peninsula) and Slovenia (in South Europe). For this, a questionnaire survey was applied to a sample of 559 participants, residing in the three countries listed above. The results showed that there were some significant differences in the form of consumption, as well as the types of EF consumed, with Slovenian participants consuming more frequently camomile, sunflower, marigold, pumpkin flower and rose. Regarding the reasons for eating EF, the Portuguese participants consider taste while those from Slovenia value more the decoration ability and the participants from Brazil value equally decoration and novelty. While in Portugal most of the participants eat EF cooked, in Slovenia and Brazil the trend is more towards eating them fresh. Regarding the risks associated to their consumption, the participants from Slovenia are those more aware of the risks, followed by Portugal and finally Brazil, where the participants are not conscientious of the possible problems that can derive from the ingestion of EF.

KEYWORDS: Edible flowers, Food security, Gourmet gastronomy, Questionnaire survey



P16. Sterol and fatty acid profile in negrinha and santulhana varietal olive oils from Trás-os-Montes region

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ABSTRACT

Olive oil is highly appreciated by consumers for both organoleptic (e.g. taste/flavour) and technological properties (i.e. cooking). Furthermore, several studies have reported that this product promotes human health through anti-inflammatory, antiarrhythmic and vasodilatory effects [1]. Two sets of lipids are associated to such effects: phytoesters [2] and oleic acid [3]. On the other hand, studies carried out in humans have concluded that polyphenols from extra virgin olive oil can reduce inflammatory biomarkers related to atherosclerosis [4].

The Portuguese region of Trás-os-Montes is the second most important producer (170472 hL in 2017) in this country. However, sterol and fatty acid composition of these olive oils have not been fully characterized already. Such studies would help increase the value of these olive oils and identify those with potentially beneficial cardiovascular effects.

Accordingly, Negrinha or Santulhana monovarietal olive oils were collected in duplicate, directly from various local olive mills. Sterols were analyzed as TMS derivatives [5] while fatty acids from esterified and free fractions were as FAME according to Pimentel et al. [6].

Total sterol content in Negrinha samples ranged from 13.79 µg/mg to 15.15 µg/mg while in Santulhana, concentration was 14.31-17.81 µg/mg. As expected, in this moiety, the main compound was β -sitosterol. Regarding fatty acids, oleic acid was the main compound in both free (57.73-109.78 µg/mg Negrinha olive oil and 44.36-79.22 µg/mg Santulhana olive oil) and esterified fractions (748.54-829.80 µg/mg and 684.38-742.26 µg/mg respectively). The results revealed a healthy lipid profile but influenced by variety and mill.

KEYWORDS: Olive oil, Fatty acids, Sterols, Trás-os-Montes region, Valorization

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P17. Chemical and microbiological stability of the low caliber apple slices prepared by osmotic dehydration

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ABSTRACT

Osmotic dehydration has received greater attention in recent years as an effective method for fruits and vegetables preservation. Process for preparation of Royal Gala apple slices using osmotic dehydration was standardized. The study was carried out with selected apples of smaller caliber, produced in the Alcobça region.

For this study apples were selected by their degree of maturation and absence of mechanical damages. Fully apple fruits were peeled and slices of 4 mm thickness were prepared. The apple slices were immersed in a sucrose solution (50% w/w) and in sucrose/sodium chloride solutions with NaCl concentrations (1% and 3%). After 4 h soaking, quick washing, blotting, the samples were drying at 20°C up to constant weight. The dried products were packed in glass containers and stored at ambient conditions. The chemical and microbial stability were monitored for 6 months. The osmo-dried apple slices prepared with 50% sucrose/1% sodium chloride showed an overall chemical acceptability (a_w of 0.192; °Brix of 26.3; pH of 3.82; Na content of 0.51g/100g). Microbiologically the product was stable (aerobic mesophile osmotolerant or osmophilic bacteria counts < 2.75 log cfu g⁻¹; fungi counts < 1.75 log cfu g⁻¹) and safe (*Clostridium* spores and *Staphylococcus* were not confirmed in this study) up to 6 months of storage at ambient conditions.

KEYWORDS: Royal Gala apple, Osmotic dehydration, Chemical and Microbial stability



P18. Strawberry spread - New Food New Tech

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ABSTRACT

This study is part of the *Agrio et Emulsion* project (POCI-01-0145-FEDER-023583), new food emulsions development. The product innovation results from the addition of a strawberry syrup to a spreadable cream of vegetable origin. Four formulations have been developed and eight syrup spreadable cream, being selected a prototype evaluated by an untrained panel taster. Physicochemical and proximal analyzes were performed: pH, total acidity, soluble solids, energy, moisture, crude protein, total lipids, carbohydrates, fiber and ash. A set of microbial populations was evaluated for microbiological stability control: enumeration of microorganisms at 30°C; enumeration of lipolytic microorganisms at 30°C; enumeration of *Enterobacteriaceae*; enumeration of osmophilic or osmotolerant yeasts and moulds; detection of spores of sulfite-reducing Clostridia. Two emerging technologies, ionizing irradiation and hyperpressure were used to study the stability of this new product. The results for the treated and untreated products showed no significant differences. The untreated samples remained stable and showed satisfactory microbiological characteristics under refrigeration at 5 °C after 3 months. Following these results, we conclude that product stability can be ensured by good manufacturing practices.

KEYWORDS: Spreadable cream, Emulsion, Hyperpressure, Irradiation, Strawberry.



P19. The history of the manufacture of cheeses in Alentejo

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ABSTRACT

Cheese production in the Alentejo is now, as it has been for hundreds of years, an important subsistence resource for small family businesses, sharing their knowledge orally from generation to generation, but maintaining the same ingredients, manufacturing methods and, certainly, the same quality of always. Although the information is scarce and widely dispersed, it is possible to find references that witness the manufacture of cheese in several places in Alentejo province, as in the case of fragments of moulds for cheese production found in Serpa and Beringel dated to the Copper Age, or the reference to cheeses and cheesecakes in several local laws ("foral") forais dated back to king Dinis or king Manuel, the first. However, the richness of the history of cheesemaking in Alentejo province, or in "Além-Tejo" as it was formerly known, goes far beyond, having been found references of cheeses from this region in reports of shipwrecks of the 16th century, reports of the king D. Sebastião visit (16th century) or king Filipe the first of Portugal (17th century) to the Alentejo, geographical descriptions of the provinces of the Iberian Peninsula from 16th century, reports of foreign travelers in the 18th century, récpies found in cookbooks from 17th century or the presence of this cheese in the universal exhibitions of the 19th century. Another important document is the description of the manufacture of sheep and goat cheese in the province of "Alem-Tejo", dated 1835 and authored by Dr. Joaquim Heliodoro da Cunha Rivara, born in Arraiolos.

KEYWORDS : Cheese, Alentejo, History



P20. Influence of *Cynara cardunculus* L. ecotypes on physical and chemical properties of PDO Évora cheese

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ABSTRACT

It is in Portugal and Spain that we find most of the varieties of cheeses produced with vegetable coagulant. Évora cheese is a Portuguese PDO cheese, with a semi-hard or hard consistency, light yellow colour, few or no holes, and intense flavour. The technological process includes the slow draining of the curds, after coagulation of raw ewe's milk, with a vegetable coagulant infusion of *Cynara cardunculus* L. The aim of this work was to analyse the influence of different *C. cardunculus* ecotypes on the chemical and rheological properties of Évora cheese. According to traditional Évora cheesemaking process, were produced batches of cheese, using three ecotypes of vegetable coagulant (C1, C2 and C3), and one commercial animal coagulant (AC). For each coagulant, groups of four cheeses were picked after 1, 3, 7, 14, 21, 35, 49, 60 and 90 days of ripening. Samples were analysed considering: structural parameters (viscoelastic measurements and texture analysis), colour (L*, a* and b*) and chemical parameters (moisture, fat, acidity, pH, total nitrogen, water soluble nitrogen, non-protein nitrogen and aminoacidic nitrogen). Data were analysed using multivariate exploratory technics. Statistical data analysis evidenced that the influence of the different coagulants (from vegetable or animal origin) on Évora cheese characteristics were more marked during the first period of ripening. Pearson correlation coefficients between structural indicators (storage modulus and hardness), and proteolysis indicators (NPN/TN% and NA/TN%), moisture and pH, were calculated. Significant negative correlations were found between moisture and hardness. These results indicate the major influence of moisture decrease, during ripening, on the texture of this cheese type, which is more relevant to its characteristics, than the softening caused by proteolysis, observed on other Portuguese cheeses produced with raw milk and vegetable coagulant.

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P21. Valorisation of Shiitake mushroom by-products through confection of pies and rissoles

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ABSTRACT

Sustainability relies on a rational utilization of the natural resources as well as minimization of impacts resulting from industry. In the case of the food industry, in which the raw-materials used are biological (animal or vegetable) products, many of the generated residues or by-products contain components that can be successfully extracted and used in to obtain other products with added value, thus combining advantages in terms of environmental impacts as well as economic profitability. The objective of the present work was to develop food products incorporating Shiitake mushrooms, as a way to value some less appreciated parts of the mushroom and also to use those mushrooms that do not comply with standards in terms of shape or size for direct sale. Hence, it was planned to incorporate the mushrooms into fillings used in rissoles and pies, which are two types of product very much appreciated either for meals or as starts or snacks. Since it was aimed to obtain products with appreciated organoleptic characteristics, a sensory evaluation was carried out, complemented by physicochemical analyses and evaluation of colour and texture. The results demonstrated that the developed foods were a good alternative to avoid discard the mushrooms not complying with quality standards for commercialization.

KEYWORDS: Added value, Residue valorisation, Sensory characteristics, Textural properties



P22. Characterization of consuming habits regarding bakery products and acceptance of new products incorporating whey residue

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ABSTRACT

In the Centre of Portugal the Serra da Estrela Cheese assumes great economic and social importance, and many small and medium enterprises depend on the income obtained from the herds or the cheese production. For these medium size enterprises, the generation of liquid effluents is a problem and, therefore, this study intended to explore the possibility of using whey residue to prepare new bakery products with improved characteristics and at the same time providing economic and environmental advantages. For that, a questionnaire survey was undertaken on a sample of 299 participants, residing in the Centre of Portugal. The results showed that about 80% eat bread on a daily basis, being the preferred types of bread fresh and homemade. The results further indicated that wheat or mixture breads are preferred, unlike whole cereal, rye or corn breads, which are not much valued by the participants. Also, the breads with a reduced salt content are valued only by 10% of the participants. Regarding cookies, they are consumed by approximately 56% of the participants, who consume them mainly between meals and 2 or 3 times/week. The preferred types of cookies include simple formulations, without fillings or flavourings. Again, it was verified that cookies without sugar are preferred only by 11% of the participants. When asked about the possibility of consuming bakery products made with whey residue from sheep milk, about 60% of the participants admitted they would, and the reasons that contributed for this decision included higher protein content followed by environmental advantages.

KEYWORDS: Bread, Cookie, Knowledge, Dietary habits.



P23. Mathematical modelling of the drying kinetics of acorn (*Quercus rotundifolia*) - optimization of shelling process

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ABSTRACT

As part of the Mediterranean diet heritage, the *Montado* agrosilvopastoral system is a diverse habitat with acorn producing oaks, where several unique traditional foods of exceptional quality contribute to socioeconomic development. In Alentejo, acorn yields of 293816 t/year are estimated, with ~41% feeding the "Alentejano" pig and wild fauna, leaving ~55% of acorns left on the fields, unvalued. Marginal amounts are used to produce acorn flour for local gastronomy. Since acorn nutritional and bioactive composition is very interesting, the sustainability of this *Montado* product can be promoted by innovating acorn foods. Irrespective of acorn-based food processing technology, peeling/shelling is a critical operation as it is a time-consuming manual process. A tentative mechanization occasionally used by small-scale producers is a flame-peeling system (>720 °C). In both, the imposed stresses can damage and induce negative effects on kernel quality, e.g. browning and loss of bioactivity. To establish a technological procedure to acorn shell brittleness while maintaining fruit quality, two drying regimes (static vs. dynamic) were modelled and drying conditions effects (T=30°-70 °C, t=2-74h) on physico-mechanical properties of whole acorns evaluated. Shell fracturability (~1.8 mm) requires a temperature value ≥ 50 °C and ≥ 60 °C under dynamic and static regimes, respectively. Significant changes in shell colour (TCD ≥ 10) only occurred in the first 2-4h, regardless tested conditions. The influence of dynamic drying regime on drying rates and fracturability promotes a time-saving process (~1-3h at 60° and 70 °C). However, process effects on kernel quality needs to be evaluated considering acorn technological applications.

KEYWORDS: Drying kinetics, Modelling, Shelling operation, Fracturability, *Quercus rotundifolia* acorn.



P24. Consumption and knowledge on legumes in Portugal

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ABSTRACT

Legumes are very nutritious food, due to the protein content, carbohydrate composition, fiber, vitamins and minerals associated to low levels of saturated fats. Regular consumption of legumes helps in the prevention and control of chronic diseases such as diabetes, cardiovascular disease, cancer and obesity.

There is a great diversity of legumes that have been used since antiquity in the Mediterranean diet. The legumes are part of the Portuguese gastronomic identity, with several traditional dishes where peas, fava beans, beans or grains are the main ingredient, but their consumption has been decreasing.

In 2016 the Food and Agriculture Organization of the United Nations declared the International Year of Pulses, with the aim of increasing public awareness of the nutritional benefits of legume consumption.

Under a Design research, it is sought to verify if Design can contribute to the development of products that increase the consumption of legumes. Design and Cooking are user-center activities and what results from the creative process must fulfill a function or meet the expectations raised.

In this context, a questionnaire was developed as a first step in the research in question, which seeks to answer questions about consumption and knowledge about legumes. The results, mostly from women, show us that legumes are highly appreciated, widely known both in terms of variety and in terms of nutritional advantages and that taste, cooking time, habit and texture are the most pointed aspects for its non-consumption. These results will aid the investigation in the sense of understanding how Design can intervene in this scope.

KEYWORDS: Legumes, Design, Cooking, Creative Process



P25. Table olives: a food of the millenary Mediterranean diet pattern

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ABSTRACT

Table olives, the fruits of *Olea europaea*, are a traditional fermented food included in the Mediterranean diet, whose consumption, in Portugal, has been decreasing in the last decades. Three different cultivars produced in Southern Portugal were studied, Maçanilha Algarvia, Cobrançosa and Galega. The olives were processed through natural fermentations in brines, although prepared differently. Maçanilha green olives were cracked, Cobrançosa turning color olives were split, and Galega black olives were prepared as a whole. The physicochemical, nutritional and microbial properties were studied according to standard procedures, when the fermentation was completed. All the fruits presented a good pulp/stone ratio, exhibiting an adequate acidity and pH values, in addition to a high water content, followed by fat, low-sugar content and fairly low dietary fiber, protein and ash, resulting in a valuable energy food. Nutritionally, the olives were not significantly different, however, Galega had the highest total phenolic content and Cobrançosa showed the highest antioxidant activity. Statistical differences were observed among their fatty acid composition, with Galega and Maçanilha having the highest oleic and linoleic contents, respectively. Although, *Escherichia coli* and *Salmonella* sp. were not found, mesophilic microorganisms and yeasts were counted in values of 5.3, 4.7, 4.0 LogCFU/g and 5.9, 5.0, 4.4 LogCFU/g for Maçanilha, Cobrançosa and Galega, respectively. This food, which is a legacy of the Mediterranean diet prevalent in the region, especially before the dissemination of western food, revealed an excellent microbial quality, a good source of total unsaturated fatty acids and phenolics revealing antioxidant potential.

KEYWORDS: *Olea europaea*; Natural fermentation; Maçanilha Algarvia, Cobrançosa and Galega cultivars

P26. Incorporation of Mediterranean shrub (*Cistus ladanifer* L.) in lamb diets to improve the nutritional value and oxidative stability of meat

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ABSTRACT

The consumption of ruminant fat has been associated to detrimental effect on human health, due to their high levels of saturated fatty acids and low content of polyunsaturated fatty acids (PUFA). Nutritional strategies to reduce the saturation and increase the healthy PUFA, such as conjugated linoleic acid isomers (CLA) in ruminant fat has been target of intensive research. However, high content of PUFA in meat increases its susceptibility to oxidation. Supplementation of diets with plants or plant extracts rich in secondary compounds like condensed tannins (CT) has been explored not only to improve the fatty acid profile of ruminant products, with particular interest in increase of the CLA levels, but also to limit the lipid oxidation. *Cistus ladanifer* L. (rockrose) is a Mediterranean shrub that contain high levels of CT¹. Results showed that aerial part (leaves and soft stems) or CT extract from *Cistus ladanifer* are able to modulate the ruminal lipid metabolism, increasing the production of vaccenic acid (t11:18:2)^{2,3}, the precursor for endogenous synthesis of the major CLA isomer found in ruminant fat, the rumenic acid (c9,t11:18:2). Moreover, increased deposition of c9,t11:18:2 was observed in intramuscular fat of lambs fed high-forage diets supplemented with PUFA-rich vegetable oils and *Cistus ladanifer* aerial part². Inclusion of *Cistus ladanifer* in lamb diets also allowed limit the lipid oxidation in meat, including in PUFA-enriched meat^{4,5}. So, utilization of *Cistus ladanifer* in ruminant diets seems to be a promising approach to improve the nutritional value and lipid oxidative stability of meat.

KEYWORDS: *Cistus ladanifer*, Ruminants, Meat, Fatty acids, Lipid oxidation

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P27. INIAV - Technology & Innovation Unit (UTI): contributions to the Mediterranean diet sustainability

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ABSTRACT

The Mediterranean diet is based on an integrated food profile and sociocultural dynamic which is recognized by WHO as having a great nutraceutical value. INIAV co-participated in the request to UNESCO for its intangible cultural heritage of Humanity status and is part of the recently established Centre of Competences partnership. The INIAV's Technology & Innovation Unit (UTI), with multiple competences in the food science and technology area, has contributed to the pursuit of relevant objectives for the Mediterranean diet safeguard and improvement as well as to its public divulgation. In order to obtain healthier, attractive, safe and sustainable foods, the UTI team has the main goal to deliver tools and contributions for the different stakeholders engaged within the Mediterranean value chains across numerous sectors (vegetables, dairy and meat). Some topics focusing in processing efficiency, new product development and food nutritional/functional characterization are highlighted: characterization, quality assessment of different varieties of fruits and vegetables, leguminous grains and medicinal aromatic plants; novel approaches on genetic and environmental influence on cereal grain quality; consumer-oriented food product development of highly nutritional/ functional fruit- and vegetable-based products, without synthetic chemicals added; technological improvement of traditional Portuguese cheeses; Muxama antioxidant compounds profile, oxidation susceptibility and biogenic amines formation related to processing conditions. At last, UTI also holds a microbial culture collection with microorganisms isolated from traditional food products (eg. olives) representing a valuable source of biodiversity and genetic resources for biotechnological applications.



P28. Nudging consumer behaviour in a restaurant setting through innovation: increasing legumes consumption by promoting healthier choices

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ABSTRACT

Legumes are nutritionally rich foods with a wide variety of gastronomic uses and great relevance to human diet and environmental sustainability. Importantly, they are a key component of the Mediterranean Diet and its gastronomic heritage in its broadest multicultural sense. However, their consumption has been steadily decreasing in Portugal.

The aim of this doctoral project is to develop nudging strategies to increase legume consumption in away-from-home meals based on gastronomic innovation. First, the motivations of Portuguese individuals to consume legumes and legume-based dishes will be studied resorting to the means-end chain theory and the performance of laddering interviews with household meal planners. Results will feed the design and performance of a large sample consumer survey on legume consumption. Next, an open innovation process involving chefs, foodservice professionals and hospitality management graduates will be conducted with the aim of designing and testing new dishes with legumes as the core ingredient. This will include the performance of a gastronomic innovation contest and the selection of dishes with high commercial viability and market acceptance. The latter will finally be the object of an intervention study designed to increase the consumption of legumes in a buffet restaurant setting based on previously selected and tested nudge strategies.

This project increases current understanding of legume consumption and its main drivers, and contributes to the development of new dishes and foodservice strategies that promote legume use by involving chefs, food service professionals and hospitality management students in an open gastronomic innovation process.

KEYWORDS: Legume consumption, Gastronomic innovation, Nudge theor, Consumer behaviour, Restaurant.

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P29. Wine water footprint assessment in the Mediterranean region

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ABSTRACT

Wine production is an important socio-economic activity in Mediterranean countries. In many areas, particularly in the Mediterranean region, climate change is likely to generate an increase in water demand and the deterioration of its quality. Water scarcity has prompted concern in the wine sector, given the strong impact that it may have on vineyard productivity and wine quality. The adoption of precision viticulture and best available techniques aiming at sustainable production, minimizing the impact on natural resources and reducing production costs, has been a goal of winegrowers. The scope of the project is focused on wine water footprint under warm and dry climate conditions in South Portugal, in two major wine producing regions (Tejo and Alentejo). An integrated assessment, along the wine chain, accounting for the blue, green and grey water footprint, at C-level of spatial and temporal resolution, will be carried out. Cross-cutting broad spectrum technologies, including production technology and ICT, with potential application for wine chain will be used to reduce water demand, assess the uniformity of water distribution and the water application efficiency in the vineyard, as well as determine the efficient water use during wine production. The water footprint sustainability assessment will give information on the existing dependence on water resources, allowing the identification of hotspots and the formulation of strategies to reduce 10% of the water footprint.

KEYWORDS: Water efficiency, Sustainable viticulture, Water footprint, Wine chain, Winery wastewater.

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P30. Physical-chemical and rheological characterization of tomato (*Solanum lycopersicum* L.) of Algarve

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ABSTRACT

The objective of this study was to evaluate the physico-chemical and rheological characteristics of two tomato varieties, Vimeiro and Runner, grown in Algarve - Portugal - in five case studies (A, B, C, D and E), during the harvest season. The samples were submitted to analysis: weight, caliber, moisture, total soluble solids, total titratable acidity, lycopene, color and hardness. When considering the factors producer X variety significant differences were observed for all parameters, excepted for color coordinates a* and H° and hardness. For weight and caliber no differences were observed between varieties. Concerning Runner variety, the producer A achieved heavier and higher caliber tomatoes compared to producer E. For total soluble solids it was verified that producer C was the one that cultivated fruits with the highest concentration for both varieties and presented a higher total titratable acidity value. These results were more evident in the Vimeiro variety. For lycopene, the highest average value was found in fruits cultivated by producer A in the Vimeiro variety. The fruits that presented the highest luminosity (L*) and higher mean values of b*, in general, were the Vimeiro variety, led by producer A. It means that the fruits have more yellowish tones than the Runner variety. The Vimeiro variety, independently of the producer, also presented higher values of C*, which means that the color of the fruits of this variety was stronger and brighter.

KEYWORDS: Tomato, Physical-chemical and rheological characterization, Runner, Vimeiro



P31. Human and canine prevalence obesity and feeding habits – a one health approach in Portugal

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ABSTRACT

Obesity has been considered a major issue in many countries of the European region since the 1980s, and obesity prevalence in humans continues to rise at alarming rates. Due to high number of pets in households, obesity should also be considered in the context of the One Health approach, since in several studies a positive relationship between owner and pet obesity has been reported due to their shared lifestyle. The aims of this study were to evaluate obesity prevalence among owners and their pets in Portugal, and to identify a possible relationship between them, as well as their feeding habits. A cross-sectional questionnaire-based study was used and owners of at least one dog were included. High obesity prevalence in both humans (21.8%) and dogs (32.9%) was found. Men over 55 years that usually take breakfast and are unemployed were more prone to be obese. Interestingly, the vast majority of owners stated that they eat healthy and that they self-disciplined to follow a healthy diet. In the case of dogs, a neutered animal that does not have a daily intake based on commercial recommendations was more prone to be obese. All of these obesity risks factors, for both dogs and their owners, have been stated by several authors with similar results in other One Health approaches. However, a negative association between dogs' and owners' obesity was verified, what is not commonly reported for other countries. The studied population was mainly from regions with rural characteristics, what may partly explain it. Moreover, the awareness that owners reported about the effects of obesity in humans, may be not the same for pets. Even so, it is curious to observe that, although 97.1% of owners considered themselves as being healthy and conscious about health issue, the prevalence of obesity continues to be high, even in a country with Mediterranean based diet, such

as Portugal. These are preliminary results, deriving mainly from an *online* survey, and as such, care is needed when drawing conclusions.

KEYWORDS: Human, Obesity, Dog, Questionnaire, One Health



P32. Nutritional value of bread enriched with legume flours

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ABSTRACT

Bread, one of the most important dietary carbohydrate sources, generally contains small amounts of resistant starch (RS). RS has been defined as “the sum of starch and products of starch degradation not absorbed in the small intestine of healthy individuals”. Interest in RS research has increased during the last three decades. RS appears to confer considerable health benefits related to inflammatory bowel disease and bowel cancer, reduction on postprandial glycaemia/insulinemia, improvement on insulin sensitivity, fat oxidation and satiety. RS also plays a prebiotic role.

Legumes are rich in RS as well as has a high amount of protein. Legumes protein doesn't have all the essential amino acids but cereals/legumes together has a high biological value protein.

The aim of the present study was to investigate the influence of partial substitution of wheat flour (10%) for different legume flours (chickpea, white beans, black beans, brown lentils, orange lentils and peas) in RS and protein content in common bread. The study also includes a sensorial analysis to understand the acceptability of the different varieties by the consumer.

RS and protein contents in all the formulations with legume flours were higher than in bread without legume flours (RS - between 21% to 81% higher; protein – between 7% to 22% higher). The variety of bread with higher RS content was bread with pea flour and with higher protein content was bread with orange lentils flour. The bread with orange lentils presented the highest global consumer acceptability.

The partial substitution of wheat flour by legume flours yields breads with higher content in RS and protein and high acceptability by consumers. These bread varieties are foods with increased nutritional value and they can contribute to a healthy diet.



P33. What is happening with Mediterranean Diet patterns in Alentejo?

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ABSTRACT

Mediterranean Diet is recognized by its positive effects in health, contributing also to food sustainability. Despite the increasing number of reports pointing the benefits of this type of diet, diseases related with food intake are increasing in Mediterranean region. Alentejo is a Portuguese region that maintain several rural characteristics, with populations living close to the sites of primary food production. Additionally, Alentejo has a characteristic gastronomy, traditionally based on dishes composed by local and minimally processed products, but which has suffering changes over time, increasing its caloric, fat and salt content. Although hypothesizing that populations maintaining proximity with agriculture and food production might have healthier food habits, comparatively to urban populations, the dietary patterns and adherence to Mediterranean diet in Alentejo population has been not characterized.

The objectives of this study were to assess the adherence of North Alentejo population to Mediterranean Diet and to relate it with individuals' body condition.

Adults (N=287) from Portalegre district (North Alentejo, Portugal) were weighted and heighted for Body Mass Index (BMI) calculation. Food Frequency Questionnaires (FFQ), validated for the Portuguese population (Lopes et al., 2007) were used, in this sample, to assess dietary habits. After having individuals' intake frequency, assessed through FFQ, Mediterranean diet adherence was assessed by alternate Mediterranean Diet (aMED) Score. This aMED was based on dietary intake of nine selected items: vegetables; pulses; fresh fruits, nuts, whole grains; fish; red and processed meats; ethanol; and ratio of monounsaturated to saturated fat (MUFA : SFA) (Barros et al., 2008).

A high proportion of pre-obesity (37%) and obesity (25%) was observed in these individuals. This proportion presented no significant differences between men and women, but a slight tendency for BMI to increase with age was observed. Concerning Mediterranean diet, individuals from North

Alentejo did not present high adherence to this dietary pattern. Most of the individuals have low or medium levels of adherence, with only 19% having high adherence to Mediterranean diet.

This is a preliminary study, needing a high number of individuals to allow the characterization of the population. Nevertheless, the results obtained point to high rates of overweight and decreased adherence to Mediterranean diet, highlighting the need of new strategies for recover Mediterranean diet and healthy eating patterns in Alentejo.



P34. Regulated Deficit irrigation in pomegranate orchard

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ABSTRACT

The pomegranate is a fruit that is part of the Mediterranean diet in Alentejo and it is emerging as an irrigated crop with high tree density. The present work shows some preliminary results of the evaluation of three irrigation strategies in pomegranate orchard along 2018 campaign. The field trial is conducted in Monte das Carvoeiras (37,99734° N, 7,81038° W, 236 m altitude), located in Baixo Alentejo region, in sandy clay loam soils and under Mediterranean climate condition, where regulated deficit irrigation (RDI) is a possible strategy to increase the efficiency use of irrigation water. The pomegranate orchard (cv. Wonderful) is 5 years old with a 5,5 m x 3,5 m compass (about 516 trees / ha), under drip irrigation system formed by self-compensating drippers, with a debit of 2,2 l / h. The three irrigation strategies under study are the following: strategy 1 - water comfort (100% ETc); strategy 2 - regulated deficit irrigation from flowering to initial fruit growth (25% ETc and 100% ETc in the remaining phases of the crop cycle); strategy 3 - regulated deficit irrigation from the non-linear phase of fruit growth to maturation (25% ETc and 100% ETc in the other phases of the crop cycle). The effect of these irrigation strategies on pomegranate is being weekly evaluated through the response of the crop to vegetative growth, stomatal conductance, chlorophyll content and stem water potential at noon. Production and characteristics of the fruit shall be evaluated at harvesting.

KEYWORDS: Water use efficiency, *Punica granatum* L., Mediterranean climate, Drip irrigation, Crop production, Fruit characteristics.



P35. Use of digital image analysis for monitoring the ripening of Évora PDO cheese

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ABSTRACT

The Évora cheese is a Portuguese PDO cheese, with a semi-hard or hard consistency, light yellow color, few or no holes and intense flavor. It is obtained after coagulation of raw ewe's milk, with a vegetable coagulant infusion of *Cynara cardunculus* L. The aim of this work was to analyze the evolution of the color inside the Évora cheese and the development of cheese gas holes during the ripening process, using different coagulants. The experimental design included flower extracts from different *C. cardunculus*, and one commercial animal coagulant. For each coagulant, groups of four cheeses were picked after selected ripening times. Samples were analyzed considering chemical parameters, structural parameters, color and digital image inside the cheese. The results evidenced an increase of the area occupied by the holes until 14d, followed by a decrease until the end of ripening time. Additionally, a decrease of luminosity during ripening was observed. Pearson correlation coefficients between structural indicators, image parameters and chemical parameters were calculated. The obtained results indicate considerable physical changes during ripening, reflecting the biochemical reactions which occur inside Évora cheese and how these changes affect the area occupied by the gas produced during the fermentation process.

KEYWORDS: *Cynara cardunculus*, Évora cheese, Image analysis, Ripening, Thistle flower.

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P36. Renewing concepts: adapting the food choice questionnaire to the Portuguese consumption of rice through the use of images

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ABSTRACT

The Food choice questionnaire (FCQ) is a well-known tool that has been used across many countries and cultures to access consumers' food choice criteria. However, as food choices are culturally dependent, there is a need to adapt the questionnaire's concepts in accordance with those used by the respondents from a given culture. As images are known to be creativity inducers, they can be used as a mean to turn concepts into broader ones, so, they can be adapted to a new reality. To adjust the FCQ's concepts to the Portuguese reality, particularly focusing on the consumption of rice, an innovative method based on images was developed.

This method was carried out in two phases. First, an online survey was developed: for each item of the original FCQ, 3 images related to the item were presented to the Portuguese respondents; after choosing the image that better suited the concept, the respondents were asked to rate the level of accordance of the selected image with the item. The results were then statistically treated. In a second phase, the selected images were presented to different focus groups, and the participants were asked to write the words that would better fit with the images.

The method used enabled the transformation of the FCQ's items into new ones, according to the users' language and culture, with little external interference.

KEYWORDS: Food choice questionnaire, Online survey, User-driven design.



P37. Moroccan Diet between a protective and causative effect

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ABSTRACT

Mediterranean Diet (MD) is a healthy food pattern that contributes to a favorable health reducing the risk of many chronic diseases and lead to a better life. Many studies have shown large variations in nutrient intake between Mediterranean countries. They led to the classification of Mediterranean food habits into four groups (Western, Adriatic, Eastern, and Northern African) whose dietary habits are closer to each other than those of other countries. Comparison between these groups allowed us to choose groups 1 and 4 as the closest to the level of food intake. Although this similarity is important, there are some differences in "traditional" consumption between countries of both groups.

Morocco, as a Mediterranean country in North Africa, is experiencing a demographic and epidemiological transition. Likewise, dietary habits, supposedly following a Mediterranean pattern, have changed considerably. Many ingredients found in Moroccan food promote good health. Moroccan food is based on whole food ingredients freshly prepared and rich in herbs. What separates Moroccan food from all others is the diversity of spices used in meals. This makes Moroccan dishes delicious while being nutritious. Numerous studies have demonstrated the therapeutic effect of several nutrients among others those characteristics of Morocco. Other studies discussed subjects on their wrong use and health insecurity of these foods. All this led us to ask: The diet in Morocco exercises a protective or causative power! Our goal then, is to know how healthy Moroccan food is, and determine the nutritional properties of foods to know where we are from the Mediterranean Diet.

KEYWORDS: Mediterranean Diet, Morocco, Healthy nutrient, Health insecurity



P38. Mediterranean Diet and autoimmune diseases: what do we know?

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ABSTRACT

Diet composition is very important to the immune system balance and plays a fundamental role in maintaining the health of all individuals, including those with autoimmune diseases (AID). In contrast to the Western Diet, considered as possible promoter of obesity, metabolic syndrome, cardiovascular disease (CVD) and AID including Systemic Lupus Erythematosus (SLE), the Mediterranean Diet (MD) has suggested protect against some chronic diseases related to oxidative stress, inflammation and the immune system. A lower prevalence of rheumatic diseases has been shown in Mediterranean countries compared with Northern Europe. Likewise, some reports have demonstrated that the MD contributes to improving rheumatic symptoms and decreasing the use of anti-inflammatory drugs and pharmacotherapy-related side effects.

Recent data have supported the beneficial effects of MD in cancer, CVD, obesity and arthritis. Others have signaled the food intake effect on improvement of prognosis and prevention of SLE. Recently, we have performed studies about AID in Morocco and salivary biomarkers. For that, we intend to study a relationship between MD and AID, especially in our country knowing that Morocco is a Mediterranean country in North Africa and characterized by its remarkable adherence to the MD.

KEYWORDS: Mediterranean Diet, Autoimmune Diseases, Systemic Lupus Erythematosus, Morocco, Food intake.



P39. Attitudes and beliefs of producers and veterinarians regarding the implementation of biosecurity measures on cattle farms

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ABSTRACT

Biosecurity practices refer to collective actions taken at international, national, local and farm level in order to reduce the risk of introducing and spreading infectious diseases among individuals, populations, farms, or ecosystems (Jia, St-Hilaire, Singh, & Gardner, 2017). In general, farm-level biosecurity is aimed at improving preventive measures, disease surveillance and control, often in relation to changing management practices. This contrasts with the specific measures implemented to achieve a single pathogen (DEFRA, 2011; Nöremark, Sternberg Lewerin, Ernholm, & Frössling, 2016).

Most animal diseases are caused by infectious agents (bacteria, viruses, protozoa or parasites) and these are the diseases that biosecurity measures can help containing. Therefore, inadequate adoption of these measures leads to increased indirect costs for industry and reduced animal welfare (DEFRA, 2011).

However, such measures seem particularly difficult to implement through laws, since the results usually benefit society more than the producer himself/herself (Kristensen & Jakobsen, 2011). Depending not only on economic factors or their viability, but also on the understanding of the principles of biosecurity by producers and veterinarians and their attitude and motivation to commit themselves, or not, to such preventive measures. In addition, the social network or community structure to which they belong to and the way they perceive the animal production industry may also influence their commitment (Brennan & Christley, 2013).

In order to provide information to decision makers (in this case producers and veterinarians), it is necessary to construct communication materials that are understandable and scientifically accurate. Unfortunately, sometimes existing communications fail. This may occur when experts put themselves

in as members of the public and present the information they find most important and interesting (Bruine de Bruin & Bostrom, 2013).

According to Breakwell (2001), mental models are possibly the most productive approach to the development of risk communication interventions.

The risk communication needs within each social group can be systematically identified by understanding the thinking processes of individuals that lead to specific behaviors and decision-making paths. In order to build a communication on biosecurity measures, it is necessary to address the mental model of producers and veterinarians (laypeople). By doing so, risk communicators can identify gaps in knowledge, perception and attitudes, overly general knowledge and absolute errors that can make the learning process frustrating (Atman, Bostrom, Fischhoff, & Morgan, 1994; Cattaneo, Wilson, Doohan, & LeJeune, 2009). From there, the aim is trying to fill the space between this mental model and the specialists' mental model, adding missing concepts, correcting mistakes, strengthening correct beliefs and minimizing the peripheral ones (Breakwell, 2001).

The general objective of this project is to answer the question: how can there be an increase of the probability that the available knowledge on biosecurity will be effectively implemented through behaviors, based on reducing the gap between lay and expert knowledge?

More specific objectives include characterizing the mental models, attitudes and beliefs of producers and veterinarians, regarding the biosecurity of extensive cattle farms and developing guiding principles for effective risk communication in the field of biosecurity, to reduce the gap between the knowledge of laypeople and the knowledge of experts.

During this project there will be an evaluation of the mental models, attitudes and beliefs of producers and veterinarians, regarding biosecurity. These two groups (producers and veterinarians) will be considered laypeople for the purpose of this study's methodology. The first step of this methodology involves conducting a panel discussion with 4-5 experts in the field in order to create an experts' mental model together with a bibliographical review.

Then, 20-30 individual interviews with producers and 20-30 individual interviews with veterinarians will be carried out, in the context of biosecurity, in order to describe the attitudes and beliefs present in both groups. It is important to note that producers cannot be veterinarians and vice versa, since we want to analyze these two groups separately. Thirdly, the prevalence of attitudes and beliefs described

in the interviews will be assessed within both groups. For this to be possible, questionnaires will be distributed by these two groups. These should be sent by email (when possible) and distributed in places frequently visited by recipients.

The questionnaires will be applied to veterinarians and producers other than those participating in the interviews. In order to reach the maximum number of responses, it will also be important to ask the employees of the places where the questionnaires will be distributed, to suggest their completion to the two groups of laypeople. Finally, and based on the results obtained through the questionnaires, guiding principles for effective risk communication will be developed. The project is expected to be finished by September, this fall.

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