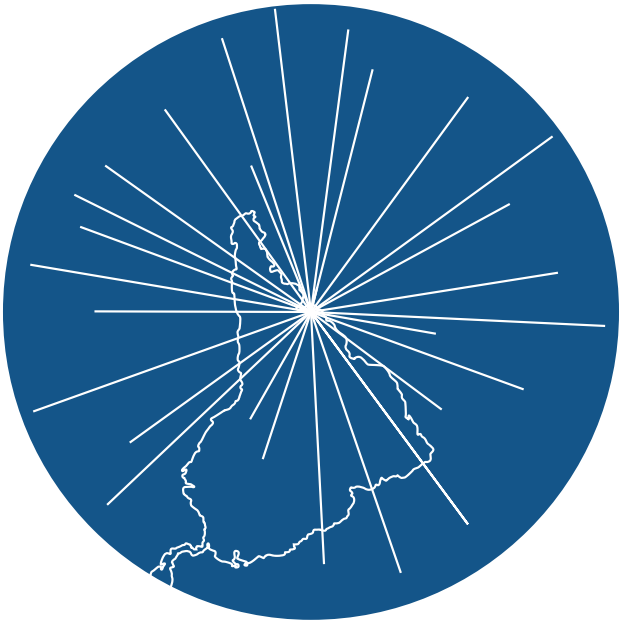
ENSOMETRICS 2018

Going Further

9 - 12th April 2018. Montevideo, Uruguay



BOOK OF ABSTRACTS

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Dear Delegates,

On behalf of the Sensometrics 2018 Organizing Committee, we would like to extend to you a very warm welcome to the 14th Conference of the Sensometric Society and to Montevideo.

We are delighted to bring further south world's leading statisticians, psychologists, sensory scientists and market researchers with a common interest: to provide reliable methodological and data analysis tools in the areas of sensory and consumer science. It is also a unique opportunity to promote cooperation and boost the development of the field in Latin America.

The conference will feature 27 oral presentations divided in 6 oral sessions as well as three invited presentations from recognized invited speakers. There will be three workshops and seven tutorials. The topics range broadly and cover relevant issues in sensory and consumer science, selected to be highly stimulating and inspiring. We are grateful to all the authors, the invited speakers, and the scientific committee for their valuable contribution. We are thankful to the sponsors and exhibitors for contributing to make this conference possible.

We also hope you enjoy Montevideo, a colorful city where you can walk along almost 300 years of history since the colonial time until the twenty-first century. Punta Carretas, the area the conference is held, is one of Montevideo's most elegant residential districts. You will find exceptional restaurants, along with peaceful parks and fashionable shops. Just a few blocks away from the conference venue you will find Punta Carretas mall, once a gray prison for political prisoners, that turned into Montevideo's most upscale mall while keeping some of its original architectural elements. Do not miss a walk along the Rambla, one of the most typical spots that Uruguayans enjoy while sharing mate. We also hope that you have a chance to experience our unique Tannat wines and our world famous meat.

We wish you an enjoyable conference and an extraordinary stay in the city of Montevideo. We hope that you keep taking Sensometrics further.

Gastón Ares & Ana Giménez
Chairs of Sensometrics 2018

On behalf of the Sensometric Society, I wish you a warm welcome to Montevideo for the 14th Sensometrics Meeting!

This is a very special conference. Not only is it the first Sensometric Society meeting to be held in South America, but it is also the first time that one of our meetings will be held outside of Western Europe and North America. The tutorials, keynotes, oral presentations, workshops, flash and poster presentations that comprise the scientific program promise to encourage an exchange of ideas. The goal: going further!

The Sensometrics & Consumer Science research group of Universidad de la República, and in particular the dedication of conference chairs Dr. Gastón Ares and Prof. Ana Giménez, have made this conference possible. We also appreciate the efforts of the Scientific Committee, as well as all the contributors who have helped to make this meeting a success. A special thank you to the meeting sponsors and exhibitors. I encourage you to visit their websites and booths to learn more about them.

As many of you know, Pieter Punter passed away last year. Pieter was a founding member of the Sensometric Society, and also a host of Sensometrics 2010 in Rotterdam. He was active in the field of sensory consumer research since the 1980s. Many of us have fond memories of Pieter – he is sadly missed.

The society that Pieter helped to found has three aims: to increase awareness of the need for the field of sensory and consumer science to have its own methodology and statistical methods; to improve the communication and co-operation between persons interested in the scientific principles, methods and applications of sensometrics; and to act as the interdisciplinary institution, worldwide, to disseminate scientific knowledge in the field of Sensometrics.

These biennial meetings are the most visible way that the society achieves these three aims. After the meeting, presentations will be disseminated through the society's website. All presenters are encouraged to submit manuscripts to the Sensometrics 2018 special issue of Food Quality and Preference, the official journal of the society. I am especially proud of the society's ongoing commitment to supporting students through travel grants and awards, and look forward to a time when we can offer more of these awards.

Have you considered joining and getting involved in the society? There are membership categories that provide access to Food Quality and Preference, as well as low-cost options without the journal. Talk to members of the Sensometrics Committee and visit www.sensometric.org to learn more. Members and non-members are welcome to attend the society's annual general meeting at the conference venue on 10 April 2018 from 17:45-19:00. We will thank Barbara Pfieffer (Vice-Chair), Thierry Worch (Treasurer), Gastón Ares and Chantal Gilbert for their contributions during their elected terms.

Finally, whether this is your first Sensometrics or your fourteenth (or anywhere in between), I wish you a wonderful and thought-provoking meeting, and a memorable stay in Montevideo.

John Castura
Chair, Sensometric Society

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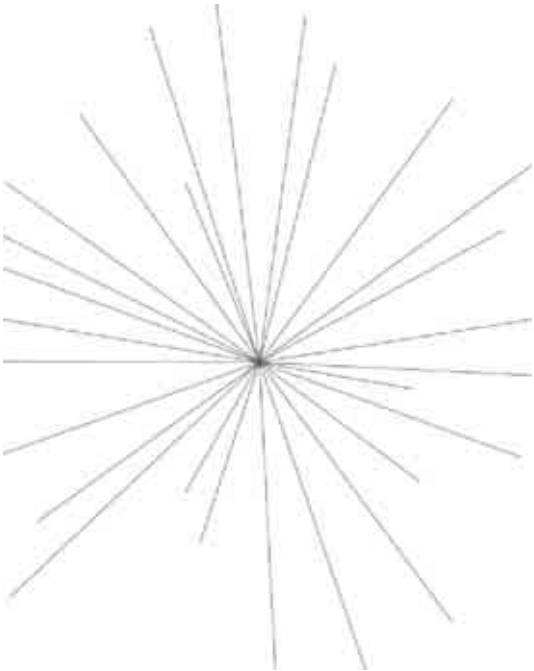
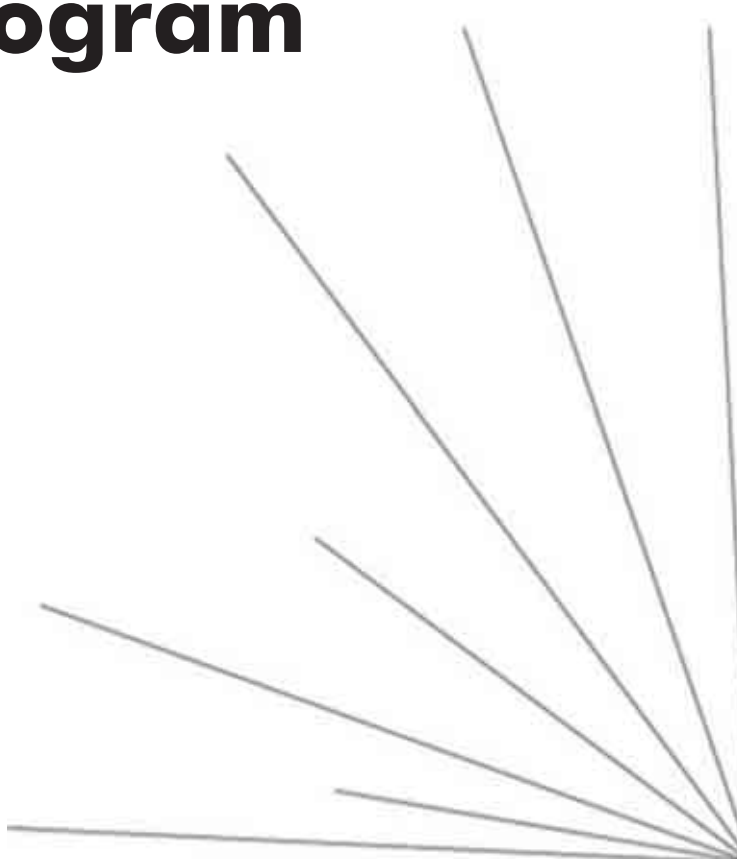


Program



9th April

08:30 - 09:00	Registration for tutorials
09:00 - 12:30	Tutorials - Morning session
12:30 - 14:00	Lunch for tutorial attendees
14:00 - 17:00	Tutorials - Afternoon session
19:00 - 21:30	Welcome cocktail

10th April

08:30 - 09:00	Opening
09:00 - 10:00	Invited speaker - Analysing individual differences in sensory science: Why and how? - Tormod Næs (NOFIMA, Norway)
10:00 - 10:30	Flash presentations
10:30 - 11:00	Coffee break
11:00 - 12:00	Oral Session 1 - Segmentation O1.1 - Consumer segmentation based on responses to check-all-that-apply (CATA) questions: Application of three way methods - Amparo Tárrega (Instituto de Agroquímica y Tecnología de Alimentos, Spain) O1.2 - Cluster analysis of multiblock datasets. Application to projective mapping/Napping and free sorting task - Fabien Llobell (XLStat, France) O1.3 - Modeling TDS data and segmenting TDS consumer panel thanks to a mixture of semi-Markov chains - Guillaume Lecuelle (INRA, France) O1.4 - Segmenting consumers on the basis of their benefit hierarchies - Juan Martínez (P&K Research, USA)
12:00-13:30	Lunch
13:30 - 15:30	Workshop - An in-depth look into collection and analysis of temporal data: A case study with TDS and TCATA - Paula Varela (NOFIMA, Norway), Ingunn Berget (NOFIMA, Norway), John Castura (Compusense Inc., Canada), Michael Meyners (Procter & Gamble, Germany), Pascal Schlich (INRA, France), Gastón Ares (Universidad de la República, Uruguay)
15:30 - 16:30	Poster session + Coffee break
16:30 - 17:45	Oral Session 2 - Relating datasets O2.1 - Impact of the questionnaire structure on overall liking results in preference mapping: a meta-analysis on 285 consumer studies - Nicolas Pineau (Nestlé Research Center, Switzerland) O2.2 - Evaluation of different approaches of “Preference sorting”: a new tool for assessing drivers of liking - Ana Carla Pinheiro (Universidade Federal de Lavras, Brazil) O2.3 - Mapping the experience of drinking. Using multiple factor analysis for contingency tables (MFACT) to understand the drinking experience of beers - Carlos Gómez-Corona (Universidad Autonoma Metropolitana, Mexico) O2.4 - Boosted regression trees for exploring the relationship between sensory and physicochemical data: application to the astringency of Uruguayan Tannat wines - Leticia Vidal (Universidad de la República, Uruguay)

O2.5 - Main factors influencing portion-size selection using PLS Path Modelling approach - Quoc Cuong Nguyen (NOFIMA, Norway)

17:45 - 19:00 Anual General Meeting of the Sensometric Society

11th April

08:30 - 09:30 Invited speaker - Methods for analyzing information from social media. Case studies - Ricardo Mansilla (Universidad Nacional Autónoma Mexicana, Mexico)

9:30 - 10:00 Flash presentations

10:00 -10:30 Coffee break

10:30 - 12:00 Oral Session 3 - Data Collection

O3.1 - It's potato, not pear! Capturing the assimilation-contrast model through physiological responses and flavor identification - Betina Piqueras-Fiszman (Wageningen University, Netherlands)

O3.2 - Investigation of effects of situational contexts and consumer expectation on the perceptual product usage experience using spread products: Development of a new consumer test method based on Kano philosophy - Yeon-Joo Lee (Ewha Womans University, South Korea)

O3.3 - Refining consumer behavior (discrete choice and eye-tracking) and sensory acceptance measures: Effect of test instructions - Hye-Seong Lee (Ewha Womans University, South Korea)

O3.4 - Connecting flavors in social media: A cross cultural study with beer pairing - (Araceli Arellano-Covarrubias, Mexico)

O3.5 - A signal detection measurement for consumer product acceptance: Degree of satisfaction-difference (DOSD) method as an alternative to hedonic scaling - Danielle van Hout (Unilever R&D, Netherlands)

O3.6 - Comparison of panel performance and influence of feedback between replication sessions of an expert and a newly trained panel – a beer case study - Line Elgaard Nielsen (Aarhus University, Denmark)

12:00 - 13:30 Lunch

13:30 - 15:30 Joint workshop Society of Sensory Professionals and Sensometric Society - Mimicking consumer experience/designing relevant tests for the consumer experience - Chris Simons (Ohio State University, USA), Ann Colonna (Oregon State University, USA), Jana Hasemann (Mars Petcare, Germany), Krystyna Rankin (IFF, USA)

15:30 - 16:15 Oral Session 4 - Handling complexity

O4.1 - Powerful visualization of product-attribute associations for T-CATA data - Michael Meyners (Procter & Gamble, Germany)

O4.2 - Excel-Based, Order-Invariant Factor Score Calculator - Tom Carr (Carr Consulting, USA)

O4.3 - Liking Product Landscape: A new methodology for visualization of consumer hedonic scores - Claudia Nallely Sánchez-Gómez (Universidad Panamericana Aguascalientes, Mexico)

16:15 - 17:30	Oral Session 5 - Temporal methods O5.1 - Time-Intensity profiling of wine models: analysis of variation among products and among panellists - Carolina Chaya (Universidad Politécnica de Madrid, Spain) O5.2 - Evaluation of time intensity curves by bootstrap confidence intervals - Fernanda Barbosa (Universidade Federal de Lavras, Brazil) O5.3 - Statistical approaches to analyze dynamic data: A comparative study using Temporal Check-All-That-Apply (TCATA), Temporal Dominance of Sensations (TDS) and Progressive Profile (PP) - Erick Esmerino (Universidade Federal Fluminense, Brazil) O5.4 - Multiple-intake TDS with untrained consumers: new challenges for sensometrics! - Pascal Schlich (INRA, France) O5.5 - Consumers can do dynamic liking and Temporal Dominance of Sensations (TDS) simultaneously as efficiently as separately - Mara Galmarini (CONICET, Argentina)
19:00	**Gala Dinner**

12th April

08:30 - 09:30	Invited speaker - Survival analysis and sensory shelf life: overview and recent developments - Guillermo Hough (Comisión de Investigaciones Científica, Argentina)
09:30-10:30	Oral Session 6 - Sensory characterization O6.1 - How do small sample sets affect data analysis results of descriptive analysis? Pauline Lestringant (UC Davis,USA) O6.2 - How to analyze CATA data that are used to characterize only one product? - Rui Xiong (The Coca-Cola Company, USA) O6.3 - Focusing consumers responses by restricting the number of answers in a CATA test: further exploration of Check-k-that-apply - Paula Varela (NOFIMA, Norway) O6.4 - What is the best way to analyse PSP data? Ingunn Berget (NOFIMA, Norway)
10:30 - 11:00	Coffee break
11:00 - 12:30	Workshop - Multiple comparison madness - Anne Hasted (Qi Statistics Ltd, UK) & Tom Carr (Carr Consulting, USA)
12:30 - 13:00	Closure
13:00 - 14:00	Lunch
14:00 - 18:00	Additional Event - Meeting of Latin American Researchers

Compusense®

We're going further with Sensometrics

Compusense is proud to be a sponsor of the 14th Sensometrics Meeting in Montevideo.

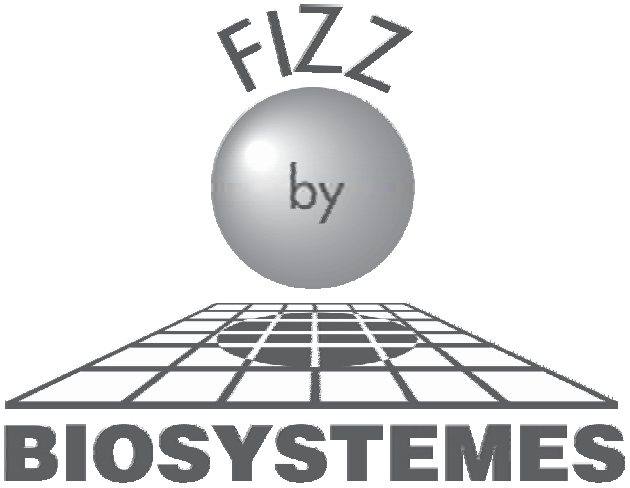
For over 30 years, Compusense has contributed to the sensory and consumer science community through our support of the Sensometrics Society and other organizations committed to promoting sensory and consumer science.
Our involvement in the Sensometrics Society is one of the ways we help further the growth of sensory and consumer science.

Selected Research Topics

- Temporal Methods (TCATA, TDS, Time Intensity)
- Sensory Informed Design
- Feedback Calibration for Descriptive Analysis
- Check-All-That-Apply
- Equivalence and Similarity
- Data Visualization

In the past year, Compusense's research efforts have produced several publications in peer-reviewed journals, numerous presentations and posters, and a range of joint projects with academic and industry partners.

To learn more about our research efforts or to collaborate with us in research, please visit **compusense.com**



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Sensometrics-related contact: Michael Meyners (meyners.m@pg.com)

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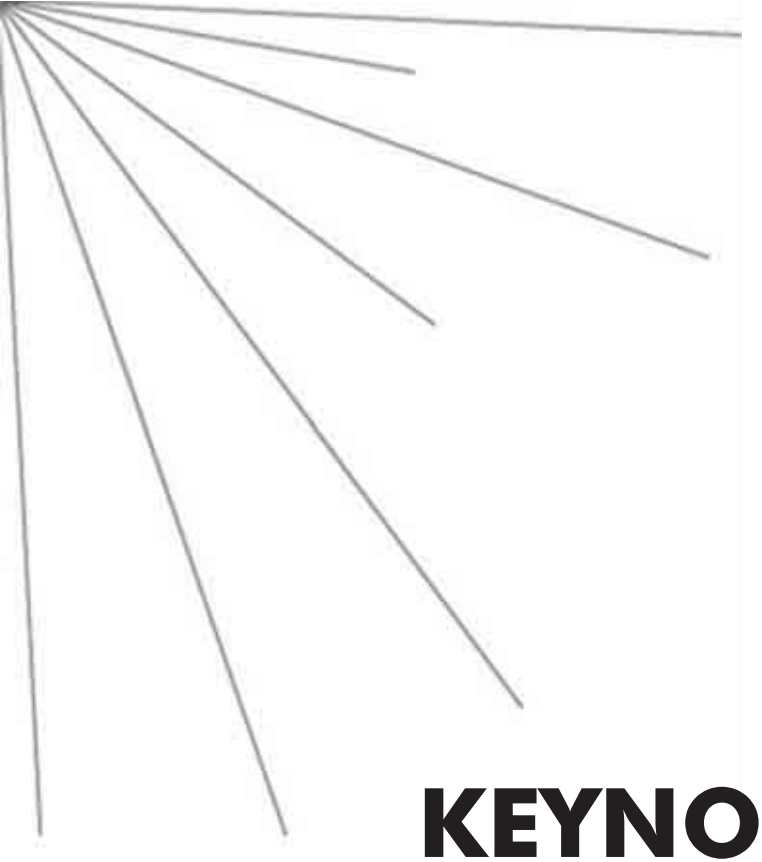


KEYNOTE PRESENTATIONS

I1

Analysing individual differences in sensory science: Why and how?

Tormod Næs
NOFIMA (Norway)

Abstract

The talk will start with a discussion of generic aspects of why and how to analyse individual differences in sensory science. Different data types and structures and how to combine them will be in focus. Similarities and differences among different methods and data structures will be highlighted. Some distinctions between situations with common structure will be presented. The concrete examples given will focus on validation, different types of segmentation, analysing individual differences per se, combining data that do not share the same dimensions and distributions around the mean. Both descriptive sensory data and consumer liking data will be discussed.

Abbreviated CV

Tormod Næs has a PhD in Statistics from University of Oslo. He currently works as Senior researcher at Nofima at Ås, Norway. His experience covers both method development and applications within a large number of areas; the most important being spectroscopy, process optimisation, product development and sensory science. He has been involved in more than 200 peer review papers published in journals related to statistics, chemometrics, food science, sensory science, spectroscopy and analytical chemistry. Tormod has also co-authored and co-edited 5 books in the areas of chemometrics, statistics and sensory science. He has supervised 22 students to final PhD degree and has been the European editor of Journal of Chemometrics and Associate editor of Technometrics.

I2

Methods for analyzing information from social media. Case studies

Ricardo Mansilla
Universidad Nacional Autónoma Mexicana (Mexico)

Abstract

In the last decade there has been a revolution in the area of artificial intelligence. The spectacular growth of storage capacities and the consistent increase in the speed of data processing has allowed the development and use of algorithms that until now were prohibitive due to their computational cost. In particular, algorithms have been developed for the semantic comprehension of natural languages. This has allowed us to analyze the enormous volumes of data that arise from the interaction of users of social networks. In this work we intend to show our experience in the analysis of information from social networks to understand phenomena of political, economic and marketing character. The exposition goes through three fundamental lines: sentiment analysis, that is, the procedures to establish if a certain phrase has a positive, negative or neutral sense for the subject; topological properties of user networks and how it relates to the existence of trolls and influencers and last, but not least, the creation of user profiles based on the behavior of the users of these networks. As a case study we will show the results we are obtaining in the current electoral campaign for the Mexican presidency.

Abbreviated CV

Ricardo Mansilla has a Ph. D. in Mathematics from the University of Havana, Cuba and a Master's Degree in Economics from the University of Carleton Canada. He currently works in the Universidad Nacional Autónoma Mexicana. His scientific interests are related to the evolutionary models of DNA, financial markets and artificial intelligence. In this last field he has worked on methods for extracting and analyzing information from social networks. He has published more than 40 journal articles and is coauthor of four books.

I3

Survival analysis and sensory shelf life: overview and recent developments

Guillermo Hough
Comisión de Investigaciones Científicas de la Provincia de Buenos Aires (Argentina)

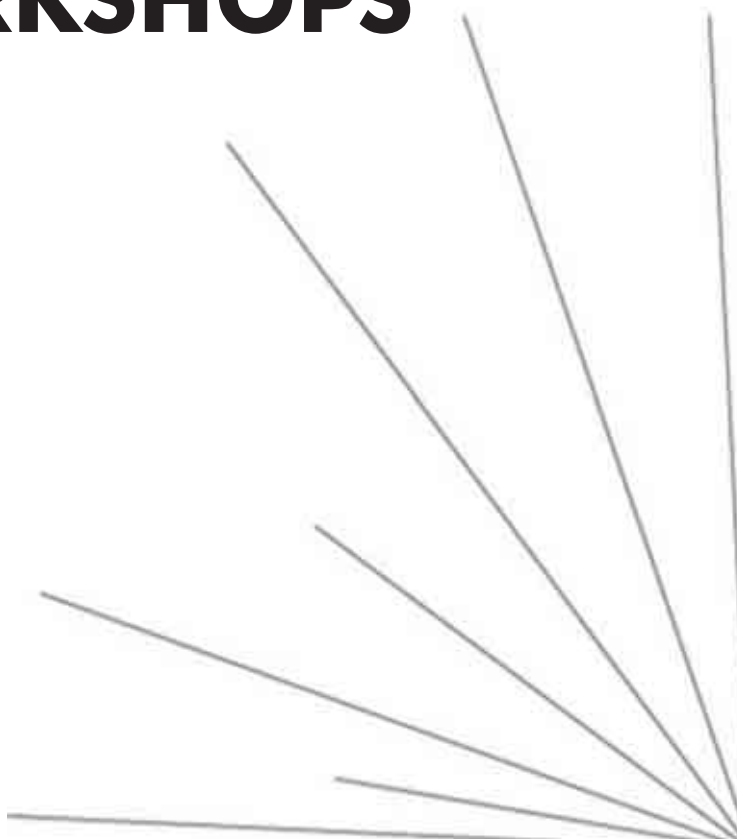
Abstract

Survival analysis is a statistical tool which has been widely used in disciplines such as epidemiology, biology and reliability. It was introduced to sensory shelf-life (SSL) estimation at the beginning of the 2000's, with the basic concept of focusing the SSL, not on the product deteriorating, but rather on the consumer rejecting it.
Since the initial development of the methodology, there have been a number of SSL extensions. Co-variables were introduced to establish how product's formulations, consumer demographics or occasions (purchase or consumption) influenced SSL. A particular type of co-variable was temperature, a frequently used accelerating factor, which was introduced to estimate a pseudo activation energy of consumer's rejection in relation to product's storage temperature. Recently this model has been extended to include a second accelerating factor acting simultaneously with temperature. Sometimes it is not convenient to have consumers evaluate all samples corresponding to different storage times. This difficulty can be overcome by having each consumer evaluate a single sample and applying a current-status model to the data.
Survival analysis has also been applied to other situations other than SSL. In determining the optimum concentration of a food ingredient such as salt, a product can be judged to be not-salty-enough, ok or too salty. Modeling this type of data has been used to determine optimum color of a yogurt, bread salt concentration and sugar levels in a dairy dessert. Another application of survival analysis has been threshold estimation when the 3-AFC ascending method is used, where the correct chance probability was considered in the model.

Abbreviated CV

Dr. Guillermo Hough is a research scientist of the Comisión de Investigaciones Científicas-Buenos Aires- Argentina. He is on the editorial board of Food Quality and Preference and Journal of Sensory Studies, and is author of over 100 published journal articles, of which 84 are in the field of sensory and consumer science. He is also author of the book: “Sensory Shelf Life Estimation of Food Products". He has coordinated international projects with researchers from Latin America, Spain and the USA and has taught numerous courses in the Americas and Europe.

WORKSHOPS



W1

An in-depth look into collection and analysis of temporal data: A case study with TDS and TCATA

Paula Varela[1], Ingunn Berget[1], John Castura[2], Michael Meyners[3], Pascal Schlich[4], Gastón Ares[5]
[1] NOFIMA (Norway), [2] Compusense Inc. (Canada), [3] Procter & Gamble (Germany), [4] INRA (France), [5]Universidad de la República (Uruguay)

Abstract

Temporal Dominance of Sensations (TDS) and Temporal Check All That Apply (TCATA) are currently the most used and discussed temporal methods in sensory and consumer science. TDS describes the evolution of the dominant attributes during consumption, understood as the sensation that captures the attention, the most striking, or a new sensation that pops up, not necessarily the most intense. Meanwhile, in TCATA the assessors continually check and uncheck all the attributes they consider that apply to the sample at each moment in the consumption. Pros and cons have been discussed for both methods, from a data collection perspective, regarding difficulty for assessors, the complexity of the concept of dominance and from a perceptual and application perspective, as the relation to drivers of liking. Recently, a new TDS variant, with an evaluation by sensory modality (e.g. flavour and texture) was also proposed, to overcome the competition between modalities in TDS evaluation.

Different statistical methods have been used for analyzing both approaches, coming from the nature of the data, and maybe driven by historical reasons, however, no formal comparison has been done before between the data collection methods and data analysis implications.

A case study involving the evaluation of 8 yogurts varying in texture and flavour were evaluated by a trained panel using three temporal methods: TDS, TDS by modality and TCATA. The workshop will give an in-depth look into the results of the study using four different statistical approaches. Implications for data collection, analysis and interpretation of the results will be discussed.

W2

Designing consumer-relevant testing
Joint workshop of the Society of Sensory Professionals and the Sensometric Society

Abstract

With the increasing power of technology and software, consumer and sensory scientists are looking beyond the traditional CLT, to alternative testing methods that better mimic real-world consumer experiences. While this may provide more relevant information on consumer perception and decision-making, statisticians are faced with the challenge of understanding what data are being collected and how to analyze them.

This joint workshop with the Society of Sensory Professionals (SSP) focuses on unique research (both quantitative and qualitative) designed to capture realistic consumer environments. It will involve presentations from leading researchers at universities and international companies on various new technologies and innovative methodologies for both consumer and sensory testing of foods and non-foods. Presenters will pose questions and challenges to a panel of expert statisticians for a discussion of ways in which we can push the boundaries of Sensometrics.

Moderator:
Hal MacFie – Hal MacFie Training Services (UK)

Presenters:
Chris Simons – Ohio State University (USA)
Ann Colonna – Oregon State University (USA)
Jana Hasemann – Mars Petcare (Germany)
Krystyna Rankin – IFF (USA)

Statistician Panel:
John Castura – Compusense (Canada)
Tom Carr – Carr Consulting (USA)
Leticia Vidal – Universidad de la República (Uruguay)

W3
Multiple Comparison Madness

Anne Hasted[1], Gemma Hodgson[1], Tom Carr[2]
[1]Qi Statistics Ltd, Reading, United Kingdom
[2]Carr Consulting

Abstract

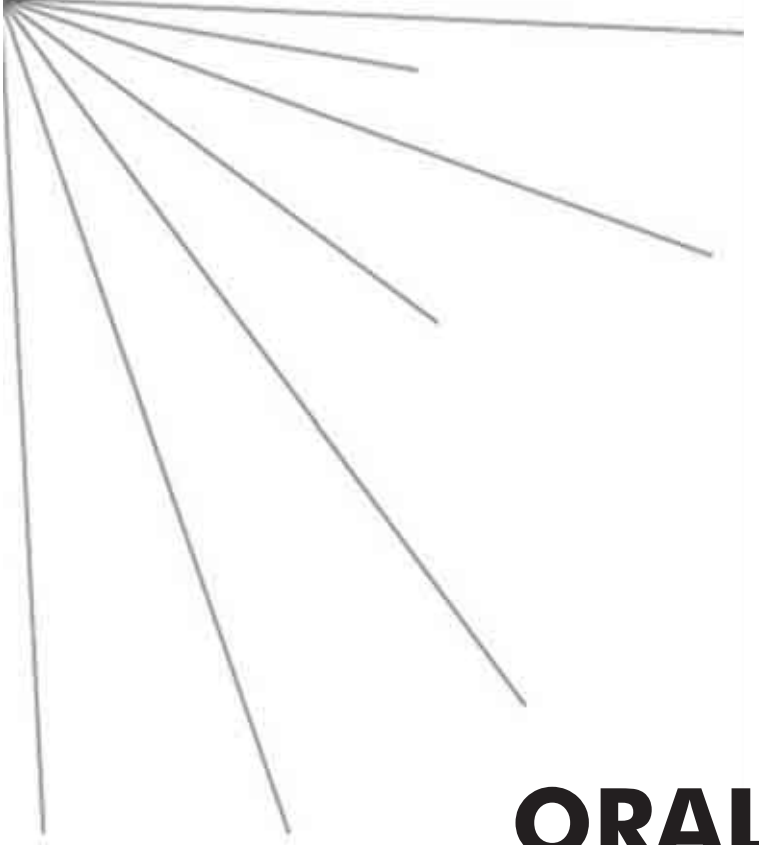
This workshop aims to re-energise the debate on the correct application of multiple comparison tests

Multiple comparison tests are devised to minimise the risk of finding spurious 'significant' differences. Many different multiple comparison tests have been proposed and are applied routinely in our field depending on whether the statistical tests are based on parametric or non parametric assumptions. In other scientific fields these tests are encountered less often as many studies are tackled using structured samples from factorial experimental designs.

There is widespread confusion among non-statisticians on the “when and why” of these tests and it is a question that consulting statisticians are frequently asked and often (myself included) find difficult to answer convincingly.

Additionally these tests add to the problems of over reliance on statistical significance, given that different tests can give different comparative significance levels, leading to the question of ”which one should we use??”

Real data examples will be used to illustrate the problems that can arise in interpreting results when the multiple comparison tests are automatically applied by statistical software, with the expectation that this will generate a lively and useful discussion from experts in the audience.



ORAL PRESENTATIONS

O1.1

Consumer segmentation based on responses to check-all-that-apply (CATA) questions: Application of three way methods

Amparo Tarrega[1], Ingunn Berget[2], Sara Jaeger[3], Paula Varela[2], Gastón Ares[4]
[1]IATA-CSIC, Valencia, Spain [2]Nofima AS, Ås, Norway [3]The New Zealand Institute for Plant & Food Research Limited, Auckland, New Zealand [4]Universidad de la República, Montevideo, Uruguay

Abstract

Check-all-that-apply (CATA) questions have become one of the most popular question formats for uncovering consumer perception of food products. Their main applications include sensory characterization and the identification of emotional associations with food products. Data from CATA questions are usually analyzed considering responses from all consumers, without taking into account consumer individual differences. The aim of the present work was to explore consumer segmentation based on responses to CATA questions using three way methods. Results from 6 consumer studies, involving sensory characterization or emotional associations to foods conducted in four different countries were analyzed. A simplified Tucker three mode PCA, often referred to as partial triadic analysis (PTA) which is a variant of STATIS, was conducted. A representation of consumers corresponding to the scores of the eigenvalue decomposition applied on the matrix of RV coefficients between each pair of tables was obtained. Hierarchical cluster analysis was applied on consumers' factor scores. Data for each cluster were analyzed using standard approaches (contingency tables, Cochran Q test, sign test and correspondence analysis). Groups of consumers with different perception were identified in the six studies. Differences between the groups differed with the dataset studied: in some studies differences were related to ability to discriminate samples, whereas in other studies differences were attributed to differences in sensory or emotional reaction towards specific samples. Results from the present work show the potential of three way methods to segment consumers based on their responses to CATA questions.

O1.2

Cluster analysis of multiblock datasets. Application to projective mapping/Napping and free sorting task.

Fabien Llobell[1,2], Véronique Cariou[1], Evelyne Vigneau1, Amaury Labenne[2], El Mostafa Qannari[1]
[1]StatSC, ONIRIS, INRA, Nantes, France [2]Addinsoft, Paris, France

Abstract

Several sensory procedures directly lead to multiblock datasets. For instance, we can cite conventional or free choice profiling evaluation, projective mapping/Napping, CATA, free sorting task…

For conventional or free choice profiling evaluation, methods of cluster analysis have been proposed with the aim of identifying sub-groups of assessors or outlying assessors (Dahl and Naes, 2004). It was shown that this kind of investigation is relevant, notwithstanding the fact that, because of the preliminary training, the assessors are assumed to form a homogeneous group.

In projective mapping/Napping task, methods of cluster analysis were also proposed (Vidal and al., 2015) and are backed up by the idea that not all the subjects have the same perception of the differences among the products.

We propose a cluster analysis approach of multiblock datasets. This approach consists in an extension of the CLV method (Vigneau and Qannari, 2003) and has some connections with the method called CLV3W (Cariou and Wilderjans, 2017). It aims at minimizing a criterion which reflects the fact that we are seeking homogeneous clusters of datasets. More precisely, the datasets in each cluster are assumed to be highly related to a latent configuration which is determined by means of the STATIS method. Two procedures are implemented. The first procedure consists in an iterative algorithm akin to the k-means algorithm. The second strategy consists in a hierarchical cluster analysis. Both strategies aim at optimizing the same criterion and, in practice, complement each other. More precisely, the hierarchical cluster analysis can help selecting the appropriate number of clusters and provides a starting partition of the datasets that can be improved by means of the iterative algorithm.

The global strategy of analysis is illustrated using projective mapping/Napping and free sorting data. Its benefits in comparison to other strategies of analysis are discussed.

O1.3

Modeling TDS data and segmenting TDS consumer panel thanks to a mixture of semi-Markov chains

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Abstract

Temporal Dominance of Sensations (TDS), as a rapid sensory profiling technique, is more and more used with consumers. At the last Sensometrics Meeting, we introduced the modeling of TDS data with semi-Markov chains (). Semi-Markov chains model the probabilities of transition from one dominant attribute to another one under the assumption that what happened before has no impact on these probabilities, and estimate distributions of attribute dominance durations. Graphical representations of this modeling have suggested the existence of several perceptions for a same product among the population.

In this paper, we introduce a new model assuming the existence of consumer segments and uncovering them. Each segment gathers people having homogenous temporal perception of the tasted product. This model is based on a mixture of semi-Markov chains whose parameters are estimated with the EM algorithm. The BIC criterion is used for determining the number of segments. Finally the segments are determined using the maximum a posteriori classification.

This paper presents mathematical background of the mixture of semi-Markov chains. The pertinence of the estimation procedure is illustrated on simulated datasets. Then, results of the segmentation applied on a Gouda cheese dataset from an ESN study with 665 consumers from 6 countries () are presented.

Keywords: Temporal Dominance of Sensations, Semi-Markov chains, Consumer segmentation, Model based clustering

Lecuelle, G., Visalli, M., Cardot, H., & Schlich, P. (2017). Modeling Temporal Dominance of Sensations with semi-Markov chains. Food Quality and Preference.

Thomas, A., Chambault, M., Dreyfuss, L., Gilbert, C. C., Hegyi, A., Henneberg, S., et al. (2017). Measuring temporal liking simultaneously to Temporal Dominance of Sensations in several intakes. An application to Gouda cheeses in 6 Europeans countries. Food Research International, 99, 426-434.

O1.4

Segmenting consumers on the basis of their benefit hierarchies

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Abstract

An understanding of how consumers prioritize product benefits is important at all stages of the product development cycle. Different data collection methods have been proposed to uncover these benefit hierarchies. We conducted an on-line study comparing four methodologies (a 5-point importance rating scale, benefit selection and ranking, maximum difference scaling, and Kano), using 30 attributes drawn from two product categories, with 200 respondents per method/category.

The results showed that hierarchies across the four methods were relatively consistent. Kano provided unique insights due to the two-dimensional interpretation inherent in the method: each benefit is evaluated from a positive perspective (how would you feel if the benefit was present) and negative perspective (how would you feel if it was not present).

It is likely that consumers do not all agree on the relative importance of category benefits and that consumer segments exist in the market place that differ with respect to which benefits most drive their purchase decisions. The prior comparisons of the four data collection methods were based on an analysis of the total respondent sample and selected a priori defined demographic subgroups. Here we wish to investigate if the methods differ in the segments they uncover based on an a posteriori clustering of the respondent level data. We compare the four methods with respect to the segmentation solutions, evaluating each segmentation both statistically as well as on the basis of interpretability and added insight. Our results confirm and extend our conclusions regarding the value of the Kano method: its two-dimensional perspective can provide deeper insight into the underlying consumer segmentation. We offer recommendations on the combination of data collection method and segmentation strategy most suitable to the study purpose and resources available to the researcher.

O2.1

Impact of the questionnaire structure on overall liking results in preference mapping: a meta-analysis on 285 consumer studies

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Abstract

Preference mapping is one of the most often used method in food industry in order to capture the liking of consumers for a set of products of interest. Literature is rich on this topic and many methods have been proposed to capture the most relevant information from the consumers.

In order to build knowledge from historical data, Nestlé recently opened an internal platform to collect and analyse preference mapping data. Since beginning of 2015, 285 studies from different markets and different product categories were collected. Considering a meta-analysis approach, we aim at investigating methodological aspects in order to improve the protocol and questionnaire of preference mapping studies.

To start with a simple question, the aim was to estimate the impact of the presentation order effect on the overall liking, and as expected the product tested first generally reaches a significantly higher liking score than the second product. It was however observed that this gap is different from one product category to another.

The second question of interest was to estimate the impact of the length of the questionnaire, i.e. the number of closed questions addressed to the consumer on top of the overall liking, on the ability of the consumer panel to differentiate the products in terms of liking. The ability to discriminate products was approximated by several indexes and results were compared between studies with the overall liking question only and studies with overall liking and additional closed questions. Results show a tendency to decrease discrimination ability when additional closed questions are proposed in the questionnaire, which would tend to indicate that fatigue increases when the number of questions is higher. This trend was observed in most of the product categories, but not always with the same amplitude.

O2.2

Evaluation of different approaches of "Preference sorting": a new tool for assessing drivers of liking

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Abstract

Sorting task is a simple procedure for collecting similarity data in which each assessor groups together stimuli based on their characteristics perceived similarities. However, this methodology does not provide responses about the preference of products. This study aimed to assess different approaches of "Preference sorting" task to assess both affective and descriptive information. It was evaluated three approaches: I – The samples were grouped according to the similarities, i.e., the samples with similar characteristics were jointed in the same group. After the sorting task, the panelists evaluated each sample according to the hedonic scale, pointing an acceptance note for each sample. In this case we have a conventional sorting task with a conventional acceptance test in the same session.; II- The samples were grouped according to the preference, i.e., samples with similar acceptance were jointed in the same group, and an acceptance score was given to the group and then, the characteristics that most contributed to the group acceptance were pointed; III – The samples were also grouped according to the preference in the same way of proposal II, but after the sorting task, each sample was described separately, i.e. the characteristics that most characterize each sample were pointed. The results were analyzed by multiple factor analysis (MFA) and through the RV coefficient. It was noted that the different approaches provided different samples configurations (groups and descriptions), being the proposals I and III more similar according to the RV coefficient (RV=0.67). Therefore, the grouping criteria and the way to descript the samples characteristics affect the "Preference sorting" results.

O2.3

Mapping the experience of drinking. Using multiple factor analysis for contingency tables (MFACT) to understand the drinking experience of beers

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Abstract

Our interaction with the world is mediated by three systems: affects, senses and cognition. Humans use these systems to interact with the social and material world, and the stimulation of these systems gives space to what we call “product experience”. Today, the consumer is changing from being a collector of possessions to a collector of experiences, a homo experientialis. But how to measure the experience?
A study was conducted to measure the experience of drinking craft and industrial beers. A total of 400 consumers were invited to drink one beer at a restaurant, rate liking and select a set of phrases that better described their experience. Results of the phrases selection were compiled in frequencies sub-tables: products*sensory-phrases, products*cognitive-phrases and products* affective-phrases. A Multiple Factor Analysis for Contingency Table with phrases as active variables and liking and purchase intention as supplementary variables was used to perform the analysis. The RV coefficient between variables showed that liking was more correlated to the sensory dimension (RV coefficient 0.825), followed by cognitive (RV coefficient 0.328) and affective dimension (RV coefficient 0.316). The first two factors of the MFACT (73% variance) indicated that craft beers evoked a more cognitive experience while the industrial beers evoked a more sensory or affective experience. This suggests that the consumers' relationship with craft beers relies more on cognitive processes than their relationship with industrial beers. In other words, drinking craft beer is associated with thinking, memorising or mentally representing the product. We therefore propose that the drinking experience can be better understood by taking into consideration three dimensions: sensory, affective and cognitive. One dimension or a mix of them can be more salient during drinking experience. This approach with an MFACT analysis enables the researcher to measure the drinking experience, merging the information obtained from each dimension.

O2.4

Boosted regression trees for exploring the relationship between sensory and physicochemical data: application to the astringency of Uruguayan Tannat wines

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Abstract

Boosted regression trees (BRT) are a novel approach for studying the relationship between sets of data. They take advantage of both statistics and machine learning techniques as they combine a large amount of simple regression trees to build a single model that optimizes the predictive performance. Despite the potential of BRT for studying complex phenomena such as sensory perception, their application in sensory and consumer science is still scarce. In this context, the aim of the present work was to study the relationship between astringency and phenolic composition of commercial Uruguayan Tannat wines using boosted regression trees. Forty commercial Tannat wines were evaluated by a trained sensory panel (9 members), who assessed total astringency intensity using time-intensity (TI) and described astringency sub-qualities using a check-all-that-apply (CATA) question composed of sixteen terms. The polyphenolic profiles of the wines were determined by HPLC-MS and conventional oenological parameters were also obtained. Fifty BRT models with different partitions of the data in training and test sets were built for astringency maximum intensity (Imax) and for the frequency of use of the 16 astringency sub-qualities considered in the CATA question. As predictor variables, 84 phenolic compounds and oenological parameters were considered for all BRT models. Both strong and weak predictive models were obtained for each response variable. Predictive accuracy was much higher for astringency intensity than for the frequency of mention of astringency sub-qualities. Still, the BRT models allowed to point out to some compositional variables most likely involved in wine astringency perception. However, the effect of these predictors differed according to the astringency sub-quality considered as response. As expected, non-linear relationships between phenolic compounds and astringency were found. Results of the present work highlight the potential of BRT models for exploring the influence of physiochemical variables on complex sensory characteristics, such as wine astringency.

O2.5

Main factors influencing portion-size selection using PLS Path Modelling approach

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Abstract

Recently, the expectations of satiation and satiety have increasingly been investigated because of the interest in how they, along with liking, can modulate portion-size selection; however, the contribution of each aspect to portion-size selection has not been unveiled. The study aims to confirm the conceptual framework by simultaneously assessing the relative influence of consumer characteristics and product-related properties on portion-size selection utilizing PLS-Path Modelling (PLS-PM) approach.

In this study, consumers (n=110) first answered questions regarding attitudes to health and hedonic characteristics of foods, then completed hunger and fullness questions, and finally, in an evaluation step, they tasted each sample and rated liking, expected satiation, expected satiety and portion-size. The consumers were also classified for mouth behaviour by using the JBMB™ tool. Eight yoghurt samples, based on DOE, with identical composition, varying in textural properties, were used in the study.

Principal Component Analysis revealed that consumer ratings (liking, satiation, satiety, portion-size) depended firstly on the thickness, and then on particle size of samples. From that, two models could be considered; one for thickness dimension, another for particle size dimension.

PLS-PM was used to generate the model, indicating that liking was a direct predictor of portion-size, with a stronger effect than satiation or satiety. The relationship between liking and satiety was observed both in direct direction (liking-satiety) and also indirect direction throughout satiation (liking-satiation-satiety). Concerning the differences between models, the first model suggested that mental hunger and physical hunger were significantly correlated with liking while the second model showed that these variables had a high relation to satiation.

These findings implied that liking was a main factor in the prediction of portion-size. The link between these factors was complex, which might be better unveiled through PLS-PM approach.

O3.1

It's potato, not pear! Capturing the assimilation-contrast model throughphysiological responses and flavor identification.

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Abstract

The assimilation-contrast model is commonly used by food science researchers to account for consumers responses on food that are based on expectations. Whether a particular food product will lead to assimilation or contrast depends on the size of the disconfirmation between the expected and actual qualities. Disconfirmations of a large magnitude may lead to strong reactions, which take place immediately and automatically. Physiological responses reflect the mechanisms that the consumer cannot control and is unaware of. However, to date studies using Autonomic Nervous System in the food domain have assumed that changes observed were due to liking, but the responses could also be due to an unexpected (disliked) taste.
We present results of the first systematic study disentangling the stimuli's liking and the level of (in)congruity between the expected and the perceived flavor to be able to capture the assimilation-contrast model through heart rate and skin conductance. We also link these responses to participants' conscious flavor identification.
For this purpose 85 participants tasted fruit and vegetable juices that differed in pleasantness. The expectations were manipulated by showing them the supposed ingredient of the sample before tasting it. In each group, one sample that confirmed expectations and two that disconfirmed them were included. The incongruent samples varied in the degree of the disconfirmation of the expectations. The effect of assimilation on ANS responses was tested by comparing in each group the ANS responses of the samples that matched expectations to those that disconfirmed them in a small degree. The effect of contrast was tested by comparing the ANS responses of the samples that matched expectations to those with the larger degree of disconfirmation. Finally, participants had to guess the flavor of the samples by selecting the flavor(s) perceived in a CATA question.

O3.2

Investigation of effects of situational contexts and consumer expectation on the perceptual product usage experience using spread products: Development of a new consumer test method based on Kano philosophy

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Abstract

In the fast moving consumer goods industry, measuring consumer product usage experience and understanding its relation to satisfaction is crucial for product development and marketing. To measure consumer experience throughout the various product usage stages, a novel two-step rating-based 'double-faced applicability' (DFA) test with a novel output measure of affect/applicability magnitude (d'A) have recently been developed by Kim et al. (2017ab). Attributes used in DFA were pre-determined by the preliminary consumer study as reported by Kim et al (2015). When assuming the attributes in DFA have a linear relationship with satisfaction, the affect/applicability magnitude of product attributes can be directly related with the magnitude of satisfaction (d'S). Yet, it is likely to assume there are attributes having different relationships with satisfaction, as proposed in Kano model. To investigate this, the consumer test method needs to differentiate attributes into classes, which require different business strategies. Especially when there is no preliminary consumer evidence for a set of product attributes under development, it would be critical to test consumer expectations as well as perceptual experience with the product attributes. Also situational contexts of the product usage influences consumer expectation and consumer perceptual product usage experience. The objectives of the present study were: 1) Developing a new attribute-based consumer test methodology consisted of series of tests including expectation, applicability and its consequences for liking. This was to enable the product attributes to be classified based on the consumer expectation, and to quantify both the expectation and experience of the product usage related with the satisfaction; 2) Investigating effects of situational contexts (easy meals, organic healthy meals for picnic, and delicious and generous meals) on the product expectation and experience. Six different spread products were used. Performance of the new method was studied in comparison with the satisfaction test method incorporating DFA.

O3.3

Refining consumer behavior (discrete choice and eye-tracking) and sensory acceptance measures: Effect of test instructions

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Abstract

Discrete choice experiment (DCE) with eye-tracking have been applied to study the relative importance of package variables that determine food choice and to investigate consumer individual differences in decision making. In such experiments, subjects may intentionally give more attention to the stimuli due to the hidden demand characteristics of the experiment, which may reduce the validity of the results. In order to overcome this problem, changes in the test instructions can be introduced. The objectives of this study were to test the effect of test instructions on results from DCE combined with eye-tracking and sensory acceptance tests. A consumer test involving a DCE with eye-tracking was applied for studying consumer perception of yogurt package variables (image, probiotics claim, taste description and nutritional information), which was followed by a sensory acceptance test. A reduced hidden demand characteristics (RHDC) instruction was designed by introducing the task as a simple preceding procedure to the acceptance test of a yogurt. In addition, for the acceptance test following DCE, an affective instruction was designed to increase attention and personal involvement by introducing the sample as a recommendation based on the choices made in the DCE. A total of 240 female consumers were randomly divided into three groups; two groups received the RHDC instruction for DCE; only one of these two groups received the affective instruction for the sensory acceptance test. All three groups tasted the same stimulus for the sensory test.
Results from both DCE and Eye-tracking showed that the relative importance of nutritional information on consumers' choices was increased when they received the RHDC instruction. The affective instruction for sensory acceptance test caused a significant increase in hedonic scores. These results suggest that care must be taken when designing test instructions in consumer research to assure valid results.

O3.4

Connecting flavors in social media: a cross cultural study with beer pairing

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Abstract

Food preferences and ingredients combinations are learned from our culture. The cultural variety in culinary practices across countries raises the question of how flavor combinations are built and how they transcend individual differences. For example, in Latin America, despite of having similar cultures and language, the diversity in culinary practices leads to different flavor combinations across countries. Therefore, we hypothesize that each country will show different preferences in flavor combinations that could be understood by social media exploration as an innovative approach.

One study was conducted exploring social media in four countries (Argentina, Colombia, Peru, and Mexico), to retrieve data from them through Synthesio® platform, which enables to find social media information. The search was done on a one-year basis, using a list of fifty seven key words associated to beer flavors. In a first analysis, the list of mentions from consumers was categorized in frequencies of flavors per country and analyzed using correspondence analysis (CA) and agglomerative hierarchical clustering (AHC). Results from the first two dimensions of the CA (95.85% of inertia) and AHC showed that the countries could be clustered in three groups. Cluster 1 with Mexico and Peru, and the rest of the countries in different clusters. In the second analysis, the co-occurrence of paired flavors in social media was used to build a similarity matrix that was analyzed using multidimensional scaling (MDS) in order to find a pattern of pairing per country. The distance between flavors in the MDS map showed how the beer flavors were paired, from the most similar to the least similar. This MDS map was useful to understand the cultural differences in flavor paring per country. Overall, the analysis of flavor pairing through social media was an effective technique to access the structure of flavor pairing for beer in different countries.

O3.5

A signal detection measurement for consumer product acceptance: Degree of satisfaction-difference (DOSD) method as an alternative to hedonic scaling

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Abstract

Predictions of consumer acceptance are often based on hedonic scores. But, hedonic scores are determined not only by the consumer level of product liking, but also consumer scale usage, which in turn is affected by experimental contexts. To measure consumer product acceptance in a more valid and reliable way, in the present study, an indirect scaling method, 'Degree of Satisfaction-Difference (DOSD)' was developed using a reminder design and signal detection theory (SDT). In this method, each test product was presented by pairing with the fixed reference product, always situated in the first position, to improve the validity of the results by reminding consumers of the evaluation context and to control the contrast effects caused by carry over. Consumers were required to evaluate the reference first for satisfaction, and then evaluate the test product (including the blind reference) for satisfaction as well as satisfaction in comparison to the reference. The comparative (distance) measure of the degree of satisfaction-difference from the reference product was computed in d' using the responses to the blind reference as a noise distribution based on the SDT A-Not A model. It was found that in the DOSD method, consumers showed consistent responses for the same stimuli when the contextual stimulus was changed, whereas hedonic scaling, performed as a control, did not. Additionally, in the DOSD, the absolute measure of the satisfaction degree for each sample including the reference was scaled in d', using the responses from a neutral product found neither satisfying nor not satisfying as a noise distribution. Compared to hedonic scores, in which it is difficult to interpret what a certain score means, the resulting output could be more clearly understood. These indicate that the DOSD method enables the computation of various measures that reveal information of consumer relevance in terms of perception and evaluation.

O3.6

Comparison of panel performance and influence of feedback between replication sessions of an expert and a newly trained panel – a beer case study

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Abstract

Level of training, experience and product knowledge influences performance of a sensory descriptive analysis panel. The Feedback Calibration Method (FCM) is an approach for training a panel were assessors receive immediate feedback on their performance. This immediate feedback is argued to result in more precise final product evaluations. It is currently unknown whether differences in panel experience are affecting how well panels responds to FCM.
The response to FCM by an internal expert panel (9 assessors, professional product specific knowledge, and years of training) was compared to that of an external trained panel (9 assessors, interest based product knowledge, newly trained) in a descriptive analysis of 5 beers. The aim was to investigate if the newly trained panel was influenced differently by FCM compared to the experienced panel, by looking at in-range frequency counts (scoring of a sample within the pre-defined intensity range). The beers were evaluated in three replication sessions with assessors receiving FCM feedback between each replication session. The performance of the panels was assessed via spider plots, profile plots, F-values, MSE-values and p*MSE-values.
The experienced panel performed better than the newly trained panel with respect to discrimination of beers and replication of own results. However, the results showed the same overall positions of beers for the two panels. This indicate that the newly trained panel possibly could perform similarly to the experienced panel with a small amount of additional training. Results from the in-range frequency counts between the three sessions, showed no overall difference between panels. However, for some products and attributes there was an increase in hits, while for others there was a decrease. From this, we conclude that FCM is useful over a short-term training session, but more long-term training sessions are needed to increase the panel performance on all attributes and samples.

O4.1

Powerful visualization of product-attribute associations for T-CATA data

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Abstract

T-CATA extends CATA by adding a temporal dimension to the evaluation. Because T-CATA extends CATA, an obvious visualization of product-attribute associations over time is to treat product x time combinations as individual observations and then use classical Correspondence Analysis (CA) to visualize the associations. Often the CA results and visualization emphasize the chronological features. However, this approach could lead to misinterpretations as time is not just a feature but also a confound. Because of time, all products might show convergence to, e.g., off flavor, which is produced only by a few observations that provide a relative but not an absolute peak in this attribute.
Therefore, we suggest alternative CA approaches to analyze T-CATA data that emphasize (Canonical CA, CCA) or remove (Escofier's Conditional CA, ConCA) temporal effects. CCA is akin to redundancy analysis. It uses external information—time and product—to highlight an overall temporal profile applying to all products. CCA nicely displays the main product differences within the attribute space. CCA better emphasizes than CA the unique properties of each product over time. Escofier's conditional CA (ConCA) removes confounding effects such as time. ConCA provides two features for T-CATA: (1) effects adjusted for time and (2) more appropriate measures of strength of association that can be used with CA for better visualization.
We exemplify the proposed methods by means of data from a study on orange squashes. The relevance of off flavor is (correctly) found to be largely de-emphasized compared to plain CA: CCA shows off flavor as an average effect because of time and ConCA shows off flavor does not contribute to the overall effect. Together CCA and ConCA facilitate a richer, more detailed, and potentially more accurate interpretation of the data. The approaches can be equally used for Temporal Dominance of Sensations (TDS) data.

O4.2

Excel-Based, Order-Invariant Factor Score Calculator

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Abstract

It is common in sensory evaluation for the number of attributes measured on a sample to be greater than the number of products in the study. This has impacts on multivariate analyses, such as factor analysis (FA), that are performed on sensory data to generate perceptual maps. Statistical software programs that perform multivariate analyses handle this issue differently. For example, Minitab does not perform FA on data sets with more attributes than products. For statistical programs that will perform FA on typical sets of sensory data, such as SAS, an important concern is how new products (i.e., ones not included in the data when the perceptual map was created) are located on an existing perceptual map. In data-analytic terms, this reduces to how the statistical program calculates the factor scores of the new products. A recognized limitation of SAS is that when there are more attributes than products in the original data set, the calculated values of the factor scores of new products are dependent on the order in which the attributes are listed in the FA.
The order-dependence of SAS's factor score calculations is illustrated using a typical sensory data set. An easy to implement, Excel-based alternative for calculating factor scores is presented that does not share the order-dependence limitation of the SAS procedure. The alternative is offered to current users of SAS who would prefer not to switch to a new statistical program to obtain invariant factor scores on new products.

O4.3

Liking Product Landscape: A new methodology for visualization of consumer hedonic scores

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Abstract

The objective of this study was to propose a new method called Liking Product Landscape (LPL) to visualize the distribution of consumers grades based on hedonic scores for specific products. To construct this diagram Support Vector Machines (SVM) with Gaussian kernel for regression and Differential Evolution (DE) were used.A consumer can be seen as a vector in m dimensional, where m is the product number, but in order to visualize the consumers as points in a 2D plane, a reduction of the dimensionality is needed. DE, which is an Evolutionary algorithm, was used for this purpose. DE minimizes the difference between two distance matrices, the first one contains the Euclidean distances among all consumers grades and the second one the distance matrix among all consumers in their representation in the 2D plane. A comparison between Principal Component Analysis (PCA) and DE was performed to prove that DE reduces the dimensionality with a better preservation of distances, and also it was found that DE is more robust than PCA to outliers. A LPL was created for each product as follows: SVM with Gaussian kernel was trained using as input the reduced data and as output data the grades given to each product. Then a meshgrid of points in 2D was created. Finally the response of each point was predicted using the SVM. To visualize the preference of a specific product and the differences among them, a heat graph for each product with the responses of meshgrid points were performed to show the consumer preferences. Besides, LPL can be used to analyze hedonic scores of different consumer groups based on demographic data. LPL was tested in different datasets: chicken, pork cracklings, and food products based on basic flavor and their combination.

O5.1

Time-Intensity profiling of wine models: analysis of variation among products and among panellists

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Abstract

Time-Intensity Profiling (TIP) has been extensively used as a dynamic profiling technique. Little research has applied TIP on wine models and to the authors knowledge no previous work included panellists as a potential source of variation. Therefore, the aim of this study was: 1) to understand the effect of ethanol and phenolic compounds (procyanidins) on wine aroma persistence and 2) to study the inter-panellists variation on the TIP curves. To do so, the same dealcoholized rosé wine was spiked with ethanol and a grape seed extract (GSE) to have four wines (a control wine without ethanol or GSE, a wine with GSE but without ethanol, and two wines with ethanol (10% v/v) with and without GSE). All the wines were spiked with a mixture of aroma compounds: isoamyl acetate, ethyl hexanoate, ethyl butyrate and ethyl decanoate. 10 individuals varying on their oral phisyological parameters were used as panel members. The panel applied TIP to characterise the wine models, in terms of the aroma attributes related to the aroma compounds mixture. TIP of wine models for the attributes "banana", "pineapple", "candy" and "dried fruit" were obtained. The results show a large variation on the TIP curves among panellists and among wine models. A comparison of different methods to analyse the wines and panellists variation is performed.

Acknowledgement: The financial support of MINECO (Project AGL2016-78936R) for the research project and of Universidad Politécnica de Madrid to cover Dr. Chaya travelling expenses are acknowledged.

O5.2

Evaluation of time intensity curves by bootstrap confidence intervals

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Abstract

In sensory analysis, the descriptive methods are used to characterize different products, it means, to describe their sensory properties. Time intensity analysis (TI) is one of these methods, whereupon subjects are used to evaluate the perception of an attribute over a period of time. The purpose of this method is to identify in which time the maximum perception occurred and to evaluate its persistence. The results of the T-I analysis are presented in graphs which contain curves describing the intensity over time, besides providing estimates parameters of interest. Although the parameters estimated can give relevant information, the assessment of the curve would be necessary. However, there is any previous work proposing intervals for these curves. Therefore, the aim of this work is to propose a new methodology to evaluate TI curves by using confidence intervals obtained through bootstrap simulation. These intervals allow to make inferences about the time intensity curves, simplifying and increasing data analysis. In this way, it will be possible to identify statistical differences between the curves referring to the products difference. A data set from an experiment associated with the evaluation of strawberry chewing gum performed with subjects from Brazil and Slovakia was used to illustrate the methodology. The confidence intervals for the time intensity curves obtained through bootstrap simulation has given relevant results, adding important information for the analysis of time-intensity data, allowing the researcher to make inferences of interest.
Acknowledgements: This work was carried out with financial support of VEGA Project 1/0280/17 “Validation of Food Products Development by Sensory Analysis and Artificial Perception Instruments” and of PNPD project of CAPES – Coordination of Superior Level Staff Improvement and PIBIC of CNPq – “National Council for Scientific and Technological Development” of Brazil.

O5.3

Statistical approaches to analyze dynamic data: A comparative study using Temporal Check-All-That-Apply (TCATA), Temporal Dominance of Sensations (TDS) and Progressive Profile (PP)

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Abstract

Dynamic sensory profile of three different categories of fermented dairy products (yogurt, fermented whey beverage and fermented milk) using different temporal methodologies (Temporal Dominance of Sensations - TDS, Progressive Profiling - PP, Temporal Check-all-that-apply - TCATA) was investigated. Once PP yields repeated measures, dominance (TDS) and proportion (TCATA) citation rates are collected continuously, different statistical approaches were used to compare the results. Consumers (n = 175) were divided among the three methodologies and evaluated the attributes: strawberry, sweet, fermented, milk, sour, bitter, and creaminess. For all methods, the total duration of the evaluation was 45 seconds, and consumers were asked to put all the sample (30g) in the mouth, and ingest it completely after the first 5 seconds. Furthermore, the time points for the PP method were set at: T1 = 15 s, T2 = 30 s, and T3 = 45 s. The adopted approaches were: compare time points of PP with (1) rates at time slices, (2) average rate in interval leading up to time slice (non-overlapping), (3) overlapping, based on different preprocessing methods (rescaling and non-rescaling data), and (4) using global averages of each method. The results have shown that average rate in interval seemed to be the most realistic method since it incorporates all data rather than slices only and did not overlapping. The preprocessing data implies mainly on the variable “time” and the interpretation needs to be made considering the balance of the way that products are described by attributes within each timepoint. Using global averages, it was possible to observe some agreement between methods, but products are mainly grouped by method. It is concluded that all the statistical approaches were effective to compare data between methods and provide important insights about product discrimination.

O5.4

Multiple-intake TDS with untrained consumers: new challenges for sensometrics!

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Abstract

Temporal Dominance of Sensations (TDS) is often used with untrained consumers evaluating a full portion of a food or beverage in several intakes (bites or sips). The resulting data challenges sensometrics at least on three aspects: validation, standardization and analysis. First challenge is to make sure that each consumer understood the TDS task properly in order to possibly remove from the analysis those who obviously did not. We designed an automated system based on criteria investigating individual response pattern. The results of its application to a large number of TDS studies will be presented. The system allows for comparison between panels composed of different types of consumers, for instance we recently used it to assess whether children can do TDS as well as adults.
The second challenge is to adapt the time standardization to multiple-intake TDS data in order to properly takes into account the within and the between intake temporality. The solutions developed are different whether the number of intakes is the same for every individual or not. The third challenge is to adapt the TDS analysis toolbox available for the mono within intake level to the multiple within and between intake levels. TDS curves and bandplots are adapted to represent this double time structure and significance level of dominance rates to take into account the decreasing numbers of panelists along intakes. A period effect made of 3 to 5 consecutive time intervals covering the full evaluation is added to the ANOVA model of dominance durations of each attribute. Significance of the period and of the period by product interaction mean respectively existence of attribute temporality and difference among product in this temporality. Transposition to MANOVA and CVA is of course possible for the multivariate analysis of dominance durations considering period effect.

O5.5

Consumers can do dynamic liking and Temporal Dominance of Sensations (TDS) simultaneously as efficiently as separately

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Abstract

Working with consumers we recently proposed to pair product description by Temporal Dominance of Sensations (TDS) with hedonic rating by either alternating TDS and liking along intakes (Thomas et al., 2016), or doing TDS simultaneously to dynamic liking on the same screen throughout the tasting (Thomas et al, 2017). Considering this second protocol, defined as S-TDL, it was the aim of the present work to study the impact of TDS evaluation on dynamic liking rating and vice versa. For this purpose, three groups of 60 consumers were recruited, each one followed a different protocol: i) classic TDS, ii) Continuous Dynamic Liking (CDL) and iii) TDS simultaneously with Continuous Dynamic Liking (S-TDL). The tastings were conducted with free multiple intakes of: two wines (Monbazillac and Pouilly Fumé; a sweet and a dry white wine; 5cl in a transparent glass), two cheeses (Roquefort and Crottin de Chavignol; 30g in each case) and the four wine-cheese combinations resulting with the aforementioned products (5cl of wine and 30g of cheese in every case). Each group completed the 8 evaluations in three sessions. Results showed that the CDL group took less time for the evaluations and gave globally less number of clicks on the liking scales than the S-TDL group, as if the fact of being more concentrated on the description made consumers more aware of the liking task. The ranking of products and combinations obtained by calculating the weighted mean liking scores, was the same with both methods. However, there was a better discrimination in liking (especially for the combinations) by the S-TDL group. Moreover, the TDS information obtained by TDS and S-TDL in terms of attribute temporalities (sequence and duration) and product discrimination based on dominance durations were almost identical, showing that the hedonic task had no impact on the temporal product description.

O6.1

How do small sample sets affect data analysis results of descriptive analysis?

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Abstract

The number of samples used for descriptive analysis (DA) is usually dictated by the study goal and context. In some studies, it may be fewer than 6 samples. How does the small number of samples impact results obtained from statistical data analysis? Are there techniques that are preferable to others? In order to address these questions, we analyzed 18 DA datasets obtained from 8 different panels on 2 product categories (ketchup and lemonade) using between 4 and 10 samples.

Several criteria indicating data analyses quality were studied. Power was used to measure quality for analysis of variance. Sample size could also have an impact on data robustness. Thus, the size of Principal Component Analysis (PCA) confidence ellipses produced by bootstrapping on judges were calculated. Comparing multivariate techniques, robust datasets should lead to similar maps for all methods. Maps obtained from PCA, Multiple Factor Analysis, Canonical Variate Analysis and Partial Least Squares – Discriminant Analysis (PLS-DA) were compared on similarity criteria: product spaces (RV coefficient) and variable loadings (angle between the same variables in different analyses).

In power simulations with constant effect and sample sizes, power increased more with the number of replicates than the number of samples. The size of confidence ellipses depended on the panel rather than sample size. Comparing map similarities among analysis methods, the RVs ranged from 0.65 to 1.00 (mean = 0.91). RVs lower than 0.90 occurred mostly between PLS-DA and other methods. There was no trend for sample size to consistently impact RVs. When comparing the average angle between the same attribute vectors produced by different methods, PCA and PLS-DA produced almost identical results. Again, there was no impact of the sample size.

Overall, small sample size in DA did not affect the performance of data analysis, and all analyses led to very similar conclusions.

O6.2

How to analyze CATA data that are used to characterize only one product?

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Abstract

Consumer tests are a critical step in the development and marketing of new products, as well as in reformulations of existing products. Since check-all-that-apply (CATA) question can be easily performed by consumers, it has become more and more popular for sensory product characterization in consumer tests. Its main advantage is that it gathers information on perceived product attributes without requiring scaling.

Flavor characterization test is required by the flavor labelling regulations to determine whether the finished product must be labeled as “flavored”. CATA questions can be used to characterize flavors of single product or multiple products. When 2 or more products are characterized using CATA questions, the current CATA statistical methods (eg, Cochran's Q test, Sign Test, Corresponding Analysis, Penalty-Lift or Penalty Analysis, and so on) work perfectly well for product comparisons. However, when CATA questions are used to identify those flavors perceived beyond the chance alone in one single product for labeling claims, current CATA statistical methods fail because the chance level in a CATA test is unknown a priori. The objective of this study is to extend 3 existing statistical tests (one-sample Z test, two-sample Z test, and Cochran's Q test (including McNemar test with Bonferroni correction)) to analyze data collected in flavor characterization tests where one beverage product is described by up to 12 descriptors in a CATA question.

Our research shows that it is critical to estimate the chance level after a CATA test is done. Once the chance level is estimated from actual CATA data, these three statistical tests enable us to analyze the data and identify which of the flavors were perceived beyond the chance by consumers. Overall, the tests tend to provide similar conclusions, with the Cochran's Q test being more conservative and therefore being recommended for labeling claims.

O6.3

Focusing consumers responses by restricting the number of answers in a CATA test: further exploration of Check-k-that-apply

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Abstract

In CATA tasks, in order to balance the importance of each consumer in the final characterization of the products, it has been proposed to limit the number of checked descriptors (Check-k-that-apply). Restricting to five the number of answers (Check-5) previously showed that, although the main conclusions were comparable, the attributes defining the sensory space (and their importance) might change from CATA to Check-5.
We further analyzed two datasets (11 Flavored ice teas and 12 Gouda-type cheeses), and compared CATA and Check-5 using three-way partial triadic correspondence analysis (PTCA). This method—based on correspondence analysis—can be used to analyze CATA data and to provide correct inferential statistics (i.e., permutation tests and bootstrap ratios); here PTCA is extended to compare assessors performing the CATA tasks, to compare the tasks (i.e., CATA vs Check 5), and to analyze the common space between the methods as well as their differences.
Results showed that:

- General conclusions were very similar (perceptual spaces generated by PTCA, high Rvs between the product spaces), but there were some differences. Specifically, CATA detects more significant attributes, but Check-5 better discriminates between products for the cheese data set but not for the tea data set (as indicated by Cochran Q tests and bootstrap ratios).
- Check-5 reduced the individual differences between consumers for both categories, as shown by the common participant map considering CATA and Check-5.
- Check-5 spanned the obtained perceptual space further than CATA.

Discussion: Consumers might have focused on the most important attributes in Check-5 to describe the differences between products, particularly for the cheese samples, where samples were closer in sensory characteristics. Future work should investigate the cognitive and sensory effects of restricting the number of descriptors to choose, and identify if there is an optimum k number of descriptors.

O6.4

What is the best way to analyse PSP data?

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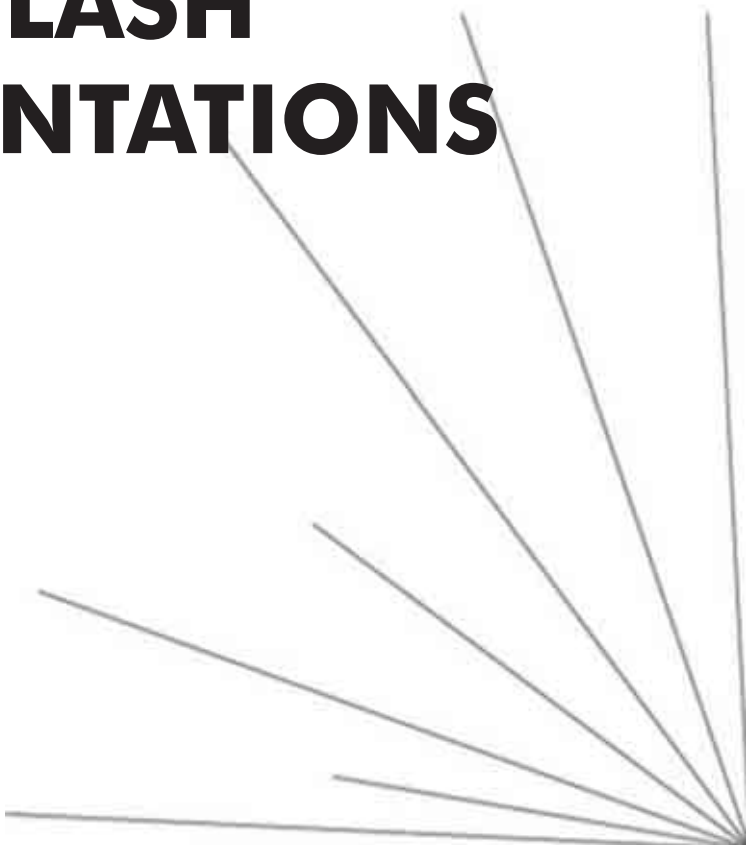
Abstract

Polarized Sensory Positioning (PSP) is a relatively new method for sensory profiling. It was developed for profiling of natural water, and has been claimed to be able to better separate similar samples than other sensory methods. In PSP each sample is compared to a number of references (usually three) called poles, and assessors evaluate them from "exactly the same" to "completely different". The output data comprise one table per assessor, and is multiway/multiblock by nature. In the original publication it was highlighted that the observed data could be interpreted as intensities of sensory dimensions represented by the references (poles), or as distances between products. With the first interpretation, data analysis should be done by multiblock PCA such as MFA (multiple factor analysis), whereas the latter approach calls for distance based methods, for instance the INDSCAL model. So far, the literature on PSP has focused on understanding the method with studies on the pole selection and comparisons with other (rapid) sensory methods, but little attention has been paid to the data analysis. In this work, MFA and INDSCAL are compared, with a special attention to how individual differences are treated in the two models.
Comparisons of MFA and INDSCAL for data obtained with both trained panel and naïve consumers, indicate that when focusing on the two first dimensions, the methods give very similar results. When higher dimensions are fitted, the methods may differ with respect to information on individual differences

FLASH PRESENTATIONS



FP01

A latent class analysis of family eating habits in families with adolescents

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Abstract

The objectives of the present study were to identify groups of adolescents based on their perception of their family's eating habits and to determine whether the groups differ in terms of frequency and source of family meals, parent and adolescent diet quality, nutritional status, satisfaction with life, family life and food-related life. Questionnaires were administered to a sample of 300 two-parent families with one child over 10 years, Chile. Questionnaires included the Satisfaction with Life Scale (SWLS), the Satisfaction with Food-related Life scale (SWFoL), the Satisfaction with Family Life scale (SWFaL) and the Adapted Healthy Eating Index. Adolescents also answered the Family Eating Habits Questionnaire (FEHQ). Latent class (LC) analysis was used to identify adolescent profiles based on the three factors detected in the FEHQ. An initial run of 1-5 clusters was analyzed. Based on the Bayesian information criterion value the three-cluster model was chosen: “Adolescents with medium cohesiveness (family meals frequency and importance) in family eating, no pressure to eat, sometimes eat large potions” (50.4%), “Adolescents with high cohesiveness in family eating, no pressure to eat, not eat large potions” (25.9%) and “Adolescents with high cohesiveness in family eating, pressure to eat and eat large potions” (23.7%). Greater cohesion around family meals was associated with higher scores on the SWLS and SWFaL in mothers, fathers and adolescents, but not with healthy eating habits, healthy weight status or SWFoL. Pressure to eat and eating large food portions at meals were higher in male adolescents and in household with a dificult financial situation. LC analysis probed to be a useful tool to cluster adolescents in terms of their perception of family meals.
Keywords: Food-related parenting practices, subjective well-being, adolescents, family meals, pressure to eat, food portion size.

FP02

On the design and analysis of in vivo deodorant studies

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Abstract
The ASTM guideline E1207-4 on sensory evaluation of axillary deodorancy is reviewed. Best practices for design and analysis of in vivo deodorant studies are proposed, and it is explained how the best practices fit in with the ASTM framework. It is recommended to:

- Use ANOVA with factors product, panellist, and wearer for the primary analysis of the study.
- Study product by wearer interaction as a secondary analysis.
- Randomise and counterbalance products to left and right axillae. Because of the randomisation, there is no need to include sequence (left-right application versus right-left) in the analysis.
- Carefully select and train panellists. Scoring of malodour intensity does require additional training.
- Use at least 10 trained panellists and wearers.
- Use either the single pair (1PR) design in case of 2 products, or the round robin design (RRB) with more than two.
- Use the Benjamini-Hochberg procedure (Benjamini & Hochberg, 1995) to deal with the problem of multiple comparisons when more than two products are being tested.
- Aim to be able to detect a value of Cohen's standardised effect size (E) of 0.35 with 95% power. Guidance is given how much data the test leader needs to collect to achieve this, and how this translates in required numbers of panellists and wearers.

It is explained how to calculate the effect size achieved in a study.
It is shown that changing the ratio wearers versus panellists hardly affects the standard error of product differences.
Several studies are used to illustrate the findings.

FP03

Analysis of Graded Paired Comparisons using Beta Regression models. Application to the palatability assessment in pets.

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Abstract

The graded method of paired comparisons consists of presenting pairs of stimuli to subjects who have to choose one of the two alternatives and rate the intensity of this choice. In the case of preference study, the subject rates the level of preference using a rating scale or using categories. The Bradley-Terry-Luce model (BTL, Bradley & Terry, 1952), widely used for analysing classical paired comparisons experiments, may be adapted for accounting the continuous nature of the subject's choice. The beta regression technique (Ferrari & Cribari-Neto, 2004) gives a general frame for fitting the BTL model for graded paired comparisons (Grand & Dittrich, 2015).The aim of this study is to analyze the added value of the continuous nature of this type of measurements, compared to the classical paired comparisons. In addition, the incorporation of covariates in the BTL model will be demonstrated. This allows to give a more insightful interpretation of the Bradley scores of products. These techniques will be applied to the assessment of palatability in pets. An experiment involving 80 cats studied the preference for 17 products, using an experimental design on four factors. The measure of the intake of the two stimuli in a paired comparison is considered as the degree of preference for one food over another. The introduction of products' covariates (factors of formulation design) in the model allows to highlight the main drivers of liking for cats.

Bradley R, Terry M (1952). Rank Analysis of Incomplete Block Designs: I. The Method of Paired Comparisons. Biometrika, 39(3/4), 324-345.

Ferrari S, Cribari-Neto F (2004). Beta Regression for Modelling Rates and Proportions. Journal of Applied Statistics, 31(7), 799-815.

Grand A., Dittrich R. (2015). Modelling Assumed Metric Paired Comparison Data - Application to Learning Related Emotions. Austrian Journal of Statistics, 44(1), 3-15.

FP04

Application of survival analysis for the estimation of difference thresholds for added sugar in grape nectar

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Abstract

Survival analysis is used in several disciplines for analyzing data where the outcome is the time until the occurrence of an event. It was introduced in sensory and consumer science to estimate sensory shelf life based on consumer's acceptance/rejection. However, its application has been extended to estimate concentration limits of sensory defects, optimum concentrations of a food ingredient and detection thresholds. In the present work, survival analysis was applied to estimate children and adults' difference thresholds for added sugar in grape nectar. Five tests with groups of 50 adults and 50 children (6-12 years old) were conducted to estimate sequential difference thresholds for added sugar in grape nectar using paired comparisons. Data were analyzed using survival analysis, following an adaptation of the procedure proposed by Hough et al. (2013) for the estimation of detection thresholds. A random variable R was defined as the sugar reduction percentage at which a participant started consistently perceiving the sugar-reduced sample as less sweet than the control, which corresponded to his/her difference threshold. The probability of a participant having his/her difference threshold at sugar-reduction percentage lower or equal than r was modelled using a lognormal distribution. Difference thresholds were determined as the sugar-reduction percentage at which 50% of the consumers had their difference thresholds. Difference thresholds ranged from 9.47% to 13.47% for children and from 4.74 to 8.80% for adults. For both groups, there were no significant differences between the difference thresholds estimated for different added sugar concentrations, which indicates that difference thresholds could be regarded as a constant proportion of the sugar concentration of the nectars. The precision of the estimations obtained using survival analysis was larger than those obtained using logistic regression. Results of the present work confirmed the potential of survival analysis for the estimation of difference thresholds.

FP05

Obtaining the ideal smoked bacon: What is the influence of the product space and multivariate procedure to construct the external preference mapping?

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Abstract

Identifying the ideal product based on sensory properties that modify its overall liking is the most important step in the development of new products and in the improvement of existing ones. The aim of this study was to evaluate the influence of the product space provided by the Descriptive Analysis (DA), Projective Mapping (PM), and Check-all-that-apply (CATA) questions on the identification and description of the ideal smoked bacon applying the PrefMFA and PrefMap. Six smoked bacon samples were characterized by DA, PM, CATA questions, and simultaneously, one hundred consumers indicated their overall liking using nine-point hedonic scale. The results showed that both the product space and the procedure technique used to construct the external preference mapping modified the description and position of the ideal product on the perceptual map. The PrefMFA showed that variability on consumer responses were expressed in two consumers segments, with different preference patterns. In conclusion, PrefMFA seems to be the best option when the consumer's voice is included.
Keywords: PrefMFA; Sensory profile; Overall liking; Ideal bacon.

FP06

Understanding Scoring Distributions on the 9 Point Hedonic Scale: Modeling and Application.

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Abstract

Introduction: In a 2014 it was observed that overall liking means from higher scoring products had smaller standard deviations than those of less liked products (nearer to 5.0 on the 9 point hedonic scale). Histograms of the liking distributions show that more respondents utilize the extreme left side (1-4) of the scale as mean liking decreases, resulting in larger standard deviations for less liked products.
To understand the implications of this behaviour we modelled the shapes of liking distributions as their means move across the 9-point hedonic scale.
Methods: Using data from 1750 food and beverage product test cells from sequential monadic research studies, a training database of over 290,000 individual responses to the overall liking question (response variable; 1-9) and their associated mean overall liking from the research (predictor variable) was created. Multicategory logit modelling was utilized to determine the expected probability of each liking response category to create a defacto “shape” as a function of mean liking. Chi-Square testing of the model's expected response probabilities was performed on a validation set of 750 test cells' liking distributions.
Results & Discussion: Modelling via multicategory logit regression proved to be a reasonable approach for describing the liking distribution shape change over different levels of mean overall liking. 85% of the liking distributions in the validation data sets could not be rejected as having come from the probability distribution predicted by the model. This result does not appear to be dependent on category of food or beverage product. Applications for this model are being explored including using simulations from the modelled shapes to compare the power of tests at different points along the hedonic scale, as well as exploring non-chance reasons for distributions that do not fit the shape predicted from the multi category model.

FP07

Stability evaluation using Free Choice Profile and a Global Quality linear scale

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Abstract

The aim was to use Free Choice Profile to characterize milk powder enriched with microencapsulated omega3 in different packages for stability at 34°C/83%RH and 43°C. The Free Choice Profile panel of 19 evaluators also used a 10 cm linear scale to evaluate Global Quality (poor/regular/excellent) and answered whether they reject the sample or not. Initially, the samples were described as having fine grain, characteristic appearance and aroma of the powder, creamy appearance of the reconstituted milk, characteristic aroma and taste of the reconstituted milk. At 34°C/83%RH, the product in BOPP/PP flexible packaging presented more changes throughout the study, after 9 weeks, it scored Poor Global Quality (3) with 94% rejection. The attributes that described it were: dark color of the powder and of the reconstituted milk, low dissolution, phases separation, foam formation, powder and lumps sensation in the mouth and salty, caramelized, fish and intense flavor and aftertaste. At 43°C, the products in PETmet/LDPE flexible packaging and metal and composite cans presented more changes throughout the study, after 9th week, they scored Poor Global Quality (2.1) with 100% rejection. The attributes that described these were: dark color of powder and of the reconstituted milk, sweet, salty and intense powder aroma, low dissolution, separation of phases and foam formation, intense aroma of the reconstituted milk, greasy and lumpy sensation in the mouth and salty, bitter and foreign flavor and aftertaste. Some attributes considered negative such as agglomerated, presence of orange particles, rancid/old aroma and flavor, astringency sensation were noticed in some of the samples, however they were not enough intense to diminish Global Quality grade and cause rejection. The use of Free Choice Profile and Global Quality linear scale were successful in evaluating stability.

FP08

New indices to assess Panel performances in Temporal Dominance of Sensations

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Abstract

Temporal Dominance of Sensations (TDS) has been developed for several years in sensory studies in order to evaluate dynamic tasting characteristics of products. Nevertheless, panel performances on this methodology principally focus on product discrimination and agreement between panellists. Our work suggests to assess panel and panellists repeatability, nowadays unchecked in litterature, authors widely considering that this criteria is contained into discrimination evaluation.
Our methodology presents three complementary approaches to allow TDS users to measure panel repeatability in their studies:
- classical method of sensory panel performances analysis: ANOVA including Product, Session and Panellist effects in which a permutation process is conducted due to TDS data specificity.
- considering repeatability as a non discrimination between the same product seen at several repetitions: this methodology is a "by product" approach.
- decomposition of TDS curves by splines methods: comparison of skeletons constructed among repetitions. Other curves parameters are also analysed to evaluate repeatability: for each attribute, time between start of session and the first quotation, time during which it is considered as dominant by at least one panellist and maximum dominance rate.
As a complementary information, a graphical representation is proposed to help users to better understand panellist repeatability and to explain potential panel consistancy issues detected using the three above-mentioned methods. This last indicator can also highlight problems such as method misunderstanding or difficulties in the use of the acquisition software for some individuals.

FP09

Combinatory tools for the development of a diet yogurt with natural sweeteners

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Abstract

This study proposes the use of Napping® methodology to optimize a mix of different stevias in high-protein yogurt through the mixture design and methodology of surface response. For this, it was used the Euclidean distance between the formulation sweetened with stevias and the standard samples, one sweetened with sucrose and another with sucralose, which is the most common artificial sweetener. The optimization of the stevias mix was validated through the temporal dominance test of the consumer sensations and acceptance. It was determined that the required amount of sweeteners to promote the same sweetness power of the yogurt, with the ideal sucrose (5.1%), is approximately 0,03%, consisting of 55% stevia 1 (75% Rebaudioside A + Stevioside), 5% stevia 2 (95% Rebaudiosíde A) and 40% stevia 3 (50% Rebaudiosíde A). It was possible to conclude that the stevias mix is an excellent alternative for sucrose and sucralose substitution, since its sensory profile was very similar to sucrose and sucralose, being dominant the sweet taste. In addition, there was no significant difference ($p \geq 0.05$) between the samples in relation to the consumer acceptance. Thus, the Napping® methodology associated with the mixture design showed great potential to perform formulation optimization.

FP10

Determining the minimum number of consumers needed for overall liking measurement

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Abstract

How many consumers is needed to get meaningful results from a hedonic test when comparing several products? This question has been asked multiple times whenever a surveyor prepares to launch a study of product acceptance. One of the biggest reasons for this question is that testing with more consumers typically requires more funds. The available literature suggests from 50 to 100+ subjects, which is a large difference. This study attempts to establish a guideline on the number of consumers needed based on the variation in the products tested and other impacts of variation. Data from four studies carried out in different countries with a variation of product groups were used. The studies included from 120 to 250 consumers. The method used to determine the needed amount of subjects was to first to randomly remove k consumers (k=1,2,…,50) from the final pool to compare fewer consumers to the total pool and then also to remove certain demographic groups to test the need for a spread of consumers. 1000 random sets were generated and the ANOVA outcome is provided over the 1000 sets. Each outcome is compared to the output of total number of subjects to determine if the results were significantly different using a t-test. A suggestion of the guidelines for each variation is provided. Results showed that the number of subjects needed based solely on statistical assumptions often is fewer than the number needed when other factors such as demographic range is considered.

FP11

Children with texture sensitivities: What do they eat?

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Abstract

Eating is central to healthy development in infants and children, with difficulties in eating sometimes delaying the achievement of developmental milestones. Food texture has been identified as a major issue in feeding problems. The objective of this project is to create food products of different textures and evaluate the acceptance of these products by those with texture sensitivities, including children with a diagnosis of Down syndrome. Approaching this objective as food scientists, we first ask “Which foods are children with texture sensitivities already eating?”

This research introduces a new method for examining oral processing within a hard-to-reach population, namely, children with a diagnosis of Down syndrome and texture sensitivities. In order to find individuals in this target population, recruitment was done at a national level, and a home-use test was employed. A survey tool was developed for completion by caregivers to identify children (aged 14 months – 4 years) with texture sensitivities. Once a child qualified for the study, four of a possible sixteen food products were selected based on the child's preference for one of the four established flavor groupings. As previous research showed that acceptance of new food products requires multiple exposures, children evaluated each product six times, with their reaction at each exposure recorded by their caregiver using a phone or other recording device. These videos were uploaded, and researchers then coded the non-verbal and verbal behaviors of each child in reaction to each food using a check-all-that-apply ballot. These data were analyzed using logistic regression. Caregivers also evaluated their own liking of the samples, as well as their perceptions of the children's liking, to provide control measures. This study, which draws on research in food science, sensory science and psychology, developed a novel method that allows for off-site evaluations of a hard-to-reach population of children.

FP12

Enhancing the interpretation of the sensory dimensions over time using Napping method: an application of Digit-Tracking with bacon labels

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Abstract

The aim of this study was to evaluate the evolution of sensory dimensions of bacon labels through the new dynamic method Digit-Tracking. Eight labels of bacon were created with a complete factorial design using the following factors: ways to smoke bacon (traditional or artificial smoke flavour), convenience (piece or sliced) and hamburgerImage (presence or absence). These labels were evaluated by 95 consumers; they were instructed to move the images on a screen tablet in such a way that two labels are close if they are similar, and two labels are distant if they are different. In addition, a brief description of the stimuli was requested. The data were analyzed with the SensoMineR. First, we obtained the final representation of the stimuli through Multiple Factor Analysis (MFA), which is the reference space and then, we could obtained the cognitive process to better understand the consumer behavior over time. The first dimension opposes the bacon in piece to the sliced bacon. The second dimension opposes the traditional smoking process to the use of artificial smoke flavour. The consumer representation shows two main groups, one first group located along the first dimension, with high coordinates on the first dimension and low coordinates on the second dimension and one second group located along the second dimension, with high coordinates on the second dimension and low coordinates on the first dimensions. In the individual evolution of dimensions, we could see subjects with the same final configuration but with different cognitive process. In this study, the majority of consumers used just dimension 1 or 2, despite this fact the test still provides important data, which were not obtained through static methodologies. Before this abstract submission, no other study using Digit-Tracking related to food stimuli was published.
KeyWords: Digit-Tracking; bacon; dynamic method; sensory dimensions;

FP13

Consumer segmentation based on the mismatch between blind and expected liking: Insights for the development of a new mixed fruit juice

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Abstract

Expectations about the sensory and hedonic characteristics of products have a large influence on consumer perception and the success of new products in the marketplace. The aim of the study was to segment consumers based on the difference between blind and expected liking to obtain insights for the development of a novel mixed fruit juice. A study with 124 consumers evaluated their expected liking of six mixed fruit juice names, using 9-point hedonic scales. Then, they tasted the six juices and rated their liking under blind conditions. Cluster analysis was performed on the difference between blind and expected liking scores to identify consumer segments with different mismatch between their blind and expected evaluations. Euclidean distances and Ward aggregation criterion were considered. ANOVA was used to evaluate differences in the overall liking scores of the clusters under blind and expected conditions. Two clusters with different mismatch of expectations were identified: cluster 1 (n=77) and cluster 2 (n=47). The overall liking scores under blind and expected conditions of two samples did not significantly differ for both clusters. However, for the remaining samples, differences between the overall liking scores under expected and blind conditions were found for at least one of the clusters. Consumer segmentation based on the difference between blind and expected hedonic liking scores provided insights for the identification of formulations with the highest chance of success in the marketplace.

FP14

Influence of fading duration in T-CATA evaluation. A case study with cooked ham

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Abstract

Temporal Check All that Apply (TCATA) is a dynamic sensory evaluation technique in which panellists are faced with a list of attributes, from which they select the term(s) they consider that apply at each point of the time of evaluation and un-select term(s) when no longer apply. TCATA Fading variant was proposed to improve TCATA task by making the term un-selection automatic and progressive over a predefined period of few seconds. The aim of the present work was to evaluate the influence of fading time on the results of TCATA Fading. Seventeen participants evaluated 5 commercial cooked hams using TCATA with two fading times (4 and 8 s). The attributes evaluated were soft, hard, juicy, fibrous, ham flavour, smoked flavour, and salty. Three replicate evaluations were carried out for each fading time. TCATA curves representing the attribute citation proportions and the differences between each sample and the average over time were obtained. For each run, total evaluation time, time of attribute selection, overlapping time between successive selections of the same attribute, and frequency of selection per attribute were calculated. As expected, longer fading time (8 s) resulted in TCATA-curves with higher citation proportions. Number of significant differences detected were also higher for the 8-s task. However, 4-s and 8-s TCATA curves revealed similar differences among samples but the duration of these differences were higher for the longer fading time. The longer the fading time, the longer the total time of evaluation, the duration of attribute selection and overlapping times. Frequency of selection did not significantly vary with the fading time which suggested that in many cases the sensation lasted no more than 4 s. Although longer fading time provided TCATA-curves with higher discrimination among samples, attention should be paid to avoid overestimation of sensation duration.

FP15

Modeling sensory changes during storage under two accelerating factors: temperature and illumination condition

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Abstract

The data to apply the model with two accelerating factors was taken from a lemon-flavored juice (LFJ) experiment. The LFJ was stored at three temperatures (24ºC, 37 ºC and 45 ºC) and two illumination conditions (no-illumination and with-illumination). For each treatment combination there were 7 storage times; maximum storage times were 300 days, 119 days and 60 days for 24ºC, 37 ºC and 45 ºC; respectively. The sensory properties were measured with a panel of 9 trained assessors using standard descriptive methodology. The descriptors that most changed with time were lemon (decreased) and disinfectant (increased). Lemon aroma (LA) data were used to apply the model.
The change in LA with storage time was best-fitted by a straight line, thus a zero-order rate was adopted. The final equation for LA was:

$$LA = LA_0 + k_{T_{ref},no} \times t \times exp\left[-\frac{E_a}{R}\left(\frac{1}{T}-\frac{1}{T_{ref}}\right)+\eta_1.L+\eta_2.L.\left(\frac{1}{T}-\frac{1}{T_{ref}}\right)\right]$$

Where LA, LA_0= lemon aroma at storage times t and zero, respectively,
$k_{Tref,no}$= reaction rate constant corresponding to Tref and no illumination,
t= time,
Ea/R= activation energy divided by gas law constant,
T= temperature,
Tref= reference temperature,
η_1, η_2= regression parameters, and
L= illumination condition, 0 for none and 1 for with.

Parameter estimation was obtained using the nls non-linear function of the R-Statistical Package. The above equation has the practical value of being able to estimate a sensory value of a product stored under given temperature, time and illumination conditions. Confidence intervals of these estimations were obtained using the contributed R-function nlsint. This estimation can be contrasted with an established cut-off value to thus establish shelf life. The proposed model can be used for sensory variables as in the present work, or for physicochemical variables of shelf-life interest.

FP16

Polarized Sensory Positioning with Check All That Apply: Comparison with Sorting, Projective mapping approaches

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Abstract

Sensory evaluation methods based on holistic judgements (Sorting, Projective Mapping, Napping®, and their variants) have been utilized and investigated extensively during the past decade for their simple, quick procedures as well as robust outcome. Polarized Sensory Positioning(PSP) which enables to compare samples evaluated in different sessions has been recently proposed. Samples analyzed by these holistic methods are delineated mainly by the samples' relative position to each other. Thus, supplementary procedures such as CATA or ultra-flash profiles are necessary to acquire comprehensive characteristics of the samples.
In the present study, the consumer's perception of 10 tea samples varying in tea leave types and flavors were delineated using Sorting task(n=39), Projective mapping(n=37), PSP with CATA(n=37). Among the 10 samples, 3 types of tea differing flavors (green, black, samdayeon) were chosen as reference poles for PSP. The perceptual map of tea samples generated by Sorting task and Projective mapping very similar while PSP produced a sample map that showed less discrepancy between samples. In PSP, the flavor differences of samples used as reference poles were overstated which resulted in lower relative discrimination of other samples. PSP may be more appropriate for mapping samples sharing similar flavor quality. When researchers are working with sample set consisting of multiple flavor quality, sorting or projective mapping may be more suitable.

POSTER PRESENTATIONS

P01

Initial identification of drivers of liking for Brazilian rapadura based on individual consumer preference: physical-chemical characteristics.

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Abstract

Non-centrifuged sugar (NCS), a technical name used by the Food and Agriculture Organization of the United Nations, is a solid product obtained by evaporation of the sugarcane juice. It has been traditionally consumed as a sweetener in most of the sugarcane producing regions around the world, where it is known by different names, most commonly Jaggery and Gur (South Asia), Panela (Latin America), Muscovado (Philippines) , Kokuto (Japan) and Rapadura or Sugar Mascavo in Brazil, depending on the degree of concentration. The objective of this work was to evaluate how the physical-chemical characteristics influence the sensory acceptance of rapaduras. Samples consisted in 7 samples produced in the Serra da Ibiapaba, CE, Northeastern region of Brazil: five from small sugar mills (RPa, RPb, SE, PA TP) and two commercial ones (CMa and CMb). Overall liking and aroma, flavor, texture and appearance acceptances were evaluated by 100 consumers, using a 9-point hedonic scale. The data were analyzed by ANOVA, Tukey test, Pearson correlation, AHC and External Prefference Mapping (PREFMAP), using the physical-chemical parameters as supplementary variables in a overall acceptance PCA. All statistical analyzes used the software XLSTAT®, version 6.11. Three segments of consumers with similar acceptance behavior were observed by AHC, confirming the PREFMAP results. Cluster 1 likes all samples equally, Cluster 2 likes samples RPb and commercial b (CMb) better, while Cluster 3 did not like sample PA. Samples RPa and CMb reached the highest hedonic scores in all clusters and were considered the most accepted products. Overall liking correlated to acceptance of all sensory attributes but PREFMAP showed that correlation also with ratio Brix/ATT and color parameters, suggesting that sweeter taste and clearer appearance led to a better acceptability.

P02

Consumer behaviour toward ultrasound technology processing: A case study with guava juice

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Abstract

In recent years, different emerging technologies have been applied in food processing. The ultrasound technology is one of these, where the main objective is to improve the microbiological, nutritional and technological quality of foods, as well as reduce the time and processing costs. However, a very important and little studied aspect is the sensorial and hedonic perception of the consumer. The aim of this study was to evaluate the consumer behaviour toward ultrasound technology used in the guava juice processing (information shown on the package) and price in terms of acceptance and purchase intention using the conjoint analysis technique. In addition, the holistic perception of guava juice using projective mapping was evaluated. The stimuli used in the present study were elaborated following a complete factorial design. Both the information related to ultrasound processing and price had significant impact on the acceptance and purchase intention. Consumers gave greater acceptance and purchase intent to products that showed information and benefits of ultrasound technology process, while purchase intention was influenced primarily by the low price. On the other hand, the information shown in the packages served as criterion of grouping the stimuli on projective mapping. Specifically, ultrasound technology and its different levels were the main factor considered during the grouping process. In conclusion, the information about the use of ultrasound technology in the process of guava juice did not have a negative effect on acceptance or purchase intent. Therefore, this study provides a basis for future studies and/or application of this technology for the commercial processing of juices without diminishing the acceptance and purchase intent.
Keywords: Ultrasound technology; Conjoint analysis; Projective mapping; Acceptance; Purchase intent.

P03

Effect of dairy protein levels over rheological and sensory properties of yogurt mousse

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Abstract

Whipped yogurts are a category of dairy products which foamy and light texture exhibit good mouthfeel. There is a lack of information related to the impact over sensory attributes of yogurt mousse coming from the variation of dairy proteins concentration. Rheology is a useful tool that relates sensory analysis with instrumental techniques, because it allows the understanding of food structure and its behavior during oral processing. Therefore, the aim of this study was to evaluate the effect of skimmed milk powder (SMP) and whey protein concentrate (WPC) level over rheological and sensory properties of yogurt mousse. For this purpose, three yogurt mousse formulations (YM1, YM2, YM3) corresponding to three SMP and WPC concentrations were selected from a response surface methodology obtained from previous studies. A traditional mousse sample without fermentation was also elaborated as a reference pattern (M). Small and large deformations rheological tests, and a sensory profile by a multidimensional approach were performed for all samples. As a result, the variation in concentration of dairy proteins coming from SMP and WPC had a significant effect over rheological and sensory properties of yogurt mousse, since sample with the highest dairy protein concentration (10,7% LDP and 4% WPC) presented the greatest rheological parameters values (consistency index (K), yield stress (s0), elastic modulus (E), storage modulus (G'), loss modulus (G'') and thixotropic index), and also the highest sensory attributes scores (aerated texture, fermented dairy flavor) as well as an improved general sensory quality compared to the pattern. Thus, an increased gel strength and foam stability of yogurt mousse is evidenced according to the dairy protein changes, caused during the fermentation process, contributing to an enhanced sensory quality of the product.

P04

Application of projective mapping and CATA questions to improve the sensory quality of Uruguayan sweet potato cultivars

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Abstract

The Uruguayan National Institute of Agricultural Research (INIA) sweet potato breeding program is focused on the development of new cultivars with an outstanding agronomic behavior (aspects such as yield, shape, size and resistance to pests and diseases) and commercial standards, as well as valuable sensory quality. In this context, projective mapping methodology has been applied with 25 untrained assessors to evaluate the sensory characteristics of new sweet potato materials, whereas check-all-that-apply (CATA) questions are used to evaluate consumers' hedonic perception of the best materials. Six materials were analyzed through projective mapping methodology INIA Cuarí, INIA Cambará, INIA Arapey, U1103.7, U1166.15 and U1160.6). Physicochemical properties (color, firmness, texture-TPA and soluble solids) after baking (200°C, average 80min) were also analyzed. Cuarí, U1166.15 and U1103.7 were perceived as clearly different from the rest. These materials were described by the assessors as humid, whereas Cambará was described as creamy. Cambará, Cuarí and U1103.7 were described as tasty, sweet and with good texture, whereas Arapey and U1160.6 were described as fibrous, hard, disgusting and dry materials. These differences were not strongly associated with soluble solids levels, while other physicochemical characteristics such as texture may exert a relevant role in global sample perception. INIA Arapey, INIA Cambará, INIA Cuarí and U1103.7 were evaluated by 100 consumers using a 9-point hedonic scale. All materials showed high consumer liking (6.3-7 in a 0-9 scale). The new cultivar INIA Cambará was the closest material to the ideal sweet potato, being described as tasty, creamy and sweet. Results from the present work highlight the potential of sensory methodologies as a feedback tool for breeding programs.

P05

Determination of multivariate rate constants for aging process in cereal products by Principal Component Analysis.

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Abstract

Food is a complex matrix where several processes take place simultaneously. In this sense, it becomes quite difficult to determine shelf life for a product based on a single parameter, i.e., is not reasonable to pick a deterioration process to describe the whole aging process of food items. Besides, products and byproducts of some reactions can favor or even accelerate other chemical and physical deterioration processes in food, directly influencing sensory acceptance.

Instead of choosing a single property to establish for how long a product is stable, it is possible to make linear combinations of sensory, chemical and physical properties monitored during a shelf life study. These different variables are synthesized into new ones through principal component analysis (PCA); one of these new components (generally, the first one) can be related to exposure time in the same way a single parameter (as vitamin content or flavor intensity) can. This relation is based on the kinetic theory, which provides another relevant parameter: the rate constant of a reaction.

In this work, the rate constants for two different cereal products were determined by PCA (for this reason, they were called multivariate rate constants). Sensory attributes and physical-chemical parameters were monitored during shelf life. For the first item (chocolate extruded cereal), different antioxidants were studied against a regular formula without additives. The ratio of the rate constants calculated for each test (tocopherol mix + rosemary extract and rosemary extract) and the regular formula were 0,53 and 0,46, respectively, indicating a deceleration of aging process by using antioxidants. For the second product (rice extruded cereal), data collected during accelerated shelf life study allowed one to conclude that the product stored at 37°C aged 5 times faster than the one kept at 27°C.

P06

Use of spherical salt for reducing sodium content while maintaining salty perception in lamb meat burgers development

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Abstract

High sodium intake has been associated with a number of non-communicable diseases. Even though salt enhances flavour, preserves freshness and improves appearance and texture of food, there are strategies for its reduction. It is possible to modify the size and the structure of the salt particle thereby enhancing its dissolution. The change in the structure delivers the same salty taste with lower salt content in the product. A meat-based product that frequently contains high amounts of sodium is the burger. It is also one of the most consumed frozen products and it is widely accepted by the population. A spherical salt was the strategy used to reduce the sodium content in a lamb meat burger development compared to a control sample trying to avoid a change in salty taste perception. The salt added to the control sample formulation arise from the average sodium content of comercial beef burgers. The final product was defined after a series of paired comparison tests carried out by 13 assessors trained for salty taste detection. Sodium content and cooking yield were estimated in burgers. A hedonic test was performed with the final product. The developed burger contained 17% less sodium than the control sample but no difference in salty taste was found between them. The product obtained 87.5% of positive reviews in acceptance test.

P07

The role of knowledgeable producers in the sensory identification of the Argentine Mesopotamian lamb: Key Element for the GI construction.

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Abstract

Eating is a biological, social and cultural act, and to understand it, it is necessary to know the territorial context. Local foods represent identity references. For the reconstruction of the sensory identity of a local product, knowledgeable consumers have to identify the particularities that make it unique. Each food culture imparts its rules designating what will be called "food", as well as when, how and where to eat it, building endless unconsciously adopted rituals. All this information will allow us to build the sensory identity of the product based on objectification. The sensory identity is also collective identity: it results from knowledge, it symbolizes belonging and builds self-esteem. A collective need to appropriate that "recipe" represents the first step for making it visible to the rest of the world. From the role of researchers we can intervene in the process of formalizing this knowledge in a context of quality labels construction working together with knowledgeable producers. In the present work we analyze the steps developed in the sensory identification process of the lamb meat of the Mesopotamian region of Argentina. It is a light lamb, raised under extensive conditions on a peculiar ecosystem: the “espinal”, conferring this type of production distinctive characteristics to its meat. A first approach with committed producers led to the task of verifying the identity of the lamb through successive paired comparison tests. Sensory panels integrated by knowledgeable producers and consumers from Curuzú Cuatiá and Feliciano were carried out in situ. Each participant had to eat and select between 2 codified samples of lamb leg meat (Patagonian vs Mesopotamian) that which they recognized as their own. In this way, an evident recognition was obtained by the villagers. This result constitutes one of the main elements in the construction of the Geographical Identification.

P08

Rheological and sensory properties of full fat and fat replaced with inulin ice cream formulas

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Abstract

Due to the popular demand for ice creams with the lowest caloric content possible, various manufacturing methods are used to obtain sensory comparable products. Consequently, the substitution of fat with functional products, such as inulin, can be some of the available alternatives to reduce the high caloric profile of ice cream products. Additionally, rheology is a useful instrumental tool that could find the correlation of physical properties to sensory attributes, and it allows the understanding of food structure and its behavior during its consumption. Therefore, the aim of this study was to compare the rheological and sensory behavior of two ice cream formulations, a full-fat ice cream (7% w/w), and a nonfat ice cream added with long-chain inulin (7% w/w). Small and large deformations rheological tests and a sensory profile by a multidimensional approach were performed to both formulations. In general terms, the nonfat product with inulin showed increased values for shear-thinning behavior, consistency index, yield stress, thixotropy, storage modulus (G') and loss modulus (G'') compared to the full-fat product. Moreover, sensory attributes were similar in terms of creaminess and mouthfeel for both formulations; nevertheless, dairy flavors, sweetness, and gummy attributes were more noticeable for the nonfat ice cream with inulin. The absence of fat allows the increased perception of flavors, and a sweeter taste might be associated to FOS (Fructooligosaccharides) residues in the inulin material. On the other hand, ice cream with long-chain inulin presented a weak gel mechanical behavior which might be explained due to the generation of a reticular structure promoted by the formation of gel particles, often present in this type of polysaccharide.

P09

Comparison between milk protein functionalized calcium carbonate microparticle (MPFCaCO3) and calcium phospate addition to vanilla ice cream: rheological behavior and sensory attributes

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Abstract

Ice cream, considered a frozen dairy dessert with a high nutritional value and a complex colloidal conformation, is used as a vehicle of substances with high nutritional value, the most common being calcium. However, incorporation might cause some negative sensory drawbacks to the product. One of the few alternatives for calcium incorporation is calcium phosphate obtained from dairy sources, but it has relatively high cost. Therefore, the aim of this study was to compare rheological and sensory behavior of three ice cream formula, one with 0.25% of milk protein functionalized calcium carbonate microparticles (MPFCaCO3), another with 0.35% of calcium phosphate, and the last one without added calcium (control). Small and large deformations rheological tests and a sensory profile by a multidimensional approach were performed for all samples. Flow curves were fitted to Herschel Bulkley model, and yield stress (so), flow behavior index (n) and consistency index (K) were obtained. MPFCaCO3 and control showed similar results in terms of shear thinning behavior, while sample with calcium phosphate showed an increase on the flow behavior index (n) value. Consistency index (K), G' and G'' for the MPFCaCO3 ice cream revealed higher values compared to the calcium phosphate and the control samples. In terms of sensory quality, all samples were rated with high overall quality. Sample with MPFCaCO3 added showed the best score in terms of its creaminess attribute and showed the least roughness. With respect to taste and odor attributes all samples showed similar profiles, enhancing sweet smell, milky and vanilla flavors. As a summary, MPFCaCO3 showed appropriate rheological and sensory behavior, which could be favorable for ice cream calcium enrichment.

P10

Evaluating new goat cheeses by Brazilian consumers: cross-national comparison

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Abstract

Goat's milk cheese is consumed worldwide presenting growing demand in Brazil. Therefore, producers look for new technologies to diversify the goat dairy sector. The present study evaluated sensory characteristics and acceptability of three new goat cheeses (Coalho goat cheese with pequi oil, matured and smoked Coalho goat cheese, and creamy probiotic goat cheese) by using CATA questions and hedonic scales. The tests were carried out in supermarkets and 300 consumers in the capital cities of three Brazilian states: Fortaleza (Ceará state), João Pessoa (Paraiba) and Rio de Janeiro (RJ) took part. Acceptance data were submitted to Anova, Tukey tests as well as Agglomerative Hierarquical Clustering. Multiple Factor Analysis (MFA) was applied in the frequency table to obtain a two-dimensional representation between samples and terms of the CATA questions. Global acceptance was used as supplementary data. All statistical analyses used the software XLSTAT. Creamy probiotic cheese was the favorite in Rio de Janeiro and Ceará, while matured and smoked Coalho goat cheese was the most liked in Paraiba. However, segmentation was observed in all localities. The first dimension of MFA separated the products by type, while the second dimension separated by origin of participants. The creamy goat cheese was described as white, slightly acidic and soft, with visible clumps and intense goat flavor; Coalho goat cheese with pequi oil was perceived as slightly yellow with holes and fruity flavor; and matured and smoked Coalho goat cheese as slightly yellow, firm, rubbery and very salty, with smooth surface and smoky flavor. All samples showed high frequency of mention for good appearance and tasty and low frequency for rancid and intense aftertaste, indicating good quality and potential of success in the market. Goat cheeses, a regional product from the Northeastern region, overcome cultural barriers since show good acceptability in Rio de Janeiro.

P11

Sensory evaluation of a gelatin-based biodegradable film

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Abstract

Packaging films must meet some specific requirements, including good mechanical properties and efficient barrier, biochemical, physicochemical, and microbiological stability, safety, easy processing and low cost. However, the first restriction of the use of these films is related to their sensory characteristics. The present study aimed to evaluate the sensory acceptance of a gelatin-based biodegradable film when compared to commercial films. The sensory evaluation was performed in the Laboratory of Sensory Evaluation at UFPEL, CCQFA, Pelotas/RS. Three commercial films (LDPE, low-density polyethylene; PP, polypropylene; and BOPP, bi-oriented polypropylene) and a gelatin-based biodegradable film were evaluated. All samples were subjected to a preference test with 100 consumers, who were asked to order the treatments from best liked (score 1) to least liked (score 4). The sensory attributes evaluated were overall preference, visual texture, color, and brightness, in that order. The samples were presented simultaneously, using a randomized complete block design. The results were analyzed by the F-test and the Friedman's test. The critical value was obtained using the table proposed by Christensen et al (2006) (ISO 8587: 2006). Significant differences at a 5% level of significance were observed among the samples for all attributes. The biodegradable film exhibited the highest scores for the attributes overall acceptance, visual texture, and brightness, and ranked second on the attribute color.

P12

Sensory assessment of white mofo matured cheeses in different ripening times

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Abstract

Ripened surface mold cheeses do not have a current legislation of standard identity and quality in Brazil, so it is important to characterize the product. The aim of the work was sensory characterizecheeses,ripened by white surface mold at different ripening times (14, 21 and 28 days) manufactured using different cultures (thermophilic T; mesophilic homofermentative O; mesophilic heterofermentative LD). For thisa descriptive profile was utilized, the analysis was performed by selection of 10 assessors who have been trained to characterize the samples of cheese. Sensory analysis with consumers was also applied, to characterize and generate a profile of products through the Check-all-that-apply methodology (CATA), which enables the use of different scales as hedonic and just-about-right (JAR) for product evaluations. The results show a well-defined profile for cheeses made with different cultures, and significant changes to the course of ripening, with increased intensity of attributes. The analysis with consumers grouped into four classes, and through internal and external preference mapping, showed preference for LD cheeses, characterizing it as bright, creamy and an expensive cheese. One cluster showed preference for T cheese, characterized as soft, velvety texture, light yellow color and mid-priced. None of the clusterspreferred the cheese O, which was characterized as hard, acid, opaque and more intense white color. Sensory results showed good correlation with physical-chemical and instrumental parameters, proving an effective way to standardize the quality of cheeses matured by P. candidum.

P13

Technological and sensory evaluation of chia (Salvia hispanica) seed addition in integral yogurt

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Abstract

Yogurt is a widely consumed food due to recent technological, nutritional and sensory advances. Seeds of chia may be used to increase the amount of fiber in food, as well as having peculiar characteristics in relation to water absorption and modification of food texture. The aim of the work was to develop probiotic stirred yogurt with the use of integral and defatted chia to improve texture and sensory characteristics. The formulations were delineated by factorial design 3^2, obtaining 9 different formulations. The technological parameters of texture were analyzed by texturometer. The CATA (Check-all-that-apply) sensory method was used to characterize the products, coupled to acceptability analysis. The results show that the addition of chia at different levels leads to significant modification with respect to the texture. The response surface analysis indicated as significant the texture parameter cohesiveness (R = 0.835), with significant effect by the addition of integral chia. There was an increase in firmness and consistency of approximately 13% and a reduction in viscosity index for samples containing less than 1.2% chia. The acceptability analysis indicates that the control formulation, with no chia addition, was the most accepted, with 86% acceptability, characterized by brightness and yogurt odor. The sample containing 1.2% chia was the least accepted (72%) and characterized as grainy by the evaluators, indicating the non-viability of its use in this concentration. The formulations containing 0.6%, 0.9% and 1.2% of chia has high correspondence with the attribute strawberry fragments, perception misinterpreted by the evaluators. All formulations tested were considered equally healthy. It can be concluded that the viability of chia to improve the technological characteristics of yogurt in concentrations less than 1.2% may be an may be an alternative to the sector.

P14

Sensory and instrumental evaluation of gluten-free breads

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Abstract

The absence of the variety of gluten-free products to meet the demand of celiac consumers demonstrates the need for studies to develop new product options. The present work aimed to develop and characterize gluten-free bread formulations, replacing wheat flour with rice flour,cassava starch and adding different concentrations of xanthan gum and ascorbic acid. A factorial design (22) was carried out, with gum and acid contents as variables. The samples were submitted to analysis of the proximal composition, color, texture and sensorial evaluation after approval by the Research Ethics Committee. The samples were evaluated for acceptability, in a hedonic scale of 9 points; (JAR) for the attributes softness and crispness, similarity with French bread with a 5-point scale and CATA (Check all that apply) for the characterization of the formulations. The formulations showed no significant difference ($p > 0.05$) in the evaluation of the color of the core, but the results of the texture profile showed that higher concentrations of xanthan gum result in greater elasticity, greater cohesiveness, resilience and lower hardness, producing a softer loaf of bread. Sensory tests showed that formulation 4, with lower concentrations of both variables, had the highest acceptability and most resembled French bread, indicating that the association of xanthan gum and ascorbic acid in lower concentrations better served the taste of the evaluators. Through CATA, it was possible to identify the characteristics that best describes the formulations, and "Crust peel" was the most associated attribute in all samples. Formulation 4, which presented the better sensory result, was analyzed for the proximal composition, and compared to French bread, demonstrating that the gluten-free formulation has lower protein and fiber contents, being suitable for its production.

P15

Multidimensional measurement for individual differences in human sense of taste

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Abstract

People's taste sensitivity was measured with intensity ratings of several concentrations of taste stimuli. Two matters affected the data analysis: Firstly, all concentrations of a taste stimuli should be included in the taste sensitivity determination. Secondly, the segmentation into taste sensitivity groups should be based on the data rather than on made-up limits, such as 25% of the people making the lowest judgments are hyposensitive tasters. Thus, hierarchical clustering as a multivariable method was used to reveal data-driven sensitivity groups.
The sensory study was carried out with Finnish volunteers (N=205, age 19-79, 80% females). Data were collected with Compusense five plus in our sensory laboratory (ISO 8589, FFF, the University of Turku) according to good sensory laboratory guidelines. Citric acid, caffeine, sucrose, NaCl, and MSG were used as the prototypic taste compounds. Four solutions of each compound were prepared in active-carbon filtered water. The intensities were rated on line scales anchored from 0 (no sensation) to 10 (extremely strong). Clustering was performed separately for each taste modality, taking all concentrations into account simultaneously. The clustering was performed on the standardized intensity ratings using the squared Euclidean distance measure and Ward's method. A three-cluster solution was retained for every taste quality.
Hierarchical clustering made it possible to analyze the complex data. The results of the clustering were distinctive for the taste modalities and the number of subjects in the sensitivity clusters varied. In general, the clusters could be labeled as hyposensitive, semi-sensitive, and hypersensitive tasters. This phenomenon was the most obvious in case of bitter and umami. Further analysis showed that the membership in a taste cluster could be partly predicted by the sensitivity to other taste modalities. When investigating the associations between taste function and other factors, the possibility of subpopulations of tasters to exist should be considered.

P16

How does the consumer perceive the coffee beverage in three regions of Brazil?

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Abstract

Brazil is the second largest consumer of coffee in the world. There is a need for segmented information by regions regarding the characteristics of the consumed coffee beverage (CCB), to understand the behavior of the coffee consumers and their main perceptions of consumption. This research was conducted via the internet with 677 responses; 3 regions: **MW** (Goiás/Mato Grosso/Mato Grosso do Sul/Federal District), producer of dairy cattle/ecotourism; **NE** (Alagoas / Bahia /Ceará /Maranhão/ Paraíba/Pernambuco/Piauí/Rio Grande do Norte/Sergipe), producer of fruit/sugar/coastal tourism; **SE** (Espírito Santo/Minas Gerais/Rio de Janeiro/Sao Paulo) coffee producer/exporter. It was applied a questionnaire with 10 questions: characterization of the interviewees; most consumed brand; reasons for choosing that brand; types of coffee preparation; the involvement with coffee consumption (7 grades: *passionate/someone who does not like or dislike coffee/someone who does not like it at all*) (Figure 1); CCB acceptability/hedonic scale; Check-All-That-Apply (CATA/24 randomized terms) and period of consumption. In the 3 regions CCB is taken mainly after lunch/afternoon and breakfast. The CCB acceptability was perceived as "like very much" by the positive coffee involvement profile (PCI) in all regions, with no significant difference. Considering each group of PCI and NE/SE regions, there were find two different acceptability groups: the passionate/lovers who perceived CCB as "like very much", and the CCB likers, that perceived it between "like very much" and "like moderately". This acceptability data were analyzed by Welch ANOVA and Games-Howell mean test. CATA analysis (Cochran-McNemar/Bonferroni Q test) with PCI from NE showed that the descriptors did not affect CCB acceptability; for SE the descriptors "pleasant aroma" and "tasty" affected positively CCB acceptability at 1 point. These drivers of CCB perceived/offered quality will be part of further research.

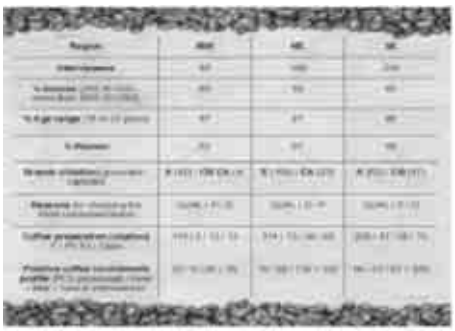

Figure 1 – Interviewees and relation with the coffee by region data (**A, T**: brands of very roasted and ground coffee; **CA, CB**: capsule coffee brands; **QUAL**: quality (flavor, origin, type, etc.), **P**: price; **D**: availability; **F**: Filtration; **Pr**: press; **Esp**: espresso; **Caps**: capsule).

P17

Evaluation of different comercial yogurt brands using the free sorting task method

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Abstract

The free sorting task (free grouping) is a new technique of sensorial characterization that analyzes and interprets the sensory response that consumers generate when evaluating a food. This type of test is quick and useful since it reduces the selection and training stages of panelists. The objective of this research was to identify the similarities and differences of yogurts expended in Lima city. We worked with six brands of peach-flavored yogurt: Milkito (709), Gloria (429), Laive (630), Metro (276), Soy vida (532) and Yoleit (910). The sorting task method was applied and a multifactorial analysis (MFA) was used with R software. The trial was performed with a group of 100 people between 18 - 28 years old (58% female and 42% male). The data analysis showed the formation of 4 groups, the first group conformed to samples 429, 910 and 709. The second group by 276, the third by 630 and the fourth by 532. The constitution of the first group was due to panelists described that the samples showed in common an orange, homogeneous appearance, fruity aroma and sweet taste. The second group was different since it presented an orange and homogeneous appearance, acid taste, and thick texture. The third group showed an orange and thick appearance, an aroma of milk and yogurt, and thick texture, and finally, the fourth group was described as different because it had an homogeneous appearance and orange dots, fermented aroma, residual flavor and liquid texture. The sorting task method is adequate to identify the similarities and/or differences of various brands of yogurt by evaluating them with consumers. Of the six brands evaluated, three were grouped as similar (429, 910 709) and different to the others. On the other hand. The three remaining samples Soy vida, Metro and Laive, were grouped individually.

P18

Check-all-that-apply (CATA) questions for sensory characterization cookie gluten-free formulated with rice flour and beans

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Abstract

The use of the check-all-that-apply technique (CATA) has allowed the characterization of products that depend directly on the sensorial perceptions of consumers. The objective of this study was to verify the consumer's perception of a gluten-free cookie prepared with rice flour and cowpea using the CATA technique. The study included 200 people for whom questionnaires of age, gender, educational level, if already consumed a cookie, and 37 word options that could be related to the sample, as well as a cookie sample for visualization and later marking all the options they deemed appropriate to the product. For analysis, a PCA was performed. Of the evaluators 98% declared that they had already consumed a cookie, 78% female and 22% male, 75% were 20 and 55 years, 24% below 19 and 1% above 56 years. The options selected by the evaluators who had the most contributions to compose the factor 1 were "practical" and "take in the bag", which also participate for group formation together with the words "morning snack" and "afternoon snack", already for factor 2 basically contributed to the "whole grains" option, which together with the words "with wholemeal flour", "oats", "wheat" and "fiber" characterize the composition of the product and relate its consumption to being a healthy option. Another group formed is composed of the "buttery" and the latter by "milk" and "vanilla", both groups suggested that consumers relate these characteristics to the taste and texture they expect in cookie. It is concluded that consumers related the gluten-free cookie formulated with rice flour and cowpea beans a practical product, as an option of snack between the main meals, with presence of fiber and whole flours, characterizing as a healthy product option.

P19

Word association technique applied to wine consumption

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Abstract

To evaluate what consumers describe when stimulated to talk about wine, the method of word association was applied to the Brazilian population through the on-line tool Google docs. 524 respondents, 83.6% of whom were women, voluntarily completed the questionnaire, composed of age, gender, frequency of wine consumption, type of wine and origin, and cited the first four words that came to mind and expressed feelings, association when thinking about wine. Most participants were between 20 and 55 years old (90.5%) and 99.8% were reported as wine consumers. The frequency of wine consumption varied from 24% for those who consume a few times a year, 19% to once a month, 15% consume wine every 15 days, 19% to once a week, 18% to two or three times per week, 2.5% to once per day and 2.5% per never consuming. The analysis of PCA resulted in the grouping of categories. The category "Sentiment" contributed to Factor 1 and "Confraternization" for Factor 2. The third group was formed by the categories "Food / Health / Culture / Innovation". The analysis of the categories indicates that the consumption of wine when performed in moments of fraternization does not consider important aspects such as health or food. Explained by the fact that it is a time when drinking with friends or family is a relevant social aspect that appear by factors that influence eating habits and lifestyle, conditioners of healthy practices. Due to the high incidence of wine consumers verified in this research, the drinking decision is the category of words classified as Feeling / Pleasure.

P20

Order and session size effects on treatment discrimination: Case study liking for Dulce de Leche

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Abstract

This study aimed to evaluate the implications of the number of samples per panelist in experimental precision and relative efficiency of treatment comparisons when modelling order effects for Dulce de Leche samples using a Sudoku design. Precision is defined as small variance and relative efficiency is defined as smaller variance than other alternative. Both are related to increasing discrimination power. A series of 8 Sudoku 16×16 squares being 4 randomized independently and 4 others in the reverse order, was designed to allow a linear model fitting to experiments of different sizes (orders 1 to 4, 1 to 8, 1 to 12 and 1 to 16). Data from 112 panelists were kept. Responses were recorded using a nine-point hedonic scale. Data was analyzed using a mixed linear model panelist, order and treatment (sample) effects. Analysis has shown a pronounced order effect, showing a first sample effect overestimation. Moreover, it was noted that order effect was rather evidenced in the first four orders, making for a relatively more precise experiment than the ones using remaining samples. Therefore, the use of Sudoku can be a convenient strategy to organize smaller testing sessions that could result in efficient experiments, with small variance of the estimated averages or effects and needing a lot less panelists to make a design as efficient as the large one used. Moreover, Sudoku can also inspire an efficient design that allows different test sessions.

P21

Applying Penalty analysis to JAR scales and CATA questions for the development of xique-xique's cookie

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Abstract

Xique-xique (Pilosocereus gounellei) is widely used on rural communities' diet on Brazilian northeast. Due to the high content of flavonoids, it has a beneficial antioxidant effect to the human body. The pulp is extracted from the xique-xique stalks and after dried and processed into flour, it presents a pleasant and delicate smell, allowing its addition to bakery products replacing partially the wheat flour. This study aimed to apply a xique-xique flour obtained by drying (60ºC) on cookie's formulation (XIQ) substituting 50% of the wheat flour. A test with 123 consumers was applied to compare XIQ to CTL (without xique-xique). XIQ presented means between 6 and 7 (9-point hedonic scale) and it was less accepted ($p<0.05$) than CTL, which obtained means 7 for smell, crispness, flavor and general acceptability. XIQ was preferred by 44 and CTL by 79 of the consumers. Using Penalty Analysis applied to the JAR data, it was observed that XIQ was considered less crispy by 34% of the consumers, reducing 1,0 point on the general acceptability. On the CATA analysis, XIQ flavor was evaluated as artificial (by 26% of the consumers with reduction of 1,2 point on the general acceptability), non-characteristic (24%; -1,1 point) and strong (29%; -0,9 point). Penalty Analysis applied to the group of 79 consumers who preferred CTL showed that XIQ was considered less sweet by 22% of the consumers (-2,2 points) and with odd flavor by 28% (-2,0 points). Applying Penalty Analysis for the evaluation of the ideal intensities of crispness and sweetness (JAR scales) and CATA for the description of smell and flavor attributes, both to the whole group and to the group that preferred CTL, allows to direct the studies aiming the improvement of the cookie´s crispness and flavor, once xique-xique's characteristic flavor affected even the sweetness perception.

P22

Research of texture attributes and development of terminology of juices and nectars

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Abstract

Texture is the most recent tools to involve the senses and to offer experiences worthy of being shared. The quest for experiences will provide opportunities for multisensory food and drink that uses unexpected texture to provide consumers. With this demand, it is necessary to study techniques capable of characterizing and to ensure sensoriality, mainly regarding texture. The objective is a research of attributes and development of terminology of juices and nectars, complemented by instrumental analysis. The samples: 30 mL, 25º C, in white disposable plastic cups assign three-digit random code numbers and incomplete blocks. Allocated in individual cabins, a selection 26 assessors has characterized the samples through a response sheet divided in 4 phases: without swallowing; first gulp; swallowing; residual. Three evaluation sessions have been realized: 100% natural orange juice (two brands); orange juice with cells (three brands); orange and peach nectar (four brands). The results were discussed on group, compiled in a consensual list, grouped and evaluated by citation frequency. The assessors described mechanical attributes such as viscosity and gumminess, and geometrical of conformation and granularity. During discussion, they reported difficulty in citing different terms, and affirmed that the division in phases made possible the research of a larger number of terms and to facilitating the classification by the temporal aspect. The instrumental evaluation indicated a significant difference between orange juice with cells and orange nectar. For 100% natural orange juice, the samples presented differences of density and viscosity. For the peach nectar, two brands did not present significant difference regarding pH and Brix; the other brands presented differences in all of the analysis. From the current study it became evident that sensorial and instrumental differences exist between the samples chosen for evaluation. In addition, it has reinforced the need for training, in standardization and quantification of terms.

P23

TDS of cheese: implications of analyzing texture and taste simultaneously

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Abstract

This study aimed to evaluate the implications of analyzing texture and taste simultaneously on Temporal Dominance of Sensations (TDS) descriptions of Prato cheese. TDS tests were performed in two ways: I-panelists performed TDS tests of cheeses evaluating an attribute list with taste and texture sensations in a same session; II-TDS sessions were performed for each sensory modality. The difficulty and reliability degrees on performing the tests were assessed by the panelists; and some physico-chemical parameters were determined to compare the sensory and instrumental results. During TDS tests, simultaneous evaluations provided a higher number of significant sensations (considering both taste and texture sensations), but at lower dominance rates. Moreover, it was noted that one of the main implications of the simultaneous analysis on TDS results was the temporality differences (the time to reach the significance level, the sensation duration and the sensations sequence). However, regarding only the attributes that most characterized the samples, the results suggested a great similarity between the descriptions obtained from both TDS modalities. The simultaneous analysis implied greater difficulty in performing the tests and less reliable results according to the panelist's opinions. Moreover, the panel considered the texture evaluation more difficult than the taste evaluation. Regarding the instrumental analysis, the physico-chemical parameter intensity (amplitude) was not strongly linked to the maximum dominance rate.

P24

Sensory description of chocolate muffins and cañihua using the method check all that apply (CATA)

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Abstract

The chocolate muffin and cañihua is a healthy food suitable for children, adults and the elderly. Because this Andean grain contains protein between 14-19% and a significant proportion of sulfur amino acids. On the other hand, it is necessary to know the sensory characteristics so that it is successful in the market. An alternative to this is the application of the Check All That Apply (CATA) method, which consists of presenting a list of terms, where consumers select the attributes they perceive in the samples, and also allows describing the ideal product for the consumer. The objective was to describe different muffins based on chocolate and cañihua flour using the CATA method. The statistical design Taguchi $L_9(3^{4-2})$ was used, obtaining 9 samples. We worked with 102 consumers between 20 - 45 years who frequently consume muffins. There was a list of 12 attributes to describe the samples. The Cochran Q test and correspondence analysis (ACM) was performed with the XLSTAT-Trial software. Regarding the results, the Cochran Q test did not show significant differences for the firmness attribute of the muffins. Sample I and H were the driest with respect to sample A, which was considered the least dry and wettest. Sample G presented the most intense taste of cañihua, unlike sample B, where the cañihua flavor was lower. Correspondence analysis presented 86.42% of total variability of the data, the samples C, F and B were described as firmness, spongy, chocolate flavor. However, the ideal product should consider the sweet, wet, spongy and chocolate flavor attributes to improve its sensory acceptance. Sample A is the closest to the ideal product, given that its attributes are more acceptable.de by the CATA method.

P25

Influence of demerara sugar addition on sensory acceptance of popsicle zero lactose banana flavor with cinnamon.

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Abstract

In recent years there has been an increasing increase in people who have lactose intolerance. This deficiency can occur in babies who are born without producing the enzyme lactase or can occur at any time in life. Thus, there was an increase in the production of products that do not contain lactose. Cinnamon (Cinnamomun zeylanicum) is one of the most consumed spices in the world, due to its actions beneficial to the body, such as: anti-inflammatory, antimicrobial and antioxidant action. Therefore, the present work had the objective of producing a lactose-free popsicle of banana with cinnamon and to evaluate the impact of the addition of sugar in 1%, 3%, 5% and 7% in the sensorial acceptance of the same. To prepare the popsicle, bananas were ground, cinnamon powder, demerara sugar and mono and diglycerides of fatty acids were weighed, and finally homogenized for 10 seconds in an industrial blender. The dough was wrapped in pans, taken to a freezing chamber where it remained for 24 hours. The popsicles were presented to 80 consumers who classified the product by means of a response sheet containing a structured hedonic scale of nine points ranging from 1 (I highly disagree) to 9 (I liked it very much), for characteristics such as appearance, aroma, flavor , texture and overall impression. The results were evaluated by analysis of variance followed by the Tukey test ($p < 0.05$). Samples did not differ significantly in appearance and flavor attributes. The sample prepared with 1% demerara sugar presented lower average values for the flavor and texture attributes. For the overall impression attribute, the samples with 3% and 5% of sugar presented greater acceptability. It was concluded that the samples with 3% and 5% of sugar presented greater sensory acceptance in the test performed.

P26

Ideal sweetness and intention to purchase lime refreshment with different ratio values.

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Abstract

With reduced time and increased workloads, consumers began to look for fast and nutritious foods. So, refreshment has been a choice to remedy the lack of time. Lime juice, in turn, is considered a source of vitamin C, in addition to containing folic acid, niacin and pyridoxine. The objective of this study was to evaluate the ideal sweetness and the intention to purchase lime nectar samples with different values of the ratio, maintaining the acid value defined and varying the soluble solids content. Samples of lemon nectar with 21, 24, 27, 30 and 33 ratio (5% of pasteurized integral lime juice, 0.12% of citric acid) were used. The samples were served to 85 consumers aged between 16 and 30 years old, 23 men and 62 women, who evaluated the samples in relation to the ideal sweetness in a scale ranging from extremely less sweet than the ideal to extremely sweeter than the ideal and buying intention ranging from certainly would not buy to certainly would buy. Linear regression was used to analyze the ideal sweetness data and frequency distribution histogram for the purchase intention data. According to the equation of the line, the ideal sweetness is equivalent to the sample of lime nectar with ratio. The samples with 30 and 33 of ratio had higher positive buying intentions (62.4% and 52.9%, respectively), the sample with 21 of the ratio showed greater indecision in purchase intention (41.2%) and the samples which contained 21 and 24 of the ratio had higher negative buying intentions (25.9% and 27.1%, respectively).

P27

Effect of fermentation and drying on the sensory quality of Theobroma cacao l., cultivated in the department of Antioquia, Colombia.

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Abstract

Cocoa (Theobroma cacao L.) has great importance in Colombia. Its quality is influenced by variables such as cultivation, type of clone and post-harvest process, which includes fermentation and drying. In these processes aroma and flavor precursors are produced, which are crucial in the development of sensory quality parameters and the differentiation of the product in the chocolate industry. The objective of this study was to evaluate a mixture of cocoa clones (CCN-51, ICS-1, FEC-2, FLE-2) cultivated in the Department of Antioquia during fermentation and drying through physical and sensory analyzes, which affect the quality of cocoa. The studied variables were ºBrix, instrumental color and descriptors of smell, taste, trigeminal sensations and general quality. The latter was carried out using a multidimensional approach profile (ISO 11035: 1994) with a trained panel using a scale of 0 to 10. An analysis of variance at 95% confidence level was used for the physical analyzes and a multivariate design for the evaluated sensory descriptors. The color analysis showed changes in the cocoa bean with shades ranging from purple to brown, these shades are associated with the transformation of polyphenols in the fermentation and drying process. During the fermentation, a significant effect was observed between the time and the region on the ºBrix. At the sensory level, there were significant differences with respect to the time of benefit where the floral, fruit, spicy, milk, and general quality descriptors presented positive correlation. The acid descriptor showed a negative correlation. In conclusion, a decrease in ºBrix could be associated with colorimetric changes and the generation of sweet, spicy, fruity and floral aroma, and flavor compounds that allow obtaining a high overall quality in the cocoa bean.

P28

Sensory quality of avocado hass (Persea americana Mill), a determinant in national and international commercialization

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Abstract

Sensory quality of avocado Hass (Persea americana Mill) allows to determine harvest and postharvest conditions. Avocado samples from five farms located in the Southeast (S), North (N), and East (E) of the department of Antioquia, Colombia were evaluated. Samples differed in the harvest moment, selected according to their dry matter percentage (%DM; 23%, 26%, and 30%), and the storage time (ST; 0, 3, 4, and 5 weeks). Trained judges evaluated the fruits according to ISO 11305. 29 descriptors including appearance, smell, taste, texture modalities were evaluated using a 0 to 5 scale, while overall quality (OQ) was assessed in a scale from 0 to 3. The sensory attributes of the avocado samples differed according to the farm location. In region S, , fruit taste was positively correlated with %DM and ST and OQ with %DM. Notes of coconut, corozo, dried fruits, spices (fennel and anise) were found. In the two farms in N, ST had a positive correlation with flux and oily texture, andnotes of coconut, corozo, dried fruits, sapote, and unripe mango were perceived. One of the farms in E showed a higher influence of %DM and ST on the sensory attributes. Both were positively correlated with oily surface and acid taste, and negatively correlated with sweet taste. Besides, ST was found to be positively correlated with acid smell, fibrous texture, and negatively correlated with color uniformity, smell, fruit taste, and OQ. In the second farm from E, ST showed a positive correlation with color and negative with green smell; in %DM it had a positive correlation with spicy sensation and fibrous texture, it was negative in fruits of lesser quality with notes metallic, vegetable: green bean, common bean, and plantain leaf. The OQ decreased for the longest ST (5 weeks) and in several farms the fruits that showed acceptable quality had an average %DM. The sensory science allowed to determine the quality of avocado Hass and its main sensory attributes, which is determinant for its commercialization.

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Flash profile for sensory characterization of a chocolate milk prepared with andean grain (quinua, cañihua and kiwicha)

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Abstract

The Flash Profile is a sensory descriptive method based on the free choice of attributes, comparing samples and quantifying by means of ranges for each attribute. Consumers can provide reliable information on the sensory characteristics, in addition to indicate the liking / dislike of the products. Andean grains are an alternative to meet nutritional needs, that when supplemented with chocolate milk, masks the flavor and aroma of the grains. The present study aims to describe the sensory characteristics of different chocolate milk drinks with Andean grains (Quinua, Cañihua and Kiwicha toasted and not toasted), using the Flash Profile sensory analysis method. Six chocolate drinks made with Andean grains were used in the present work, coded as: QNT, CNT, KNT, QT, CT, KT. The generalized procuster analysis (GPA) and an analysis of variance (ANOVA) were applied to know the acceptability of the products with the XLSAT-trial version software. The QT sample is associated with the terms chocolate, bitter and sweet taste, the sample KT presented the terms sandy and chocolate and for the CT sample presented the terms milk, fluid and sweet flavor. The non-toasted Andean grains presented higher descriptors than the toasted ones , the KNT sample, presented chocolate flavor, toast, chocolate flavor, viscous and milk flavor; the sample CNT was attributed the terms of toasted, sweet and viscous and finally for the sample QNT, presented the terms gritty, chocolate flavor, toasted, Andean grain flavor, fluid. For the acceptability test, significant differences were found ($p < 005$) for the samples, where the QNT drink is different to all the treatments, although the others do not present differences between them. The Flash Profile method is an adequate test to describe food and it helps us to determine the attributes of a product.
Keywords: Flash profile, chocolate milk, Andean grains

P30

Descriptive analysis, overall acceptance and CATA (Check All That Apply) of lamb meat from different genetic groups

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Abstract

Lamb meat consumption has been increasing in Brazil and consumers have been expecting a high quality product. In the meat production system, the genotype is an important factor that affects the quantity of muscle and fat distribution throughout the carcass and consequently the meat quality. The choice of genetic group for each production system is very important in order to obtain a profitable activity as well as to reach the consumers´ expectations. This study aimed to evaluate lamb meat from animals of seven different genetic groups: Dorper (D), Texel (T), Ile de France (I), Santa Ines (S), ½ D + ½ S (DS), ½ T + ½ S (TS) and ½ I + ½ S (IS), by Quantitative Descriptive Analysis (QDA) and overall acceptance. Check All That Apply (CATA) was also used to characterize the samples. For QDA, the following attributes were evaluated: lamb aroma and flavour intensity (1 - extremely weak; 9 - extremely strong); blood aroma, fat flavour and salty taste intensity (1 - extremely strong; 9 - none); tenderness (1 - extremely tough; 9 - extremely tender) and juiciness (1 - extremely dry; 9 - extremely juicy). A nine-point structured scale (1 = dislike extremely; 9 = like extremely) was used for overall acceptance and for CATA the following attributes were presented to the panellists: lamb aroma, blood aroma, strong aroma, lamb flavour, blood flavour, strong flavour, tasty, greasy, salty, metallic, liver, sour, soft, hard, juicy and dry. No difference was observed for any descriptive attribute among the different genetic groups as well as for overall acceptance (values ranging from 7.0 to 7.3). The CATA attributes explained 63.9% of the variation between the genetic groups and the more frequent terms were tender, tasty, lamb flavour and juicy. Research funded by FAPESP
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P31

Reformulating the Minas Frescal cheese using consumers' perception: insights of Intensity Scales and Check All-That-Apply (CATA) questions

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Abstract

The performance of methods based on consumer perception such as check-all-that-apply (CATA) questions and intensity scales to sensory profiling Minas Frescal cheese and provide relevant information to product reformulation was evaluated. Ten commercial samples with different formulations (full-fat, low-fat or low-lactose) were evaluated by 200 consumers equally divided into 2 groups, where one group evaluated the samples and described their ideal cheese using Intensity Scales and the second one used CATA questions to do the same. Twenty-two sensory descriptors, including attributes of appearance, aroma, flavor and texture were assessed. In intensity scales, consumers evaluated samples using a 9-point hedonic scale and a 10-cm unstructured linear intensity scale. After performing the first stage, consumers were asked to describe, in the same intensity scales, their ideal product. In CATA, respondents were instructed to evaluate the overall liking and then check all the attributes necessary to describe the samples. The results showed that both methodologies provided similar information about the sensory characteristics of the Minas frescal cheeses, the description of the ideal product and the directions for product reformulation. The ideal Minas Frescal cheese presented high moisture, intense white color, homogeneous mass, typical Minas Frescal cheese aroma and flavor, softness and juiciness. Using the intensity scales, the recommendation is to increase the typical aroma and flavor, salty flavor and juiciness and to decrease the bitter flavor, while in the CATA questions only the increase of the typical Minas Frescal cheese flavor was important for all the classes of cheeses. Even for a heterogeneous product that has no defined manufacturing protocol, both sensory methodologies presented satisfactory results and may be considered by the dairy industry when classical descriptive analysis are not available.

P32

The effect of familiarity and culture: a case study covering coalho cheese in two Brazilian areas using free word association and PLS-DA

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Abstract

Coalho cheese is a traditional dairy product produced in the Northeast region of Brazil, being also present in the cuisine of the other regions of Brazil as Southeast areas. The main aim of this study was to investigate the effects of familiarity and culture related to consumer perception of coalho cheese using word association technique. Consumers (n=400) of the Brazilian Northeast and Southeast areas were recruited using a web-based questionnaire. Data analysis has been conducted using Chi-square test and Partial Least Square - Discriminant Analysis (PLS-DA). Results show that different perceptions were detected by Chi-square test ($X2=49.183$, $p<0.0001$) for both Northeast and Southeast areas. Word association identified twenty categories that were used for describing coalho cheese, such as: positive feeling, way of preparing, Northeast culture, accompany, texture, social, sensory characteristic, ingredient, food, dairy product technology, culture, negative feeling, contamination, beneficial to health, sale, appearance, manufacturing method, bad for health, family and absence of quality standard. Partial Least Square regression - Discriminant Analysis (PLSDA) shows that consumers living in the Southeast area associate coalho cheese with the terms “Social” and “Harmful to health”, while consumers that live in region Northeast link the coalho cheese to the terms “Northeastern culture”, “Accompaniment”, “Dairy derivative technology”, “Manufacturing method” and “Family”. These results show that product development and marketing strategies should carefully consider adopting different marketing strategies for the two areas investigated. Discussion will be focused on comparing these findings with other similar research as well as discuss managerial implications and future research avenues.

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Sensory study and similarities evaluation of handmade carrot, mango, passion fruit and tangerine peel liquors.

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Abstract

The liquor business is experiencing solid and continuous growth in both established and emerging markets. This market growth demands companies to provide quality products and ones with remarkable Brazilian characteristics. With the objective of disseminating the production of artisanal liqueurs, we worked with carrot, mango, passion fruit and tangerine peel in order to evaluate the sensorial characteristics of these products and to establish the similarities of the groups and attributes studied. Acceptance tests were performed (60 analysts) using a structured hedonic scale of nine points and tests of intention to buy using a 5-point scale. The results were submitted to Analysis of Variance (ANOVA) using the software Microsoft Excel 2016 and the significant data ($p < 0.05$) were evaluated through the Tukey Test. The similarity index of the studied groups and the Tukey test were obtained through the statistical program Past (Paleontological Statistical) version 3.15 (2017). The applied affective tests indicated that the tangerine peel liquor was the least accepted for all the evaluated attributes (color, aroma, flavor and overall acceptance), presenting a difference at 5% of significance among the samples. The Intention of Purchase test also showed similar performance for the tangerine peel liquor. The other liquors presented no differences between them at 5% of significance. The Similarity Index among the liqueurs proved to be the tangerine peel liquor that was most distant from the others. When the attributes of the studied liquors were confronted, it was noticed that there was a similarity for color and aroma and a lesser similarity for the attributes global taste and acceptance. We concluded that the formulation of the tangerine peel liquor elaborated in this work would not be a good option for technological diffusion, however, the carrot, mango and passion fruit liquors are presented as viable options of artisan production.

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Chemical, aromatic and sensorial characterization of varietal wines of the cv. Pais from Maule Valley and Itata.

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Abstract

The quality of the wine is identified according to its geographical origin. The variety País is cultivated in a dry area, it is a heritage in Chile with vines of more than 100 years of cultivation. The objectives of this work were to characterize and compare the phenolic, aromatic and sensory composition of the wines of the País variety produced in the Maule valley and Itata.
Ten wines from cv. País, five of the Maule Valley (Cauquenes and San Javier) and five of the Itata Valley (Ninhue, Quirihue and Portezuelo), of the 2016 vintage. In the chemical aspect, the pH, acidity of titratable, total phenols, total anthocyanins were characterized and the monomeric, oligomeric and polymeric fractions of flavanols. In addition, a polysaccharide fractionation analysis was carried out according to its molecular weight, and a profile of aromatic compounds. In the sensory aspect, an internal panel of 15 evaluators trained in wines was used, who carried out a quantitative descriptive analysis.
According to the obtained results, the locality affects the fraction of flavanols, the wines originating from the Maule Valley presented a higher monomeric and oligomeric concentration of flavanols. As for the sensory characteristics, the effect of the origin was reflected in the aromatic and gustatory aspect. Greater intensity was found in floral aromas and red fruits (direct and retronasal perception), in wines from the Itata Valley. Similarly, the astringency and the body were perceived more intense in the original wines of the Itata Valley.

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Evaluation of conventional and light grape juices by Check-all-that-apply methodology

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Abstract

The consumption of fruit nectars has increased in the world, due to the practicality offered by the products. The objective of the work is to carry out a study where the terms descriptors that are involved in the sensorial acceptance of conventional and light grape nectars by check-all-that-apply (CATA) methodology. The analysis was performed with eight commercial grape nectar samples, four conventional and four light in calories, applied to 120 consumers present at IFSULDEMINAS - Campus Inconfidentes, MG - Brazil. The methodology to evaluate the Acceptance Test was as proposed by Stone & Sidel (2004) in evaluating of overall impression. The results obtained by the CATA method were transferred to the construction of the External Prefence Map (MDPREF). According to MDPREF, the 2º Conventional and 2º Light were the ones that presented greater acceptance, being related to the terms characteristic flavor, strong flavor, strong color, characteristic aroma, color and characteristic appearance of the product. The 4º Light sample had lower acceptance for all attributes and was confirmed by the external preference map because it was related to the watery, non-characteristic taste and light-weak color of the product, providing a sample with sensory aspects inferior to the others evaluated.

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Determinacion of descriptive terms of conventional and lights grape juices by open-ended methodology

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Abstract

The consumption of fruit nectars has increased in the world, due to the practicality offered by the products. The objective of the work is to carry out a study of terms descriptors of conventional and light grape juices by open-ended methodology. The analysis was performed with eight commercial grape nectar samples, four conventional and four light in calories, applied to 80 consumers present at IFSULDEMINAS - Campus Inconfidentes, MG - Brazil. The tests were carried out in individual cabins with white fluorescent lighting. In the open-ended test the consumers had to describe with at least three and at the most five words what they thought of the sample. From the open-ended test, the 15 descriptor terms or words were selected with greater frequency. The terms frequently larger were: characteristic flavor, sweet, characteristic aroma, watery, color characteristic, weak color, strong flavor, little sweet, bitter, non-characteristic flavor, strong acid color, characteristic appearance, color characteristic and mild flavor.

P37

Sensory acceptance of lime refreshment with different ratio values

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Abstract

The consumption of processed fruit juices has increased in Brazil and in the world, due to the lack of time of the population to prepare fresh fruit juice, the practicality offered by the products, the replacement of the consumption of carbonated beverages and the concern with the consumption of healthier foods The objective of this study was to evaluate the sensory acceptance of lime refreshment samples with different values of ratio while keeping the acid value defined and varying the soluble solids content. to 21, 24, 27, 30 and 33 (5% pasteurized whole lime juice, 0.12% citric acid). The samples were served to 85 consumers, aged between 16 and 30 years, 23 men and 62 women, who evaluated the samples in relation to the sensory acceptance for the attributes appearance, aroma, taste, texture and overall impression. The results were evaluated by Analysis of variance followed by tukey test at 5% probability. The lime refreshment samples did not present significant difference in relation to the appearance, aroma and overall impression attributes. In relation to the flavor attribute, the samples elaborated with ratios 21, 24 and 27 presented greater sensory acceptance while the sample elaborated with ratio 30 presented lower average for this attribute. For the texture attribute, the nectar elaborated with ratio 21 presented greater sensorial acceptance and the lowest mean value was observed for the sample elaborated with ratio 30.

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Ideal lime flavor and intention to purchase lime refreshment.

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Abstract

The consumption of processed fruit juices has increased in Brazil and in the world, due to the lack of time of the population to prepare fresh fruit juice, the practicality offered by the products, and the concern with the consumption of healthier foods. The objective of this study was to evaluate the ideal intensity for lime flavor and the intention to purchase samples of lime refreshment with different levels of lemon flavor flavor. Lime refreshment samples were added with the following amounts of natural lime flavor for each liter of refreshment: 0; 0.1; 0.2; 0.4 and 0.6 mL / L (9.7% sugar, 5% pasteurized whole lemon juice, 0.12% citric acid). The samples were served to 85 consumers, aged 16 to 48, being 28 men and 57 women, who evaluated the samples in relation to the ideal flavor of lime flavor in a scale ranging from extremely less lime flavor than the ideal to extremely more lime flavor than the ideal and the intention of buying with varying range of certainly would not buy it would certainly buy. Linear regression was used to analyze the ideal lime flavor data and frequency distribution histogram for the purchase intention data. According to the equation of the line, the ideal lime flavor content is 0.55 mL / L of lime refreshment. The samples with 0.1 and 0.4 mL of Lime refreshment flavourant / L showed the highest positive purchase intention (59.5% and 54.8%, respectively), the sample with 0.2 mL Flavor / L (38.1%) and samples containing 0 and 0.1 mL of lime refreshment flavor / L showed higher negative buying intentions (22.6% and 20.2% , respectively).

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Sensory acceptance of lime refreshment with different levels of flavored lime flavor.

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Abstract

The consumption of processed fruit juices has increased in Brazil and in the world, due to the lack of time of the population to prepare fresh fruit juice, the practicality offered by the products, and the concern with the consumption of healthier foods. The objective of this study was to evaluate the sensorial acceptance of samples of lime refreshment with different levels of flavored lime flavor. Lime refreshment samples were evaluated with the following lime flavor natural flavor contents: 0; 0.1; 0.2; 0.4 and 0.6 mL / L (9.7% sugar, 5% pasteurized whole lime juice, 0.12% citric acid). The samples were served to 85 consumers aged 16-48 years , being 28 men and 57 women who evaluated the samples in relation to the sensory acceptance for the attributes appearance, aroma, flavor, texture and overall impression. The results were evaluated by Analysis of variance followed by tukey test at 5% probability. The lime reef samples presented no significant difference in terms of appearance, taste, texture and overall impression attributes. In relation to the flavor attribute, the samples prepared with 0, 0,1 and 0,2 mL / L of flavored lime flavor were more accepted while the sample containing 0.6 mL / L of flavoring presented lower average value for this attribute. It was concluded that the addition of lime flavor flavors, at the concentrations tested, influenced the sensory acceptance only of the flavor attribute.

P40

The perception of the consumer regarding functional foods

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The increase in life expectancy leads to an increase in the incidence of chronic diseases such as diabetes, cancer and cardiovascular diseases (associated with problems with cholesterol). In order to minimize costs associated with health, governments promote the development of studies on products that have beneficial effects on health, in addition to their basic nutritional effects. Examples of such products are functional foods. A functional food is similar in appearance to a conventional food or may even be one, which is consumed as part of an usual diet. The main objective of this work was to study the impact of labelling on consumer behaviour in relation to functional foods that promote the reduction of cholesterol levels. Thus, it was possible to understand how the nutritional information is perceived by the consumer, taking into account the presentation and clarity of the label, as well as such influence in the act of the purchase and/or consumption. Therefore, a questionnaire was applied to 214 individuals, aged over 18 years and whose consumption of functional foods (which promote cholesterol reduction) was performed on a regular basis. The results showed that the female gender, aged between 26 to 45 years old, with a medium-°© high literacy and with a healthy body mass index, is the major consumer of this type of functional foods. Mostly they do not consume a fixed brand. Concerning the behaviour of this type of consumers in relation to labelling, it has been verified that they read the nutritional labelling of products. However, they have difficulties in understanding it, mainly due to the use of very technical language and the little nutritional information used. Also, the consumers do not consider the design of the label appropriate.

Keywords: Cholesterol, functional foods, labeling, nutritional information, consumer behavior.

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Effect of salt reduction on consumer acceptance and sensory quality of instant dried soup

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Salt is a known flavour enhancer contributing to the positive sensory attributes of foods. Additionally, salt also increases the volatility of aroma compounds, or mouth feel, by affecting the lubricating properties of saliva. However, health authorities worldwide have recommended reducing salt in processed foods in order to reduce the risk of high blood pressure, which raises the risk of cardiovascular disease. Thus, maintaining consumer acceptance of the low salt products is a challenge. In this study, Gracilaria gracilis, a macroalgae was used to enhance consumer acceptability of a low salt instant dried vegetable soup. Response surface methodology was performed to examine the effects of independent variables on sensory properties and to determine the optimum level of ingredients. Independent variables selected were: salt concentration, Gracilaria concentration and basil concentration. For each response, second order polynomial models were developed using multiple linear regression analysis. The optimum values for salt, Gracilaria and basil concentrations were found to be 0, 1.5, and 0.3 %, respectively, showing that seaweeds can be used for salt replacement. Additionally, the acceptance of optimum formulation by the consumer was assessed through a focus group. The participants of this group classified the product, in general, as being easy to prepare and with pleasant taste. The findings suggest that the use of seaweeds is a useful approach to reduce salt content in foods.

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