The innovation box of Objectif Végétal

Move closer to academic research to boost your potential of innovation!

n°4

Sensory analysis, an innovation tool for the plant sector

- ✓ Organoleptic qualities
- ✓ Aesthetic qualities
- ✓ Plant breeding






- ✓ Sensotyping
- ✓ Phenotyping




- ✓ Consumers' expectations
- ✓ Sensory analysis
- ✓ Innovation

Editorial

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The struggle for new markets and the necessity to find innovations to boost the plant economy require from fruit, vegetable, ornamental, wine and cider sectors to understand the motivations, expectations and perceptions of the consumers. Today it is necessary to **gather consumers and professionals of the plant sector at the heart of the conception of new products through reverse engineering approaches.**

Development of new successful product meeting market expectations needs precise and multi-criteria quality characterization: physico-chemical, nutritional, sensory characteristics and functional properties e.g. processing and storage capacity.

Numerous complementary methods are now available to perform these characterizations. **Sensory analysis** is based on a multi-criteria assessment and integrates *de facto* all the main constitutive components of the perceived product quality. Well managed, sensory analysis **remains today one of the best evaluation tools for food and non-food products**.

Looking for partnership?

Four contacts to help you build your projects and support them:

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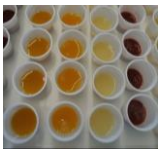
REVIEW OF THE MAIN CONCEPTS

Sensory analysis, a tool to assess product quality

Evaluation of a product quality is SUBJECTIVE.
Numerous biases may modify consumers' perceptions (adaptation, tiredness, interactions between testers...)

Sensory analysis is a science based on a set of methods measuring sensory perceptions.
It enables to assess:

Differences



« Descriptive » trials
performed by **trained panels**

Preferences

Hedonic trials
performed by consumers without any training

Attitudes, motivations, behavior

« Qualitative » trials
performed by consumers without any training

Understanding consumers' liking to support innovation

Sensory analysis links: the results from expert panels (= **sensory descriptions**) with the results from consumer tests (= **sensory preferences**)

to map sensory preferences of consumers on the basis of **objective criteria** and **help professionals** to:

- breed plants that meet consumers' expectations
- segment their products
- improve their marketing communication

Sensotype the products to accelerate plant breeding and segmentation

Research centers develop alternatives to traditional sensory analysis in order to face the high-throughput phenotyping challenge: be able to **characterize a high number of samples in a short amount of time.**

For this purpose, **sensotyping tools** were developed to get simplified descriptive sensory analyses that are easy-to-use for the **professionals** to quickly screen new products.

Example: faster sensory evaluation of taste, texture or visual aspect of a fruit or a plant in relation with quantification of a physical, chemical or biological marker.

INFO +

Sensory analysis is a transversal science that enables numerous research teams of SFR Quasav to work towards creation of plant products that meet producers and consumers' expectations: **new varieties** of apples, pears, roses, **new cultural practices** to improve aesthetic quality of ornamental plants, **new process** to improve the organoleptic qualities of wine or cider... The researchers of GRAPPE laboratory (ESA, unit under contract with INRA) and of some teams of IRHS have been producing knowledge, **methods and tools dedicated to the professionals of the plant sector** in order to better understand the consumers' expectations and integrate them in the innovation process.

RESEARCH RESULTS

3D architecture data and morphometric **data predict the visual characteristics of rose bushes** (virtual rose bushes or real rose bushes filmed in rotation) assessed by a trained panel.

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Metabolites QTL (mQTL) associated to organoleptic and nutritional qualities of carrot are being identified.

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The **colour** of apple skin and cider can modify the perception of flavor and aroma.

Each **chemical compound** of cider (sugar, acid, alcohol, aroma and especially procyanidins) **highly influences the tasting characteristics** through numerous chemical and cognitive interactions.

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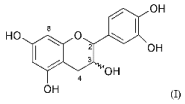

Tasting performances are correlated to the **dependence level of the consumer**, regardless of the age of the elderly individuals.

Establishment of a new method for sensory characterization called « **mixed profile** » that combines the advantages of conventional and free profiles.

Development of a method for a better consideration of the **variability of products and tasters** during sensory analysis.

These investigations are done thanks to the shared equipment of **SFR Quasav:**

Senso Veg · PHENOTIC SEMENCES & PLANTES · PIAM PHYTO

RECENT PROJECTS

APPLIED RESEARCH PROJECTS

European project OPTIFEL (2016–2019): Optimsed food products from fruits and vegetables for elderly population and measure of their sensory performances.

Interregional project CICHROM (2014-2017): Colour of cider products and perceptions by consumers.

Regional project VSS (2014-2017): Perception of sulfite-free wines by the consumers.

AlterQual (2014-2018) in collaboration with CTIFL: Finding genetic and biochemical markers to breed carrots gathering resistance to pathogenic agents, organoleptic and nutritional qualities.

NUMEROUS PROJECTS IN COLLABORATION WITH PRIVATE COMPANIES

- Validation of **new varieties** of fruits and vegetables
- Evaluation of **new cultivars** of ornamental plants
- Sensory position of **wine compared to competitors**
- Identification of **barriers and strategies to raise consumer acceptance** of new products

PhD THESES

Mathieu Mingioni. Impact of flavour interactions in a food matrix on perception, preferences and eating pleasure of elderly population.

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Sandra Beauchet. Conception of a simplified method that combines evaluation of the environmental impact by LCA method and evaluation of a product quality; application to viticultural systems.

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Ronan Symoneaux. Building of the tasting equilibrium of ciders by understanding the role of polyphenols in sensory perception.

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Morgan Garbez. Architecture and visual quality of a lignified ornamental bush: rose bush.

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OFFERS TO COMPANIES

Examples of topics for collaboration

- Identification of appreciation determinants and consumers' motivations in diverse products universes. **Consumers acceptance of innovations and consumer co-creation.**
- For **carrot breeding**: search for metabolites associated both with resistance to pathogenic agents and sensory quality, search for candidate genes.

- Control of **visual qualities of ornamental plants** through environmental parameters (nitrogen, hydric stress, quality and intensity of light).

- **Influence of cropping practices, quality of raw materials** and **processes** on organoleptic characteristics of products, their typicity and their variability.
- Conception of a tool for grape tasting in order to identify the **dates of harvest and choose the type of wine** to elaborate.

Strenghten your R&D team by recruiting a **CIFRE PhD student** (financial support by ANRT and CIR), a **recent PhD graduate** (financial support by CIR) or a **working student** (in contract of professionalization or apprenticeship)

Training for enterprises

- Sensory analysis for fruit and vegetable sectors: how to organize more efficient and objective tasting sessions
- Main methods and statistic treatments for wine sensory analysis

Catalogue online : groupe-esa/formation-tout-au-long-de-la-vie

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or share your needs with us!

Services

Integrate sensory methods and better understand and improve the perceived quality of your products.

Senso Veg
Plateforme sensorielle sur le végétal & le vin
Donnez du sens à vos innovations

Céline Brasse
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Do your innovations meet consumers' expectations? Researchers and experts give you keys for success.

VégéConso

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Objectif Végétal, Research, Education & Innovation in Pays de la Loire is a regional program (2014-2019) established by the Pays de la Loire Regional Council and that involves the teaching and research institutions (Université d'Angers, leader of the program, Agrocampus Ouest, ESA, Inra, Université de Nantes) as well as the international French cluster Végépolys.
Objectif Végétal program mainly aims to reinforce the visibility of the regional centre for education and basic research, to boost translational research and reinforce the processes of economic valorization of research findings, and to develop international partnerships.

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