

Sensory analysis and emotional profile as a tool for the valorisation of sustainable and innovative food chain

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STATE OF ART

Świąder and Marczewska (2021) in a pilot study investigated the objectives to identify trends in the use of **sensory evaluation** in New Product Development (NPD) in the food industry. The main research problem identified by the authors in NPD is the repeated failure of new products due to a **lack of understanding** of **consumer motivation** and choice [1]. To overcome this problem, the authors suggested to use in parallel **analytical** (to measure in detail the sensory evaluation through descriptive, discrimination or grading test) **and affective analyses** (to evaluate the product preference or acceptability by consumers), integrated with instrumental measurements to obtain more complete product information.

Indeed, both for analytical and affective tests, the **decision-making** of the panelist represents a crucial moment in collecting good data for the sensory analysis. To overcome the gap between the **perception and the moment of the decision-making**, Torrico (2021) introduced novel techniques to measure the **sensory, emotional, and physiological responses** of consumer toward foods [2]. The author suggested a complementary measurement of self-reported responses by integrating physiological reactions through the utilization of biometrics, in which indicators like heart rate, body temperature, and facial expressions have demonstrated their ability to capture the subconscious reactions of consumers during sensory tests.

Considering the amount of research papers on this topic, Modesti et al. (2022) presented a review of **food quality** assessment and **prediction** of consumer choices through **traditional** (panel testing and consumer test) and **novel techniques** (wearable sensors and E-senses), highlighting the importance of integrating different methods [3].

OBJECTIVES AND MILESTONES

This PhD thesis research project aims to **assess the combination of sensory analysis and emotional profiling as a tool for the enhancement of a specific food supply chain**. Several innovative methods will be applied to define the organoleptic profile of certain types of foods (wine, bakery products, herbs and spices, etc.) and their emotional potential in the consumer (Table1).

For this purpose, a **new method**, named **Sensory Critical Control Point (SCCP)**, will be established and validated to identify in each selected supply chain the main points in the production process that may have an impact on the organoleptic properties of the final product and consumer acceptance (Figure 1).

Table 1. Material and methods to be used for this PhD project.

Method	Type	Measure	Food Supply Chain		
			Wine	Bakery products	Herbs and Spices
Traditional	Panel testing	Perception	X	X	X
	Consumer test	Perception	X	X	X
Novel Bioengineering	Electronic-senses	Perception	X	X	X
	Electroencephalography (EEG)	Emotion	X	X	X
	Galvin skin response (GSR)	Emotion	X	X	X
	Electrocardiogram (ECG)	Emotion	X	X	X

A1) Identification of innovative methods of sensory and emotional analysis for product improvement within the different matrices of food supply chains (wine, bakery products, herbs and spices).

A2) Optimization of a standardized and innovative method of sensory analysis and emotional profile as a tool to valorize food products in the production, aggregation, processing, distribution, and consumption stages, using different approaches (bioengineered wearable sensor methods, e-senses, panel testing and consumer test).

A3) Individuate the main critical control points of matrices selected that can have a direct impact on the organoleptic properties of the final product and, on the consumers acceptance.

A4) Development of a reliable, affordable innovative protocol (SCCP) for the evaluation of quality control by sensory analysis and emotional profiling of foods valuable for application in food industry throughout the supply chain.

A5) Writing and Editing of the PhD thesis, scientific papers and oral and/or poster communications (Table 2).

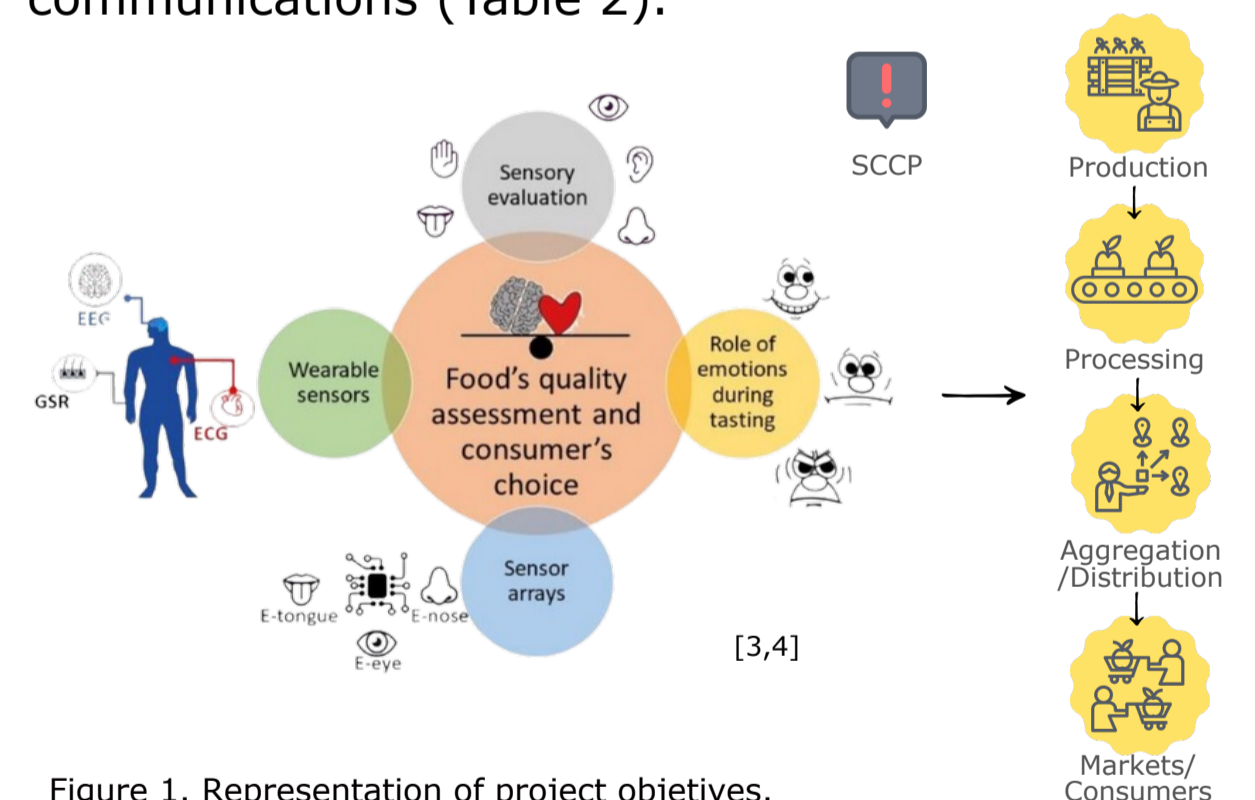


Figure 1. Representation of project objectives.

Table 2. Grantt diagram for this PhD project.

Activity	Months	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
A1) Sensory and emotional methods	1) Wine																								
	2) Bakery products																								
	3) Herbs and spices																								
A2) Sensory and emotional optimization	1) Traditional methods																								
	2) Novel bioengineered methods																								
A3) Critical control points	1) Wine supply chain																								
	2) Bakery products supply chain																								
	3) Herbs and spices supply chain																								
A4) Development SCCP protocol	1) Production stage																								
	2) Aggregation stage																								
	3) Processing stage																								
	4) Distribution stage																								
	5) Consumption stage																								
A5) Thesis and Paper Preparation																									

References:

- [1]. Świąder, K. and Marczewska, M. (2021). Foods. 10. 446.
- [2]. Torrico, D.D. (2021). Foods. 10. 2620.
- [3]. Modesti, M., Tonacci, A.; Sansone, F. et al. (2022). Chemosensors. 10. 7. 244.
- [4]. Modesti, M., Taglieri, I.; Bianchi, A.; Tonacci, A. et al. (2021). Appl. Sci. 11. 8453.