

ARTIFICIAL MOUTH FOR THE STUDY OF MECHANICAL AND PERCEPTUAL PROPERTIES OF FOODS

artificial mouth / chewing simulator / masticator / food / flavour molecules



CONTEXT

During the consumption phase, the destructuring of the food in the mouth generates molecules responsible for the flavour. The mechanisms of release of these molecules are strongly linked to the composition of the food, its texture and the parameters of chewing and salivation. In order to study them, researchers are developing *in vitro* models, simulating some oral functions, to overcome *in vivo* constraints such as the inter- (different subjects) and intra-individual (for the same subject during repetitions) variability.

DESCRIPTION

At the CSGA of Dijon (France), in collaboration with the Plateform3D, researchers designed an innovative artificial mouth prototype that simulates the human chewing process. It reproduces compression and shearing due to jaw movements, tongue movement and salivary flow. The upper and lower jaws are equipped with human first premolar "A6" type teeth. A syringe pump ensures a constant flow of real or artificial saliva during the process. The forces exerted by the jaws and tongue are recorded continuously by means of a sensor. All setting parameters (flow rates, forces, temperature, etc.) are controlled by a specially created software.

The chewing simulator can be put online with a mass spectrometer to monitor in real time the release of aromas (volatile flavour molecules). It also allows saliva aliquots to be collected for analysis of released non-volatile molecules (e.g. sapid compounds).

COMPETITIVE ADVANTAGES

- It allows a real-time and simple (fast execution of tests and easy move of the chewing simulator) study of release kinetics of volatile and non-volatile flavour molecules
- It allows to simulate the human chewing process without being subject to the inter- and intra-individual variability of a tasting panel
- It allows decoupling the different oral functions involved during food consumption
- It allows the development of novel food by reverse engineering (link flavour perception - food structure/texture)
- The setting of the masticatory parameters allows studies in specific populations (e.g. elderly people) or in animals



Markets & applications

Food & Pharmaceutical industry

- ❖ Real-time study of release kinetics of flavor molecules or other active ingredients
- ❖ In-mouth simulation of the consumption process of a food or pharmaceutical product



Development stage

Prototype validated on various foods at laboratory scale



Research team

Team Flavour, Food Oral Processing and Perception - "Centre des Sciences du Goût et de l'Alimentation" (CSGA)
PFT Plateform3D - "IUT du Creusot & lycées Léon Blum et Camille Claudel"



Target partnership

Companies and public laboratories studying food and its flavour or developing oral pharmaceuticals

CONTACT-US

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