

BaGaTel: an ontology driven database on food composition, transformation process, nutritional and sensory quality

*Guichard, E.,^{1,2} Guillemain, H.,^{3,4} Perret, B.,^{3,5} Pénicaud, C.⁵

*Presenting author: Guichard, E.

¹elisabeth.guichard@inra.fr

² CSGA, AgroSupDijon, CNRS, INRA, Université Bourgogne Franche-Comté, 17 rue Sully, 21000, Dijon, France; ³ PLASTIC Platform, INRA, 78850, Thiverval-Grignon, France; ⁴ URTAL, INRA, 39 Poligny, France; ⁵ UMR GMPA, AgroParisTech, INRA, Université Paris-Saclay, 78850, Thiverval-Grignon, France.

The food processing sector is facing sustainability challenges of growing complexity, such as climate change, increase of overweight, obesity or population aging. These problems make it necessary for the food industry to develop new strategies to formulate well-balanced products in terms of nutritional requirements and sensory acceptability by consumers, while using eco-friendly transformation processes. To tackle this challenge, a database BaGaTel has been built, guided by a process and observation ontology in food science, PO² ontology [1], to integrate data in the field of reformulation of dairy products taking into account their nutritional and sensory properties as well as their environmental impact, using a consensual model and a shared structured vocabulary. Data from a total of 40 different projects (collaborative national/ European, publications, PhD theses, reports) have been integrated with their associated metadata (non-confidential information on the project and link to publications, nature of the data, incertitude, step of the process, materials, methods, ...). The metadata associated to each project, the list of the terms used in BaGaTel and a video tutorial, which presents the data entry interface and the visualization of data, are available on the NutriSensAI portal [2]. Such a database fits the rules of Data Management Plan. Our objective is to reach progressively the different levels of the FAIR principle (Findable, Accessible, Interoperable, Reusable). The major benefit from our data organization is to be able to use information from different projects performed on different samples assumed comparable. By relating sensory and rheological data on hard cheeses, it was thus possible to estimate missing data on the basis of common characteristics of the samples of a dataset [3]. A unified analysis on cheese samples from different projects realized with different compositions (fat, protein, minerals, water), different process (model cheese or traditional ripened cheese), allowed to point out that the intensity of perceived saltiness was not only linked to salt content but modulated by the cheese composition. It is also possible in BaGaTel to look for the data needed to realize a Life Cycle Assessment [4] of a product and import the results in BaGaTel, as it was already done for Comte cheese [3].

Such a tool is thus of tremendous support to formulate well-balanced products in terms of nutritional requirements and sensory acceptability by consumers, while using eco-friendly transformation processes.

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