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Agroscope

Research strategy of Functional Nutritional Biology

Improving the nutritional profile of food by fermentation

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"Good food, healthy environment"
The mission of Agroscope is at the core of the research strategy of Functional Nutritional Biology (FNB), which aims at adding value to food by objectively bridging food quality to human metabolic health in particular by improving the nutritional profile of food by fermentation.

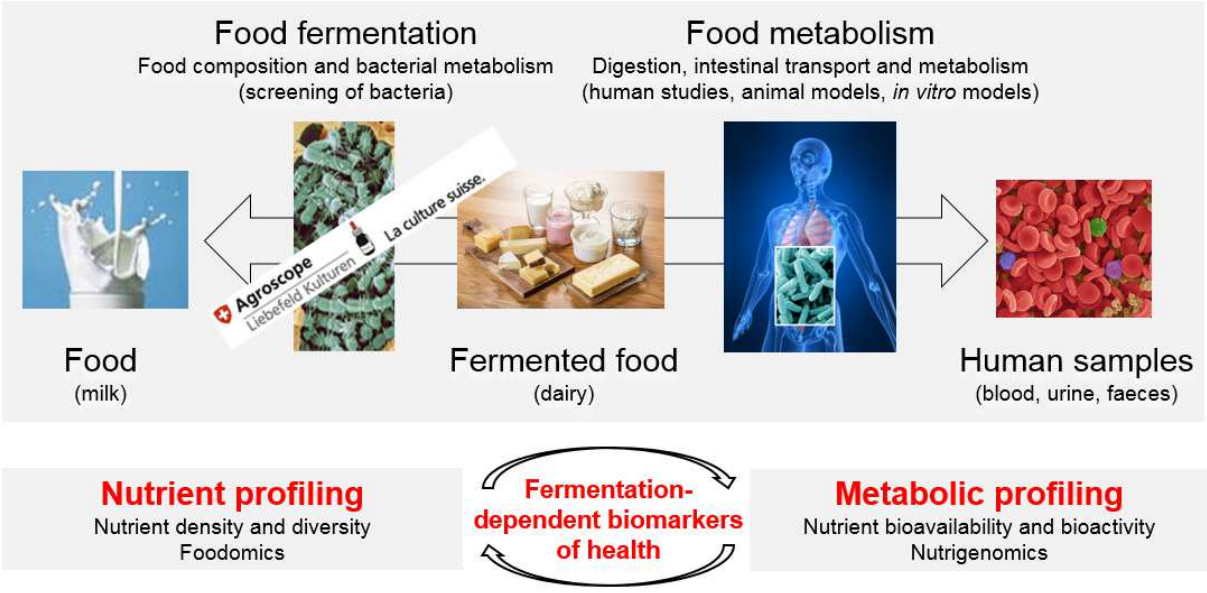
FNB – a unique research

- We link the nutrient profile of food, in particular fermented dairy products, to the metabolic response of humans by making use of foodomics and nutrigenomics analytical tools
- We make use of a bacterial collection of >10'000 strains to increase the nutrient diversity of the milk matrix
- Our vison is to have fermented foods specifically integrated into the Swiss Food pyramid

Overview of the research strategy of FNB

FNB aims at objectively bridging food quality to human metabolic health by improving the nutritional profile of food by fermentation (**Figure 1**). In particular, FNB develops a research program focused on microbial diversity in order to increase nutrient diversity in foods and, in turn, health. A key challenge in this context is to conduct an applied nutritional research that links data obtained in human studies to the quality of the foods investigated in these studies. This goal is achieved by focusing FNB research on two closely related pillars, **nutrient profiling**, as a key method to characterize the fermented foods, and **metabolic profiling** to characterize the dietary response of the human organism. The term "profiling" indicates the emphasis given to a holistic nutritional characterization of both foods and human biological samples. The sequential shift from "nutrient" profiling to "metabolic" profiling denotes the importance of understanding the transformation by the human organism (in particular digestion and intestinal transport) of the nutrients present in foods into metabolites, which will ultimately define the balance between health and metabolic diseases. The third pillar aims at linking the nutrient profile of foods to the corresponding metabolic profiles of subjects having ingested these products in order to identify *"**fermentation-dependent biomarkers of health**"*, *i.e.* nutritional biomarkers of health that are produced by the fermentation of food. In analogy to the glycaemic index, nutritional biomarkers of health are not only markers of the immediate response of the organism to the ingestion of foods that are directly associated with health (*e.g.* risk factors) but also reflect on the nutritional quality of the ingested foods. Finally, 'omics' technologies provide the analytical tools to allow an efficient translational analysis of the data from the composition of fermented products (foodomics) to the metabolic response of the subjects having ingested these products (nutrigenomics). Milk is used as the model food matrix for this research and the knowhow acquired by FNB will ultimately add value to dairy products.

Figure 1. Improving the nutritional profile of food by fermentation



Research pillars of Functional Nutritional Biology

- **Nutrient profiling**: Linking the genome of lactic acid bacteria to the nutrient profile of fermented foods
- **Metabolic profiling**: Defining a healthy metabolic profile in humans (malnutrition in aging and obesity as reference)
- **Fermentation-dependent biomarkers of health**: Linking the nutrient profile of fermented foods to the metabolic profile of humans