

Non-targeted mass spectrometry in agricultural research: example of the identification of pollen species, and nutritional value of fermented food

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The exploratory nature of non-targeted spectrometry-based methods has been used at Agroscope for many purposes, as the study of the composition of fermented dairy foods and their effects on human metabolism. This ranges from the metabolic profiling of foods products and its link with lactic acid bacteria's genome, to the identification of biomarkers of intakes and their effects on health. Examples of experiments conducted in rodents and in human will briefly be presented, as well as associations between metabolomics and other 'omics datasets such as genomics and transcriptomics.

A special example of a non-targeted mass spectrometry-based method is the identification of pollen. The shape and size of pollen grains vary greatly from species to species and the protein composition is also very characteristic for each species, since proteins act as "recognition substances" to avoid interspecies hybridization. The topic of pollen identification is of crucial importance in beekeeping and is a routine analysis to label bee products. Identification is also useful to study the diet and preferences of honey bees. Finally, some crops or plants can be contaminated by agrochemicals, which is an important factor for hive health. So far, pollen has been identified by visual assessment, which can be very subjective. Untargeted peptide and metabolite profiles could be a complementary, more objective method of identification, since it has also the potential to have a more detailed taxonomic identification compared to visual estimation.