

Metabolomics in Food Science: Evaluating the Impact of Functional Foods on the Consumer

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In modern society there is an increasing interest in health improvement from dietary alterations, i.e. prevention of potential health problems rather than cure. However, in order to develop foods that promote health benefits, rapid, advanced analytical tools are required in order to comprehensively analyze measurable parameters within consumers, such as biofluid metabolites.

Furthermore, in food research, both the product and consumer can be regarded as highly complex systems and during clinical trials, the health effects of Functional Foods must be established after consumption of realistic quantities of the product under investigation. Conventional analytical approaches present a number of disadvantages which restrict their usefulness, such as: 1) laborious and often elaborate sample preparation 2) multiple procedures, each limited to the analysis of a few compounds 3) metabolite breakdown, 4) failure to meet the required sample throughput rate, and 5) inability to detect synergistic effects. Therefore, in order to further the understanding of the relationships between consumer health and food ingredients it is critical that novel analytical concepts are developed and implemented. With recent advances in NMR spectroscopy, many of these problems can be circumvented. Extensive, non-selective, "information-rich" metabolite profiles of complex biological samples can be obtained with minimal sample preparation and multivariate chemometric methods, used to extract latent biochemical information and allow classification of the profiles.

In this lecture, various NMR spectroscopy-based metabolomic strategies will be discussed in relation to the study of Functional Food impact on the healthy consumer and illustrated with examples of its application in 'real' clinical biochemical investigations.