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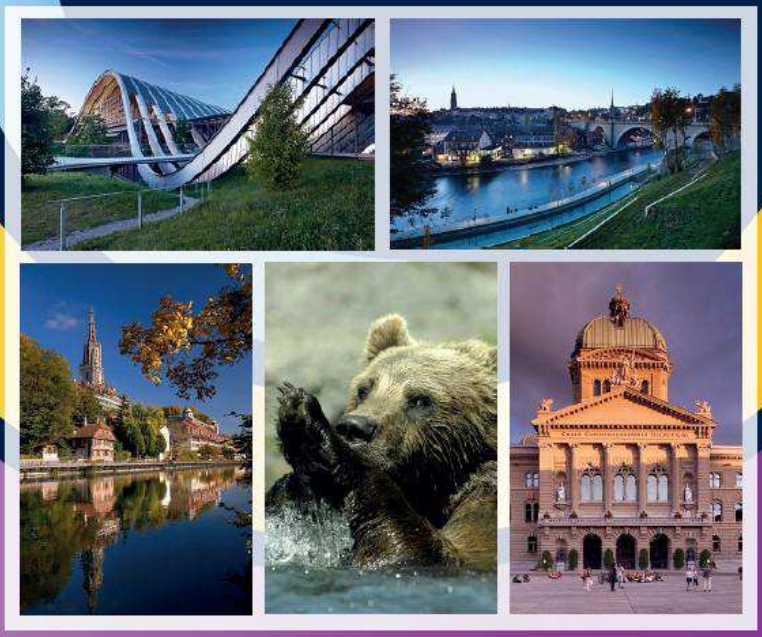

From Foodomics to Nutrigenomics: Translating food composition data into healthy diets

Book of abstracts

In partnership with the National Committee of the International Union of Nutritional Sciences (IUNS) and the Swiss Society for Nutrition (ssn)

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NuGO is an Association of Universities and Research Institutes focusing on the joint development of the research areas of molecular nutrition, personalised nutrition, nutrigenomics and nutritional systems biology

In vitro faecal Fermentation of Broccolo di Torbole Ecotype (*Brassica oleracea* var. *botrytis*)

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Introduction: Gut microbiota (GM) is intrinsically connected to host health and metabolism, thanks to its capability to digest and transform dietary compounds, especially the ones that escape human digestion and become available for intestinal bacterial metabolism, such as fiber and plant secondary metabolites. Phytochemicals represent a wide class of dietary molecules principally contained in plant foods with renown beneficial effects on human health, including antioxidant capacity, improved vascular health and brain function. A relationship exists between GM and phytochemicals, since GM is able to biotransform plant secondary metabolites into the derivative metabolites with *in vivo* activity. Similarly, also the GM breaks down complex vegetable dietary fibers with production of short chain fatty acids and gas as main fermentation end products. This study aims to analyze changes in microbial populations and metabolites after *in vitro* faecal fermentation of Broccolo di Torbole (*Brassica oleracea* var. *botrytis*), a broccoli ecotype rich in polyphenols (flavonoids, hydroxycinnamic acids) and glucosinolates, and also dietary fiber (non-starch polysaccharides and other plant components). *In vitro* metabolic impact of Broccolo di Torbole will be preliminary to study *in vivo* metabolism of this plant food in a human feeding study in obese subjects.
Material and methods: Fecal samples were collected from 5 donors (female, age between 20 and 50 years, no antibiotic treatment in the 3 months preceding the experiment), diluted 1/10 (wt/vol) in PBS and used as fermentation inoculum at 1% (wt/vol). As substrates, inulin (positive control), cellulose (negative control) and Broccolo di Torbole (steamed-cooked leaves and fruit in equal proportion), were employed at 1% of the total fermentation volume after *in vitro* upper digestion, were carried out over 24 hours, as previously described. *In vitro* anaerobic batch cultures fermentations were carried out anaerobically at 37°C for 24 hours and at pH between 5.5 and 5.9, to simulate the proximal colon. Samples were collected from each vessel at hour 0, 5, 10 and 24 for microbial 16SrRNA sequencing analysis and MS-based metabolite profiling.
Results and discussion: Faecal fermentation of a local Trentino ecotype of *Brassica oleracea* showed to modulate gut microbial composition over time and these changes will be related to production of *Brassicaceae*-derived microbial metabolites in fermentation supernatants and to systemic metabolites produced after *in vivo* long-term clinical nutrition study in obese subjects.