Effect of a diet rich in prebiotic fibers of inulin type and behavior on intestinal health in obese patients in an human in vitro fermentation patterns

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Obesity and its associated pathologies have serious consequences on patients' lives, leading to high costs for society. Consumption of dietary fiber(DF) and prebiotics remains essential for the modulation of the gut microbiota to prevent these diseases(Delzenne et al. 2013). In this regard, the Food4Gut multidisciplinary research project is investigating the use of fiber- rich vegetables, especially fructans, in order to observe their positive effects on intestinal health. In this framework, obese patients are subjected for 3 months to one out of two possible dietary treatments: one based on fructan-rich vegetables and one based on vegetables poor in fructans (placebo). Feces were sampled and used as inoculum in a dual in vitro model of the gastro-intestinal to study the changes in fermentation patterns of the fibre fraction of vegetables according to the treatment the patient had received. Six vegetables were sampled in triplicates (N=3) and steamed for 20 to 30 min: Jerusalem artichoke, salsify, asparagus, pumpkin, fennel and swede (Kalala et al.2017). They were chosen because they display a variety of contents in fructans, soluble (SDF) and insoluble dietary fiber (IDF).Steamed vegetable samples were hydrolyzed in vitro with porcine pepsin and pancreatin to mimic digestion in the upper gut. Undigested fiber residues were recover using a 6kDa dialysis membrane and fermented in vitro with the fecal inoculums collected before and after the treatment. Fermentation kinetics over 24h as well as short-chain fatty acid production and profiles were compared according to the individual donor and the vegetable species. The extent and the rate of fermentation were strongly related to the content and fiber profile of vegetables, with high variability between individuals. This variability included a significant difference in the SCFA profile due to the dietary treatment with a higher proportion of butyrate after the intervention with fructan-based diets. It can be concluded that fermentation potential of feces microbiota of obese patients is highly variable between individual and that a dietary intervention with fructans for 3 months positively shift the fermentation pattern of vegetables fibre.

References

Delzenne N et al. 2013. Gut microbiota and metabolic disoder. BJN
Kalala G et al. 2017. Characterization of fructans and dietary fiber profiles in raw and steamed vegetables. In press IJFSN