AXOS AND INULIN IMPACT INTER-INDIVIDUAL VARIATION ON MICROBIAL METABOLISM AND COMPOSITION, WHICH IMMUNOMODULATES HUMAN CELLS

Pieter Van den Abbeele[1], Bernard Taminiau[2], Iris Pinheiro[1], Cindy Duysburgh[1], Heidi Jacobs[3], Loek Pijls[3], Massimo Marzorati[1,4]

[1] ProDigest bvba, Technologiepark 3, 9052 Ghent, Belgium; [2] Department of Food Science, ULG, Quartier Vallée 2, Avenue de Cureghem 10, 4000 Liège , Belgium; [3] Cosucra Groupe Warcoing S.A., Rue de la Sucrerie 1, 7740 Pecq, Belgium; [4] Center of Microbial Ecology and Technology (CMET), Ghent University, Coupure Links 653, 9000 Ghent, Belgium

Corresponding author: Massimo Marzorati (massimo.marzorati@ugent.be)

Introduction and objectives. In the past decade, potential improvement of health by modulation of the human gut microbiota has gained a lot of attention. Different *in vitro* models have been developed to assess how food compounds affect the human gut microbiota. In this study, the main objective was to investigate how inulin (Fibruline instant – FIB) and arabinoxylo-oligosaccharides (AXOS) modulate microbial activity and composition of different individuals and subsequently influence epithelial permeability and immune response.

Material and methods. Fecal batch fermentations were performed for three different test conditions (Blank control, FIB and AXOS) supplied to three different human gut microbiota. At several time points, samples were taken for microbial activity analysis, including pH, gas and short-chain fatty acid (SCFA) production. On the final time point, samples were collected for microbial community analysis via 16S rRNA gene sequencing and for interaction studies with human epithelial Caco-2 cells and THP1 macrophages to evaluate effects on gut barrier function (TEER) and immune response (NF-KB, IL-10 and IL-6).

Results and discussion. Both inulin and AXOS decreased the colonic pH (-1.5 pH units), due to increased productions of acetate, propionate and butyrate. Differences in terms of metabolites production could be linked to specific microbial alterations at genus level upon inulin/AXOS supplementation, as shown by 16S-targeted Illumina sequencing. An example was the high propionate production upon AXOS supplementation with donor 2, related to a strong stimulation of *Megamonas*, a genus only detected for this donor. Both products positively affected gut barrier and immune function with increases in TEER, NF-KB, IL-10 and IL-6. Ingredients with different structures selectively modulate the microbiota of a specific donor leading to differential changes at metabolic level. The extent of this effect is donor specific and is linked to a final specific modulation of the host's immune system.

Theme: 'The gut and beyond'