

Influence of food matrix on prebiotic efficacy of inulin-type fructans

Peter P. J. Jackson (University of Reading, Reading, UK), Robert Rastall (University of Reading, Reading, UK), Anisha Wijeyesekera (University of Reading, Reading, UK), Stephan Theis (BENEO GmbH, Obrigheim, Germany), Jessica Van Harsseelaar (BENEO GmbH, Obrigheim, Germany).

Introduction: The impact of food matrices on the prebiotic efficacy of inulin-type fructans (ITF) is of growing interest amongst the scientific community as previous research suggests that the food can either hinder or enhance the bioavailability of bioactive molecules including polyphenols. Yet, while prior studies have utilised numerous food products for ITF supplementation, due to differences in experimental design, drawing decisive conclusions on the food matrix impact on ITF efficacy cannot be undertaken

Methods: Study design was a prospective parallel-group, randomised trial involving 96 healthy adults lasting 10 days. Volunteers were assigned 1 of 4 ITF-fortified food products: rice milk, chocolate, shortbread, or pure inulin which were consumed 2x per/day resulting in a total ITF intake of 10g/day. Stool & urine samples were collected at Day-0 & Day-10 along with food & daily bowel habit diaries. Changes in microbial communities were analysed via FISH-FLOW & 16S rRNA sequencing.

Results: Targeted analysis via FISH-FLOW and 16S rRNA sequencing revealed that the selective effect of ITF towards bifidobacteria is unaltered in differing food matrices ($P < 0.01$ and $P < 0.001$). Further individual bacterial groups varied among the food products and the analysis method applied i.e. increases in *Bacteroides/Prevotella* (shortbread), *Roseburia* spp. & *F. prausnitzii* (shortbread and rice milk) & decreases in *Clostridium* cluster IVXA + IVXB & *Blautia* (inulin, shortbread, & rice milk).

Discussion: Our study aimed to determine the effects that differing food matrices have on the prebiotic efficacy of ITF using a standardised protocol. We confirm that irrespective of the food application and matrix, prebiotic ITF are selectively utilized and lead to specific changes in the gut microbiota. *Bifidobacterium* was the only genus consistently impacted by inulin-type fructans.