# Prebiotics in human digestion

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Introduction

Prebiotics are non-digestible food ingredients that are thought to stimulate the growth and/or activity of bacteria in the digestive system thought to be beneficial to human health. There is considerable industry interest in the development of prebiotics, such as FOS, GOS or inulin, and in appropriately establishing their health claims. Current methods for assessing the action and digestibility such molecules are generally tedious, expensive and require large amounts of material. This research aims to improve such methods.
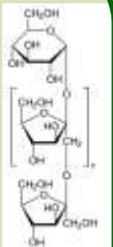
Non-digestible polysaccharides
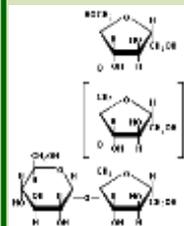
Inulin: $(Fru)_n$-$(Fru)_n$-Glu (β-1,2)

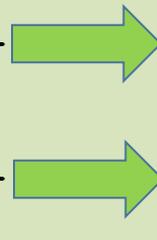Principle: (Almost) no degradation in stomach and small intestine

Fructo-ologosaccharide (FOS): $(Fru)_n$-Glu (β-2,1 and α-1,6)
Galacto-oligosaccharides (GOS): $(Gal)n$-Glu (β-1,4 and others)

Digestive tract:

Stomach + Small intestine

Colon

Model system:

Enzymatic degradation
Amyloglucosidase, Amylase, etc.

Bacterial degradation
Lactobacillus, Bifidobacterium, Clostridium, Bacteroides
Total count

Results

➢ Growth on Starch, Inulin and FOS
➢ No growth in Control and Cellulose

➢ Mainly the formation of acetate, propionate and lactate is observed, but also traces of butyrate and formic acid.
➢Traces of glucose and fructose are observed after 2 hours

Conc. (ml/l)

Time (hrs)
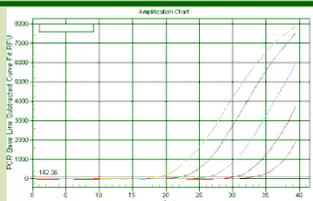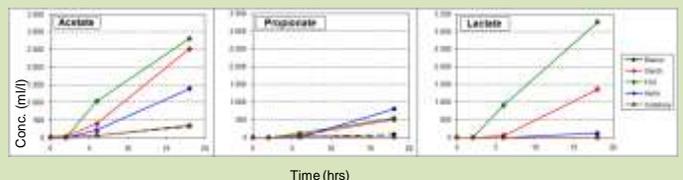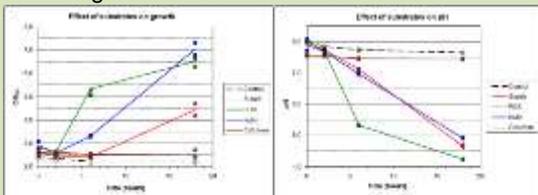
Quantitative PCR analyses

(relative) amounts of bacterial species in the fecal slurry for *Lactobacilli*, *Bifidobacteria*, *Bacteroides* and *Clostridia., data to be combined in the "prebiotic index"*.

Relative abundance*

Occurrence of bacterial species at T= 6 hrs compared to control T=0 hrs.

	Substrates			
Species	**Control**	**FOS**	**Inulin**	**Cellulose**
Lactobacilli	1,4	12,5	19,4	1,4
Bifidobacteria	2,0	28,0	11,0	1,1
Clostridia	0,5	0,6	0,7	0,5
Bacteroides	1,1	1,1	1,6	0,6

* Paffle-method to compare results

Conclusions

Analysis of the bacterial flora is important for the characterization of fermentation events. They help the further validation of the **"prebiotic index"** as fast and cost-effective screening of prebotic action within individuals or selected populations.