

# The effect of the undigested fraction of maize products on the activity and composition of the microbiota determined in a dynamic *in vitro* model of the human proximal large intestine

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- Five test products (undigested fractions) were tested in **TIM-2** for their effect on the microbiota activity and composition (using **I-Chip**)
  - Cellulose → negative control                      Standard carbohydrate mixture → control
  - PROMITOR™ Resistant Starch 60 (RS 60); type 3 resistant starch
  - PROMITOR™ Resistant Starch 75 (RS 75); type 3 resistant starch
  - PROMITOR™ Soluble Corn Fibre (SCF)
  - **Biogum (BG)**
  - Soluble Fibre Dextrin (SFD)
- TIM-2 was inoculated with a standardized faecal American-type microbiota
  - **10 g/day** of the test products was added
  - Samples were taken from lumen and dialysis liquid
  - Metabolites measured: Short-chain fatty acids (SCFA; acetate, propionate, butyrate), lactate, Branched-chain fatty acids (BCFA; *i*-butyrate, *i*-valerate) and ammonia
- Intestinal-Chip analysis:
  - DNA was isolated from luminal samples at the start and at the end of the TIM-2 experiments.
  - Analysis of the composition of the microbiota (using I-chip) indicated the bacterial genera which were selectively stimulated or suppressed by the test products.

## Metabolite production (table):

- Compared to the negative control, total cumulative amount of metabolites produced for all fibers tested, was:
  - Higher for the beneficial metabolites (short-chain fatty acids and lactate)
  - Lower for the potentially harmful metabolites (branched-chain fatty acids and ammonia)
  - Higher for butyrate ratio

	cumulative amount (mmol) / ratio (%) after 72 h			
	acetate	propionate	n-butyrate	lactate
NC	63.8 / 67	15.3 / 16	15.5 / 16	2.3
RS60	66.8 / 58	25.0 / 22	23.3 / 20	3.5
RS75	53.3 / 49	28.6 / 26	27.4 / 25	3.2
SCF	100.6 / 60	29.5 / 17	38.6 / 23	7.6
BG	118.5 / 60	15.6 / 8	64.6 / 33	32.4
SFD	119.5 / 62	43.1 / 22	31.6 / 16	4.7

## I-Chip (figure):

- $\Delta$  signal end/start of the experiment
- expressed as fold increase (green) or decrease (red) compared to the standard carbohydrate mixture

## Conclusion:

- All fibers were able to stimulate production of beneficial metabolites and minimize production of putrefactive microbial metabolites, compare to a control
- All fibers stimulate bifidobacteria (most for BG (biogum); shown as box in figure) compared to a control

