

# Evaluating the impact of polysorbate 80 on the gut microbiota of healthy individuals using a dynamic *in vitro* gut model

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## CONTEXT

### Consumer Concerns & Perception:

- Food safety is a main factor influencing purchasing decisions [1]
- Additives are perceived as higher health risk than pathogenic bacteria [2]

### Manufacturers' Safety Measures:

- ✓ Raw material quality control
- ✓ Cleaning and disinfection
- ✓ Temperature control
- ✓ Extended shelf life: adding food additives (preservation, coloring, texturing, etc.)

**Regulatory Oversight:** EFSA required re-evaluation of all food additives approved before 2009

### Polysorbate 80 (P80):

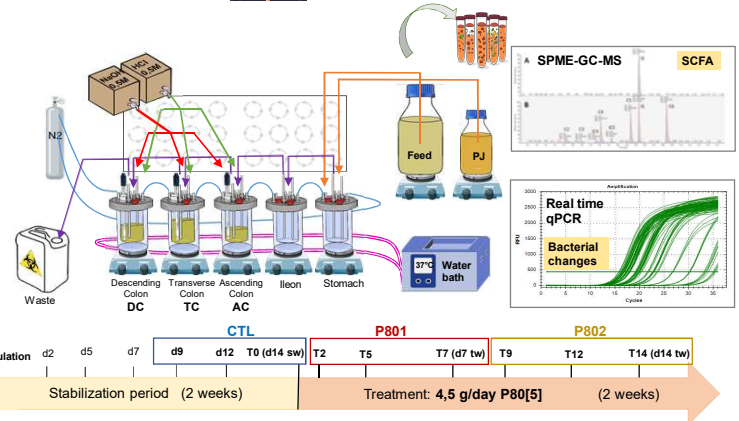
- Common emulsifier in dairy, ice cream, confectionery, and bakery products
- Linked to intestinal inflammation and colon carcinogenesis [3]
- 2015 EFSA re-evaluation: No safety concerns but called for further studies [4]

## AIM

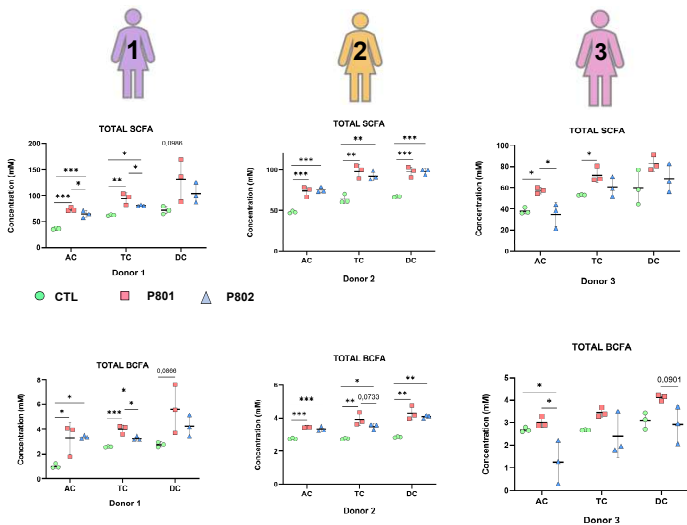
Provide additional insight into the effects of P80 on gut microbiota and metabolite production in three healthy individuals using the SHIME® gastrointestinal model.

## METHODS

Donor 1	Donor 2	Donor 3
59 years old BMI 23.4 kg/m <sup>2</sup>	35 years old BMI 26.4 kg/m <sup>2</sup>	26 years old BMI 28.3 kg/m <sup>2</sup>
1	2	3



## OUTCOMES



### Dysbiosis

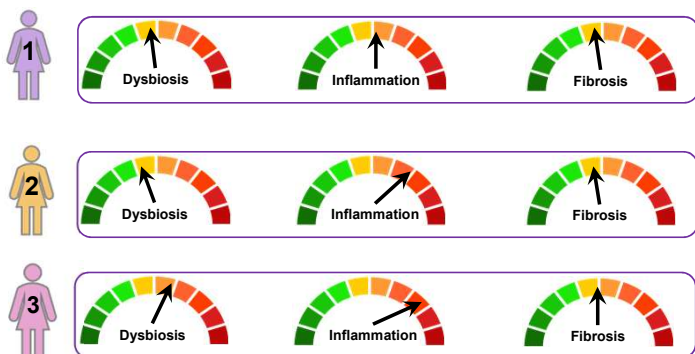
- ↓ *Roseburia*
- ↓ *F. Prausnitzii*
- Changes in F/B ratio

### Inflammation

- ↓ *A. muciniphila*
- ↑ *Enterococcus*
- ↑ *Klebsiella*
- ↑ *Escherichia/Shigella*

### Fibrosis

- ↓ *Coprococcus*
- ↓ *Oscillospira*
- ↑ *Veillonella*
- ↑ *M. schaedleri*



## TAKE HOME MESSAGES

- ❖ Gut microbiota response to polysorbate 80 (P80) varies between individuals.
- ❖ Daily P80 consumption may increase the risk of dysbiosis and intestinal inflammation in some donors.
- ❖ P80 induces non-permanent changes in metabolite production: increase during the first week of treatments but declines in the second week.
- ❖ Including a gastric digestion phase reduces P80's negative effects previously observed in short-term fermentations [6]
- ❖ Further analysis is needed to evaluate the pro- or anti-inflammatory effects of P80 on the intestinal tract.

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