# Dietary supplementation of different doses of NUTRIOSE®FB 06 fermentable dextrin: tolerance and faecal enzymes in healthy men

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## INTRODUCTION

NUTRIOSE®FB 06 is a dextrin obtained from wheat starch. In contrast to GLUCIDEX®6, a standard maltodextrin, NUTRIOSE®FB 06 is not completely hydrolysed and absorbed in the small intestine, due to many α 1.6 linkages and the presence of non-digestible glucoside linkages (e.g. α 1.2 and α 1.3). Compared with other low digestible carhohydrates, NUTRIOSE®FB 06 may show a better tolerance as it is partly digested and absorbed in the small intestine and is slightly excreted in the faeces.

The aim of the study was to assess the tolerance threshold of NUTRIOSE®FB 06 in g/day in humans during seven days of treatment with the compound and to compare the gastro-intestinal effects to the standard GLUCIDEX®6-maltodextrin. Besides tolerance, the second objective was to examine the fiber like effects of NUTRIOSE®FB 06 by measuring the breath $H_2$ excretion, changes in enzymatic faecal activity and NUTRIOSE®FB 06 faecal residue. Meanwhile food intake parameters like food habits, hunger and satiety feelings were evaluated as well.

## MATERIALS AND METHODS

### Subjects

- Twenty healthy men with hydrogen producing microflora (assessed pre-study).
- Age between 20 and 44 (mean 32) years.
- Body mass index between 20.1 and 29.5 (mean 24.5) kg/m².
- Subjects did not use antibiotics or laxatives up to 1 month before the start of the study.

### Design (Fig. 1)

- After a run-in period of one week, two treatment periods of three weeks followed separated by a wash-out period of one week.
- Treatments differed in gradual build-up (10, 30 and 60 g/d or 15, 45 and 80 g/d) and type of product used (NUTRIOSE®FB 06 or GLUCIDEX®6, the placebo).
- Each dose was consumed in four equal portions at breakfast, morning, lunch and dinner for seven days.
- Subjects restricted their fibre intake and excluded pre- and probiotics from their diet.

### Study parameters evaluated on day - 1 and each 7th day of the study:

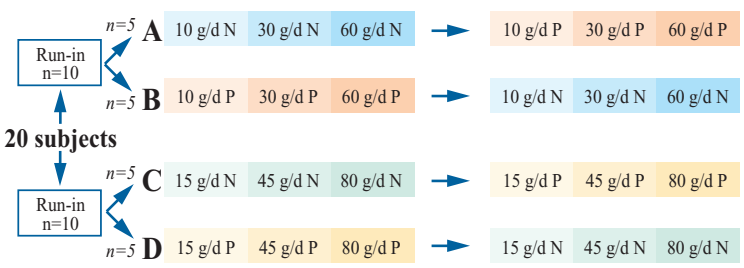
- Subjective evaluation of gastrointestinal complaints, food habits and well-being by questionnaires.
- Enzymatic activities in faeces collected over 48 h.
- Residue of NUTRIOSE®FB 06, estimated by the analyses of polymerised glucose in 48-h faeces.
- Dietary changes by a food frequency questionnaire.

### Study parameters evaluated on the 7th of the first dose of each treatment (10 or 15 g/d):

- Breath $H_2$ excretion over the day.
- Ratings of hunger and satiety over the day.

**Fig. 1 - Gradual build-up of test substance in three weeks with NUTRIOSE®FB 06 (N) or placebo GLUCIDEX®6 (P).**

Between the switch in test substances a wash-out period of one week separated both treatments.




## RESULTS AND DISCUSSION

### Gastro-intestinal complaints:

Compared with placebo, flatulence occurred more frequently over the last 6 days on 30, 60 or 80g/d of NUTRIOSE®FB 06. During the last 24 h, i.e. the 6th to 7th day of 60 and 80 g/d of NUTRIOSE®FB 06, the frequency of flatulence was still higher. During the last 24 h on a daily dose of 60 g NUTRIOSE®FB 06 the frequency of defecation was decreased compared with GLUCIDEX®6. Bloating occurred more often during the last 24 h on a treatment with 80 g/d of NUTRIOSE®FB 06. **None of the doses of NUTRIOSE®FB 06 resulted in diarrhoea.**

### Fermentation:

- Fermentation of NUTRIOSE®FB 06 led to an increased faecal concentration of α- and β-glucosidase (fig. 2 and 3).
- An increase in polymerised glucose with NUTRIOSE®FB 06 was found in the faeces (fig. 4).
- As compared to placebo, breath $H_2$ excretion increased during NUTRIOSE®FB 06 ingestion (differences in letters in fig. 5). No statistical difference in area under the curve was found between treatments, probably due to the variation in the measurement.
- **All effects assemble a fiber like effect.**

### Food intake, hunger and satiety:

- No significant difference between treatments was present for any of the food habits.
- Dietary intake did not change during the study.
- Only the Area Under the Curve (AUC) of the rating on "feeble or weak with hunger" was lower on Day 7 of the treatment with 15 g/d of NUTRIOSE®FB 06 as compared to 15 g/d of GLUCIDEX®6 ($p=0.04$). No other significant difference in hunger and satiety ratings was present.

**Fig. 2 - Change in faecal concentration of alpha-glucosidase**

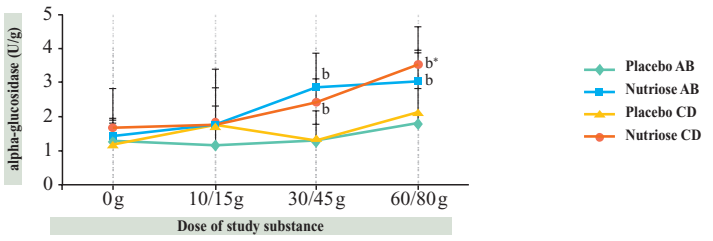



**Fig. 3 - Change in faecal concentration of beta-glucosidase**

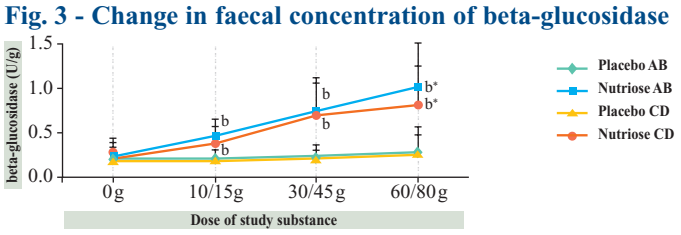



**Fig. 4 - Change in faecal concentration of polymerised glucose**

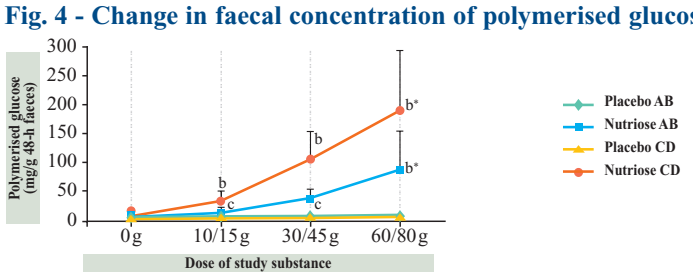
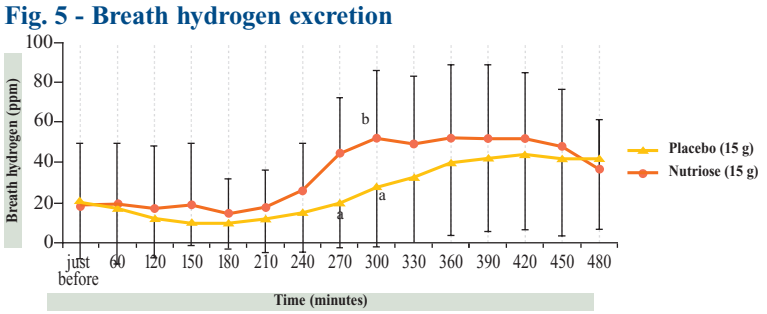



**Fig. 5 - Breath hydrogen excretion**




## CONCLUSION

NUTRIOSE®FB 06 is a fermentable carbohydrate and is up to a dose of 45 g well-tolerated. Higher daily dosages (60 and 80 g/d) may result in flatulence and bloating.
The small amount of residue of NUTRIOSE®FB 06 in the faeces, suggests that approximately 87% or more of NUTRIOSE®FB 06 is digested or fermented in the gastrointestinal tract.
Fermentation of NUTRIOSE®FB 06 led to an increased faecal concentration of α- and β-glucosidase, which could be explained by a fiber like effect.

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