

Dose-response impact of a soluble prebiotic fiber, on satiety and weight management



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Introduction

The role of the diet in the prevention of obesity is widely acknowledged. Dietary carbohydrates may impact body fatness and affect the likelihood of passive over-consumption and long-term weight change⁽¹⁾. In this context, fibre supplements seem to favour adherence to a low energy diet and hence weight loss. Some fibres may potentially play a role in hunger feeling, caloric intake, satiety and therefore food intake management. NUTRIOSE® has demonstrated strong effects on hunger feeling and weight management at a daily oral intake of 34g/day in a first clinical study. The aim of this second clinical trial was to investigate whether oral dietary supplementation with this resistant dextrin at **different dosages** was associated with a **positive impact on satiety-related and some anthropometric parameters**.

Material and Methods

Outcomes

- Primary: Impact on short-term satiety, food/caloric intakes, bodyweight
- Secondary: Impact on hunger feeling and other anthropometric parameters

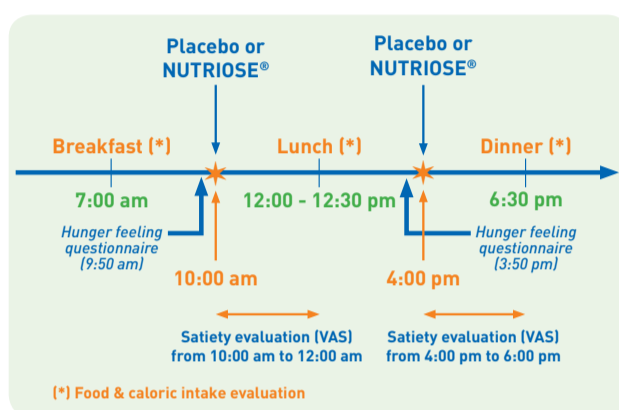
Design

- 9-week randomized, placebo-controlled, double blind, parallel, single center
- 5 groups of 20 overweight Chinese male and female (50/50) volunteers (24 ≤ BMI ≤ 28 kg/m²), factory workers eating each meal in the canteen (7d/7).
- Clinical measures:
 - ◆ **Satiety related parameters** :
 - **satiety** (from D-2 to D21): measured over 2 hours after product intakes through a standardized referenced visual analog scale (VAS-09)
 - **hunger feeling** (from D-2 to D21): 2 daily evaluations before NUTRIOSE® intakes ("How hungry do you feel?")
 - **food/caloric intake** (daily): individually assessed through a pre-calculated menu and a Daily Food Record at every meal from day -2 to day 63.
 - ◆ **Anthropometric parameters**: bodyweight, BMI, body fat, waist circumference (weekly from D-2 to D63)

Products

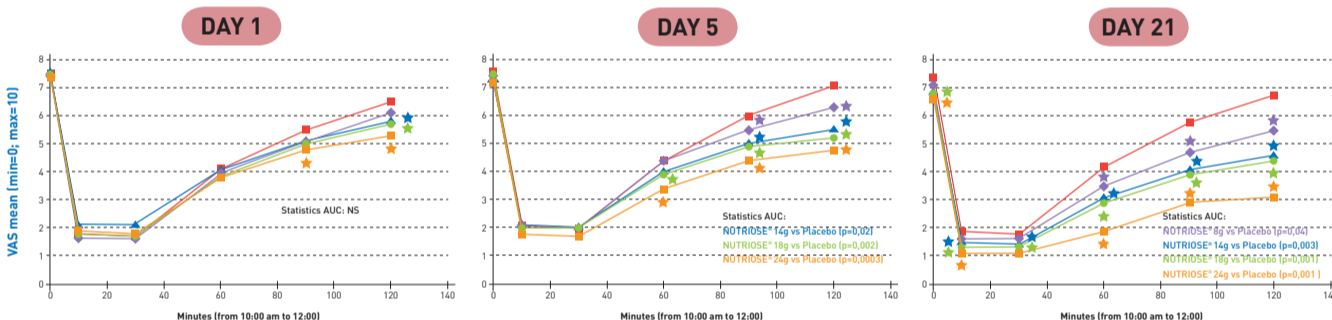
- Placebo group : orange juice → 2 daily intakes of 250 ml (a)
- Treatment groups : NUTRIOSE® in orange juice → 2 daily intakes of 250 ml containing either **4g** (b), **7g** (c), **9g** (d), **12g** (e) of NUTRIOSE®, namely **8, 14, 18** or **24 g** of NUTRIOSE®/day

Daily schedule



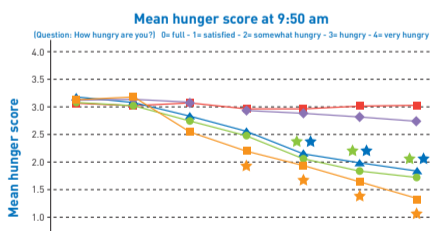
Results

Satiety evaluation "How hungry do you feel?" VAS evaluation in the morning



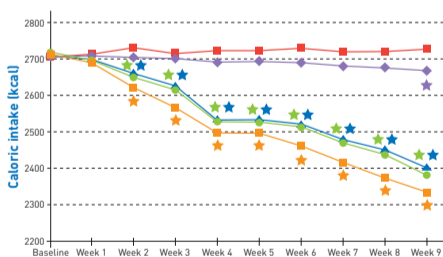
During the study, NUTRIOSE® exhibits a progressive and significant impact on short-term **satiety** (see figures 1, 2 and 3). This effect is **time correlated**, the impact on satiety becoming visible earlier while progressing in the trial and increasing in value from day 0 to day 21. Be that as it may, some statistical differences appear for the 8g/d group from Day 5. Moreover, this effect is also **correlated to the ingested dose**, the significance increasing with the dosage.

Hunger evaluation



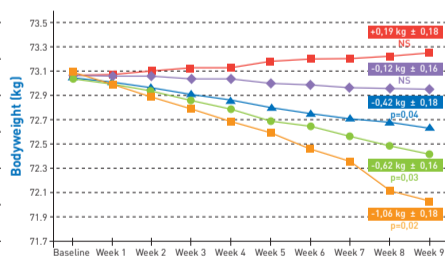
The **hunger feeling status decreases** over the study; this decrease is significant from Day 5 to the end of the evaluation for the group 24g and from Day 7 for the groups 14g and 18g. The **number of volunteers who are not hungry** increases during the study (data not shown).

Total caloric intake per day



There is a **significant decrease in caloric intake** (and in food intake - data not shown) correlated with the decrease in hunger, from week 2 to the end of the study for the groups 14g, 18g and 24g of NUTRIOSE® and at week 9 for the group 8g of NUTRIOSE®.

Body weight



As a consequence, NUTRIOSE® intake induces a strong and prolonged **impact on weight management**. The **decrease** observed from baseline to the end is significant for the groups 14g, 18g and 24g/day. In the meantime **BMI, body fat and waist circumference** display significant decreases (not shown) for these 3 groups. For each of the tested parameters, the results are also **dose-correlated**.

Discussion - Conclusion

- NUTRIOSE®, a non viscous soluble fibre, has previously demonstrated a positive impact on weight management in a 12-week dietary intervention in 120 healthy overweight Chinese men at a daily dosage of 34 g. In this second study, NUTRIOSE® displays significant time- and dose-related effects on **short-term satiety** (from day 5 at 8 g/day), **hunger feeling** (from day 5 at 24 g and day 7 at 14g/day), **food and caloric intakes** (from day 21 at 14 g/day).
- Several hypotheses may be formulated. The modulation of the microbial ratios in the gut flora composition may firstly enlighten these results [2;3]. Moreover, the slow and prolonged production of short chain fatty acids (SCFAs) along the colon may provide long lasting energy and delay or reduce hunger feeling. Finally, due to its fermentation pattern described *in vitro* as long-lasting and producing high propionate concentrations from 8 to 24 hours [4], it is also in line with some described role of SCFAs, such as:
 - butyrate may promote satiety [5] and have a direct effect on afferent terminals in rats [6];
 - the pattern of fermentation, mostly the ratio of acetate to propionate reaching the liver, is a putative intermediate marker possibly predicting the potential lipid lowering properties of non digestible carbohydrates;
 - the classical deleterious role attributed to acetate as a precursor of lipogenesis might be modulated [7].
- Finally, the results of this second study bring additional evidence to the fact that **NUTRIOSE® may be a useful tool in the modulation of satiety** from 8-14g/day, and in **weight management** from 14g/day.

Bibliography

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