

The Effect of Plant-Based Proteins on Markers of Gut and Metabolic Health

Background/introduction/summary

Plant-based proteins were shown to have a lower impact on the climate in comparison to animal proteins which launched a transition from a diet based on animal protein to a plant-based diet¹. However, detailed scientific knowledge about related health effects is still lacking.

This pilot study focuses on colonic protein fermentation and its effect on microbiota composition, gut markers and metabolites with the aim to determine influencing factors of protein digestibility, to investigate nutrient interactions regarding fermentation processes in the colon and to understand metabolic mechanisms.

The study is part of the PhD project within PAN Sweden Research Centre. With the newly gained knowledge the long-term goal is to create "sustainable produced products with health benefits for everyone".

Materials and Methods

After a 4-week baseline period, participants are asked to supplement their diet with a plant protein. The protein amount is calculated individually in regards to the body weight.

During the whole course of the study weekly faecal samples are collected as well as questionnaires to evaluate bowel habits, gastrointestinal symptoms, physical activity and individual food habits.

After the start of the dietary intervention, 24h urine samples and fasting blood samples are additionally collected once a week. Furthermore, the body composition is measured weekly during the intervention.

Results

The pilot study started in November 2021 and the intervention is still ongoing. First results are expected during summer 2022. In total, 32 healthy male and female participants have been included in the present study (1 drop out as of now).

The screening consisted of an 1-hour meeting during which study details – such as the schedule, the participant's tasks and the intervention – were explained. Additionally, a case report form was filled in for each interested person to evaluate e.g. medical background and to assess if any of the exclusion criteria apply.

The exclusion criteria included: age <18 or >45 years; BMI <18.5 or >30 kg/m²; acute chronic disease, inflammatory or functional gastrointestinal diseases; eating disorder; vegan diet; use of antibiotic medication, laxatives or anti-diarrhoeal medication during the last 3 months prior the first visit; regular consumption of probiotic or prebiotic products for the past 6 weeks before the first visit; more than 5 h of moderate-vigorous exercise per week; use of dietary protein or fibre supplementation; pregnancy or breastfeeding; smoking or usage of snus; unstable body weight during the last 3 months before the first visit.

Furthermore, people were asked to hand in three food diaries after the screening which comprised two weekdays and one weekend day. These diaries were assessed regarding protein and dietary fibre intake and people were excluded if their diet was too low in protein and/or dietary fibre.

After advertising the study, 306 people reported interest and 93 could be booked for a first meeting. Eventually, 78 people were screened either at Campus USÖ (Örebro University) or via Zoom. After analysing all documents, 37 people were considered eligible to participate in the study.

The findings of this pilot study shall help to design future studies, also considering protein amount and duration of dietary interventions.

Conclusions

With an increasing intake of protein, we expect to observe an increase in metabolites which are related to and deriving from proteolytic fermentation in the colon in faecal as well as blood samples.

Furthermore, we hypothesised that a 4-week dietary intervention will result in microbiota composition changes also in regard to protein-fermenting bacteria.

We expect that even at higher doses participants will be compliant with the protein supplementation.

Reference

1. Poore, J. & Nemecek, T. (2018): Reducing food's environmental impacts through producers and consumers. *Science* 360 (6392): 987–992.

Acknowledgements

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