

My New GUT



The effect of high fibre and high PUFA diets on metabolic risk markers

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Background

Obesity and associated co-morbidities, such as Type 2 Diabetes and cardiovascular diseases constitute major health concern in most Western countries. Intervention studies with diets rich in fibre and polyunsaturated fatty acids (PUFA) provide evidence in improving blood lipid profile^[1]. Arabinoxylan oligosaccharide (AXOS) belongs to new class of prebiotic fibres that was shown to beneficially affect fat metabolism^[2].

Aim of the study:

It is hypothesized that the diet high in PUFA and/or high in fibre AXOS will decrease serum concentration of triglycerides, total and LDL cholesterol and increase HDL cholesterol.

Methodology

In a randomised, double-blind diet intervention, 30 individuals with BMI between 25-40 kg/m² have been allocated to the sequence of two isocaloric diets, i.e. high PUFA and high prebiotic arabinoxylan fibre (Fig.1).

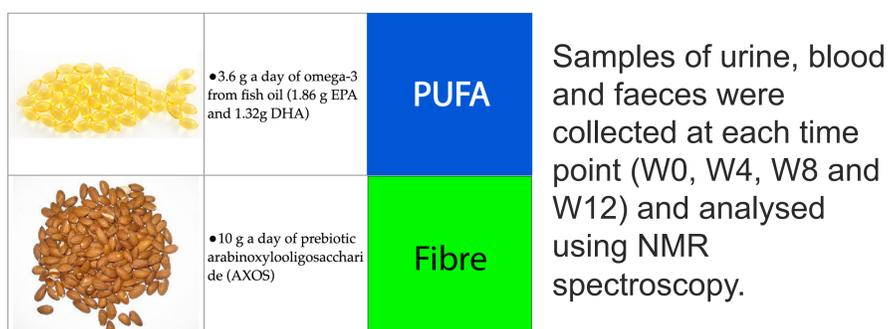


Figure 1. Two isocaloric diets have been investigated, high PUFA diet and high fibre diet.

The effects of the diets on metabolic profile were evaluated using multivariate statistical analyses such as Principal Component Analysis (PCA) and Orthogonal Projection to Latent Structure Discriminant Analysis (OPLS-DA).

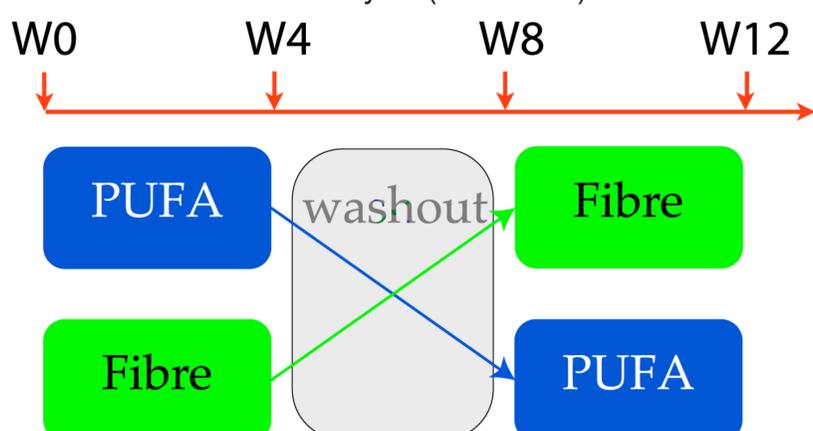


Figure 2. The crossover study design.

PUFA modified plasma metabolites

The levels of triglycerides were significantly decreased in participants receiving high PUFA diet as compared to participants that received high fibre diet. Further specific lipidomics analysis is still on-going which will provide more details about the modification of the triglycerides. The results for the first arm of the fibre diet are not consistent when compared to the second arm. For this reason further investigation is required with regards to the fibre intervention.

As results were biased by the crossover study design, it could be beneficial to extend the length of the washout period. No metabolic variations were observed for urine and faecal water statistical analysis.

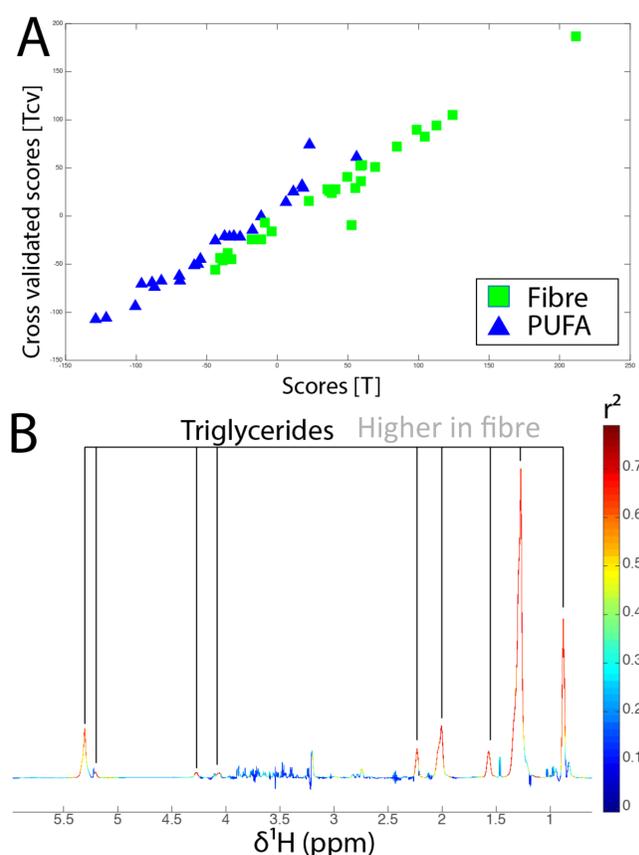


Figure 4.(A). OPLS-DA plot presents scores (T) versus cross-validated scores (Tcv) that were calculated from ¹H-NMR spectra of plasma samples as a matrix of independent variables and type of diet as a prediction vector. The loadings plot (B) presents the metabolites (red) that contribute to the scores plot the most.

Conclusion

PUFA constitutes a promising food ingredient for future dietary management programmes to tackle obesity and related disorders.

Partners involved

The study is carried out in collaboration with the University of Copenhagen.

Literature

1. Connor et al.(1993) *Annals of the New York Academy of Sciences*, 683, 16-34.
2. Grootaert et al.(2009) *Fems Microbiology Ecology*, 69,231-242