

## Research

# Effects of indigestible carbohydrates in barley on glucose metabolism, appetite and voluntary food intake over 16 h in healthy adults

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## Abstract (provisional)

### Background

Recent knowledge in animals suggests that gut microbial metabolism may affect host metabolism, including appetite regulating hormones. The aim of the present study is to evaluate the potential effects of a whole grain barley kernel product, rich in intrinsic indigestible carbohydrates (dietary fibre and resistant starch), on markers of metabolism and appetite regulation in healthy subjects.

### Methods

Boiled barley kernels (BK) or white wheat bread (WWB; reference) were provided as late evening meals to 19 young adults in random order using a cross-over design. During subsequent ad libitum standardized breakfast and lunch meals (10.5-16 h), blood was collected for analysis of glucose, plasma insulin, adiponectin, ghrelin, glucose-dependent insulinotropic polypeptide (GIP) and glucagon-like peptide-1 (GLP-1), serum free fatty acids (FFA) and interleukin (IL)-6. In addition, appetite sensations, voluntary energy intake and breath H<sub>2</sub> were determined.

### Results

BK as evening meal increased plasma GLP-1 at fasting ( $P < 0.05$ ) and during the experimental day ( $P < 0.01$ ) compared with WWB. In addition the BK evening meal decreased fasting serum FFA ( $P < 0.05$ ) and tended to decrease fasting serum IL-6 ( $P = 0.06$ ). At lunch, preceded by BK evening meal, voluntary energy intake was decreased ( $P < 0.05$ ) when compared to WWB evening meal. The BK evening meal decreased incremental blood glucose area ( $P < 0.01$ ), promoted higher breath H<sub>2</sub> ( $P < 0.001$ ), maintained adiponectin concentrations ( $P < 0.05$ ) and reduced perceived hunger ( $P < 0.05$ ) during 10.5-16 h after the meal.

### Conclusions

The results indicate that the BK evening meal, facilitate glucose regulation, increase the release of GLP-1, reduce subsequent energy intake while at the

same time decreasing hunger over 2 subsequent meals, and fasting FFA the subsequent morning, possibly mediated through gut microbial fermentation of the indigestible carbohydrates.