



Effects of GI and content of indigestible carbohydrates of cereal-based evening meals on glucose tolerance at a subsequent standardized breakfast

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Abstract

Objective: To evaluate the impact of four low-glycemic index (GI) and one high-GI cereal-based evening meals on glucose tolerance at a subsequent standardized breakfast.

Design: Wheat kernels, barley kernels, spaghetti, spaghetti with added wheat bran and white wheat bread (WWB) were consumed in the evening in a random order at five different occasions. At the subsequent breakfast, blood glucose, serum insulin, plasma short chain fatty acid, plasma free fatty acid (FFA) and breath hydrogen were measured.

Setting: The study was performed at Applied Nutrition and Food Chemistry, Lund University, Sweden.

Subjects: Fifteen healthy volunteers were recruited. One subject was later excluded owing to abnormal blood glucose values.

Results: The blood glucose response (0-120 min) to the standardized breakfast was significantly lower after consuming barley kernels in the evening compared with evening meals with WWB ($P=0.019$) or spaghetti wheat bran ($P=0.046$). There were no significant differences in insulin concentrations at breakfast. Breath hydrogen excretion at breakfast was significantly higher after an evening meal with barley kernels compared with WWB, wheat kernels or spaghetti ($P=0.026$, 0.026 and 0.015 , respectively), and the concentration of plasma propionate at breakfast was significantly higher following an evening meal with barley kernels compared with an evening meal with WWB ($P=0.041$). In parallel, FFA concentrations were significantly lower after barley kernels compared with WWB ($P=0.042$) or spaghetti evening meals ($P=0.019$).

Conclusions: The improved glucose tolerance at breakfast, following an evening meal with barley kernels appeared to emanate from suppression of FFA levels, mediated by colonic fermentation of the specific indigestible carbohydrates present in this product, or, to the combination of the low-GI features and colonic fermentation.