Effect of barley $\beta$-glucan on postprandial glycaemic response in the healthy human population:
A meta-analysis of randomized controlled trials

Suhad AbuMweis a, Sijo Joseph Thandapilly b,c, Joanne Storsley b,
Nancy Ames b,c,*

aDepartment of Clinical Nutrition and Dietetics, Faculty of Allied Health Sciences, Hashemite University, Zarqa, Jordan
bAgriculture & Agri-Food Canada, Richardson Centre for Functional Foods and Nutraceuticals, 196 Innovation Drive, Winnipeg, MB R3T 6C5, Canada
cDepartment of Human Nutritional Sciences, University of Manitoba, W383 Duff Roblin Building, Winnipeg, MB R3T 2N2, Canada

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ABSTRACT

Background: Despite the many published studies examining the effects of barley and barley products on postprandial glycaemia (PPGR), to date, a meta-analysis to quantify the overall PPGR lowering effect of barley beta-glucan in the literature has not been published.

Objective: The meta-analysis presented in this manuscript was designed to quantify the efficacy of barley and barley products on postprandial glycaemia.

Methods: The review was registered on PROSPERO (registration number CRD42015027988). Analysis was performed on a total of 17 studies that included 68 different treatments (which covered a range of food types) and 212 subjects. Multiple comparisons or strata within studies were combined using a fixed effects model, and a random effects model was used to obtain an overall estimate on outcomes of interest.

Results: Compared with controls, barley and/or $\beta$-glucan from barley significantly reduced glucose area under the curve (G iAUC) by $-34.4 \text{ min} \times \text{mmol/L}$. The glycaemic index (GI) was also significantly lower than that for control products ($-24.3$). Consumption of foods containing barley and/or $\beta$-glucan from barley significantly reduced insulin AUC by $2577 \text{ min} \times \text{pmol/L}$, and a significant reduction in insulin index was observed ($-33.8$). The ratio of BG to AC did not meet the EFSA suggested amount of 4 g BG per 30 g AC in the majority of studies examined; meta-regression analysis indicated no significant dose–response relationship between BG dose and the mean difference in G iAUC.

Conclusions: Results of the meta-analysis show that consumption of barley and barley $\beta$-glucan lowered postprandial glycaemic response, and that the magnitude of reduction in PPGR was large enough to be considered a physiologically relevant change. However, due to the relatively low number of studies eligible for inclusion in the meta-analysis, and the high inter-study heterogeneity observed among the studies included, this meta-analysis points to the need for more high quality dose–response studies to verify that barley can improve health outcomes of free-living humans who consume a varied diet.

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