Proceedings of the Nutrition Society (2022), **81 (OCE5)**, E196 doi:10.1017/S0029665122002294

Summer Conference 2022, 12–15 July 2022, Food and Nutrition: pathways to a sustainable future

The effect of broad bean hull on postprandial glucose response: a pilot study

Q.Q. Ni[1], V. Raikos[1], N.J. Hayward[1], H.E. Hayes[1], F. Thies[1] and V. Ranawana[2]
[1]*Rowett Institute, University of Aberdeen, Aberdeen, UK and*
[2]*School of Health and Related Research, The University of Sheffield, UK*

Dietary fibre (DF) has been associated with a reduction in postprandial hyperglycaemia(1), a risk factor for diabetes and cardiovascular diseases. Current UK recommendation for fibre intake (30 g/day) is not easily achievable. New food products enriched with DF could help the general population to meet the recommendation and provide health benefits. The seed coat (hull, BBH) of broad bean (*Vicia faba*) is removed during processing and is a food-grade underutilised secondary product rich in DF(2). This study aimed to evaluate the acute effects of consuming BBH-enriched bread on postprandial glucose response (PGR). Nine heathy adults (5 females, 4 males, aged 29–75 years, BMI 22.5–28.0 kg/m^2) from Aberdeen area were recruited into a randomised controlled crossover trial. Participants consumed either one portion of control (122 g, 5 g DF) or BBH-enriched bread (156 g, 21% w/w BBH, 23 g DF), providing equal amount of carbohydrate (55 g), and PGR was monitored at 5-minute intervals over 4 hours following bread consumption using Continuous Glucose Monitoring (iPro, Medtronic Ltd). Blood samples were collected at baseline, 15-minute, 30-minute, 45-minute, 60- minute, 90-minute, 120-minute, 180-minute and 240-minute for measuring plasma insulin concentrations using ELISA (Mercodia AB) and plasma lipid profiles (using a Thermo Konelab clinical analyser and kits for HDL, LDL, total cholesterol (TC) and triglycerides (Microgenics GmbH)). PGR and insulin results were calculated as the incremental area under the curve (iAUC) using the trapezoidal method. Data were expressed as mean ± SD. Paired-sample t-test was used for data analysis and two-way repeated ANOVA was used to analyse the effect of interaction between meals and time on plasma lipid profiles (ver. 27.0; SPSS Inc). Statistical significance was defined as $p < 0.05$. The iAUC of glucose responses for BBH-enriched and control breads were similar ($iAUC_{0\text{-}240min}$ = 223.6 ± 156.5, 241.1 ± 142.9 mmol x time/L respectively, $p = 0.700$). The insulin response following control bread ($iAUC_{0\text{-}240min}$ = 3117.2 ± 1126.8 mmol x time/L) was significantly higher than the BBH- enriched bread ($iAUC_{0\text{-}240min}$ = 3010.4 ± 1449.5 mmol x time/L, $p = 0.039$). Plasma lipid profiles were similar between treatments ($p > 0.05$). There were significant effects of time (baseline to 4-hour) on TC (reduced by 0.07 and 0.25 mmol/L in control and BBH treated respectively, $p = 0.008$), HDL (reduced by 0.01 and 0.10 mmol/L in control and BBH treated respectively, $p = 0.005$) and LDL (reduced by 0.07 and 0.14 mmol/L in control and BBH treated respectively, $p = 0.011$). There were no significant meal x time interaction effects on changes of plasma lipid profiles ($p > 0.05$). Addition of 21% BBH in bread did not affect PGR and postprandial plasma lipids but significantly reduced insulin response. These effects may be driven by DF and possibly phenolic compounds present in BBH. Further longer studies appropriately powered are required to confirm these results.

References

1. de Carvalho CM, de Paula TP, Viana LV, *et al.* (2017) *Am J Clin Nutr* **106**(5), 1238–1245.
2. Ni QQ, Ranawana V, Hayes HE, *et al.* (2020) *Foods* **9**, 1192.