

Processing blueberries by homogenising increases postprandial glycaemia in response to an oral glucose tolerance test in healthy volunteers, compared with whole berries

V. Rungapamestry¹, K. Ross¹, M. Cruickshank¹, K. Moar¹, S. Duthie¹, M. Neacsu¹, R. Brennan², W. Russell¹ and N. Hoggard¹

¹Rowett Institute of Nutrition and Health, University of Aberdeen, Aberdeen AB21 9SB and ²The James Hutton Institute, Dundee DD2 5DA

Blueberry consumption is associated with decreased risk of metabolic complications relevant to the development of Type 2 Diabetes (T2D), which is partly attributed to their anthocyanin content⁽¹⁾. We have previously shown that a wild blueberry extract, *Vaccinium myrtillus*, improves postprandial glycaemia in T2D⁽²⁾. In the present study, we aim to test whether food matrix and processing affects metabolic control, including glycaemia, following consumption of a single dose of anthocyanin-rich blueberries by healthy volunteers.

In a randomised controlled cross over trial, 8 healthy volunteers (2 males, 4 females) with mean age 41 (SEM 4.1) years and BMI 24.9 (SEM 0.86) kgm⁻² received 400 g of whole blueberries (WB) or blueberries homogenised for 2 min into a purée with nothing removed (BP), followed by a polysaccharide drink (equivalent to 75 g glucose). Interventions were two weeks apart and preceded by a 3-day low phytochemical diet. Glucose, insulin, and non-esterified fatty acids (NEFA) from plasma collected before and up to 180 min after intervention were measured using commercial kits (Microgenics GmbH; Hemel Hempstead, UK).

Intake of BP increased postprandial glycaemia, as shown by a 9 % increase in the area under the curve (AUC) for glucose, compared with WB (998 (SEM 44) mM for BP and 915 (SEM 45) mM for WB, $P = 0.006$). Seven of the eight volunteers showed an increase in postprandial glucose after consumption of the BP, compared with WB (Fig. 1). This may be due to quicker release of intrinsic sugars from BP or an effect of BP on the polysaccharide drink and subsequent breakdown and uptake of sugars across the intestine, increasing glucose bioavailability into the bloodstream. There was no significant change in AUC for plasma insulin or NEFA.

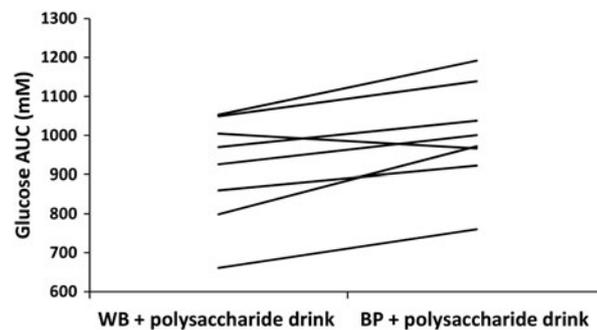


Fig. 1. Individual responses in area under the curve (AUC) for glucose after the intake of whole berries (WB) or blueberry purée (BP) followed by a polysaccharide drink.

This study highlights the potential negative impact of consuming homogenised berries on metabolic control, compared to whole fruit. Our ongoing work aims to further clarify the reasons for the observed changes in postprandial glucose.

This work was funded by The Scottish Government Rural and Environmental Science and Analytical Sciences Division (RESAS).

1. Wedick NM, Pan A, Cassidy A *et al.* (2012) *Am J Clin Nutr* **95**, 925–933.
2. Hoggard N, Cruickshank M, Moar K *et al.* (2013) *J Nutr Sci* **2**, 1–9.