The glycaemic and insulin index values of a range of Australian honeys

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Honey is often considered to be a uniform foodstuff consisting, on average, of 17% water, 82% carbohydrate and 0.5% proteins, amino acids, vitamins and minerals. However, the colour, flavour, and sugar profile of honeys vary depending on the floral nectar source visited by the bees. Australian honey has a greater range of flavours and colours than honeys from other countries and can vary markedly in the amounts of fructose and glucose they contain. Consequently, it is likely that different types of Australian honeys will produce different blood glucose and insulin responses. The aim of this study was to compare the effects of equal-carbohydrate portions of eight different types of Australian honey on postprandial blood glucose and insulin responses. A glycaemic index (GI) and insulin index (II) value was calculated for each honey, using glucose as the reference food (index value of glucose = 100). The sugar profiles and organic acid contents of the eight honeys were determined using standard HPLC methods and the osmolality of each honey was measured using an osmometer.

The study was conducted in two parts using two separate groups of 9–10 healthy, non-smoking, normal-weight subjects. The reference food and four types of honey were tested in each part. The study employed a repeated-measures design, such that in both parts of the study, each subject consumed each of the four test honeys on one occasion and the reference food on two occasions. Subjects fasted for = 10 h overnight and then reported to the test centre the next morning, where they first gave a fasting finger-prick blood sample and then consumed a fixed portion of the reference food or a honey containing 25 g of available carbohydrate. Additional finger-prick blood samples were obtained at 15, 30, 45, 60, 90 and 120 min after eating commenced. For each subject, a GI value was calculated for each honey by dividing the area under the 120-min plasma glucose response curve (AUC) for that food by the average AUC value for the reference food and then multiplying by 100. An II value for each food was calculated using the same formula with insulin instead of glucose AUC values. The mean ± SEM GI and II values for the eight honeys are shown in the table below (n = 10 except for the honeys tested in the second part of the study * where n = 9).

Honey variety	GI value (%)	II value (%)	Fructose (g in test portion)	Glucose (mg/test portion)	Osmolality	Total organic acid content
Yellow box	35 ± 4	40 ± 5	15.3	9.0	5676	0.50
Stringybark*	44 ± 4	47 ± 3	15.9	8.5	5678	0.56
Red Gum	46 ± 3	51 ± 3	11.7	11.2	4884	0.48
Iron bark	48 ± 3	42 ± 4	14.1	9.8	4624	0.72
Yapunyah*	52 ± 5	42 ± 4	15.5	8.8	4824	0.84
Commercial blend 2 (WA)*	62 ± 3	62 ± 4	13.6*	10.5	4551	0.47
Salvation Jane	64 ± 5	52 ± 3	12.9	11.2	4804	0.43
Commercial blend 1 (NSW)*	72 ± 6	67 ± 6	13.6	15.5	5708	0.57

The mean GI and II values of the honeys were significantly related ($r = 0.88$, $n = 8$, $P < 0.01$). The glucose content (grams per 25-g available carbohydrate test portion) of the honeys was significantly related to their mean GI ($r = 0.79$, $n = 8$, $P < 0.05$) and II ($r = 0.77$, $P < 0.05$) values. The honeys' fructose contents were negatively but not significantly related to the mean GI and II values ($r = –0.41$, $n = 8$, NS). Both the sucrose and maltose contents were positively but not significantly related to the honeys' mean GI and II values. Similarly, the honeys' osmolality and organic acid contents were negatively but not significantly related to their mean GI or II values. Honey is a complex substance containing as many as 180 different compounds, some of which, such as flavonoids and phenolic acids, may reduce glycaemia. The results of this study show that all types of honey should not be classified as one foodstuff, particularly for people with diabetes.

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