Glycemic Index Research Report #1643

For Hermanbrot Pty Ltd.

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Sydney University's

Glycemic Index Research Service (SUGiRS)

School of Life and Environmental Sciences

Charles Perkins Centre, D17

University of Sydney, NSW, 2006

AUSTRALIA

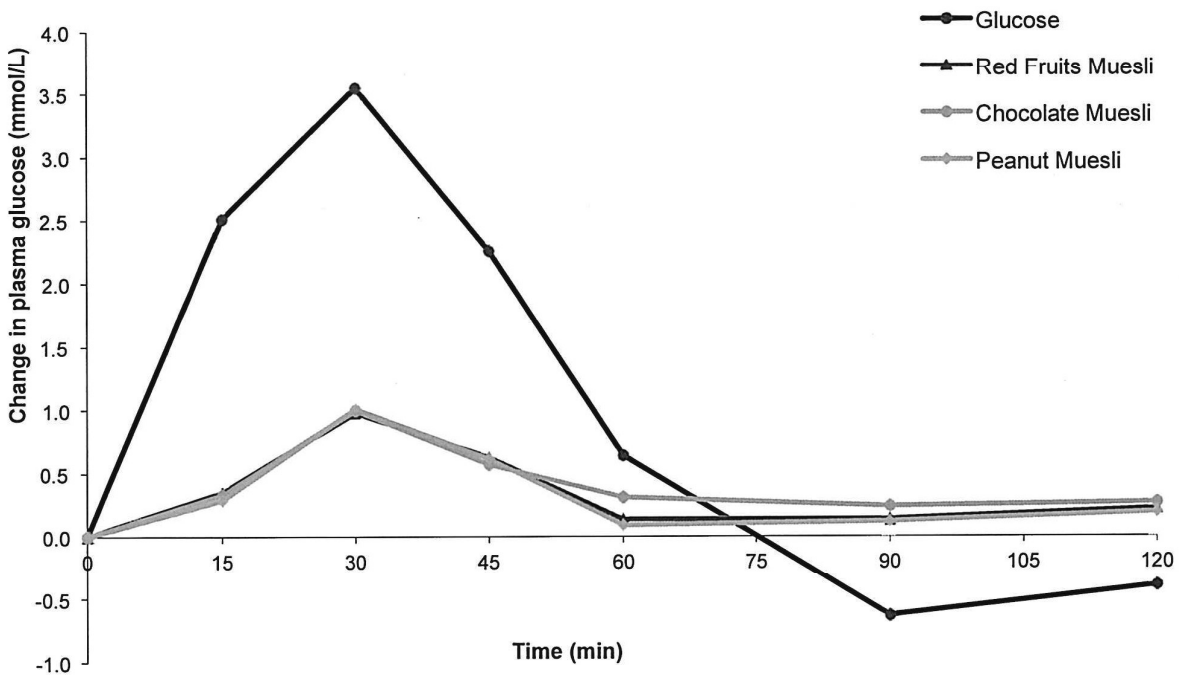
Ph: +61 2 9351 6018

Results

The average glycemic response curves for the reference food and the 3 test products

The average two-hour plasma glucose response curves for the 25-gram carbohydrate portions of the reference food and the three muesli products are shown in Figure 2 below. The reference food produced a rapid rise in plasma glucose to a high peak plasma glucose concentration at 30 minutes and the greatest overall glycemic response. The overall shape and magnitude of the glycemic responses was similar for the three test products, with a low peak plasma glucose concentration at 30 minutes followed by a gradual decline in glycemia between 30 – 120 minutes. Amongst the test products, the Peanut Muesli produced the smallest overall glycemic response.

Figure 2. The average plasma glucose response curves for the equal-carbohydrate portions of the reference food and the three muesli products, shown as the change in plasma glucose from the fasting baseline level.



The foods' glycemic index values

The differences in the glycemic responses produced by the reference food and the three test products are more clearly reflected by their GI values than their plasma glucose response curves. The GI values for the three Protein Muesli products varied among the subjects that participated in the study (Appendix A). This variation between different peoples' responses to the same food is normal and is due to a number of factors, such as different rates at which the subjects ingested the food, differences in the nutrient content of the individual test food portions, differences in the subjects' carbohydrate metabolism, and lifestyle and genetic factors.

It is standard scientific practice that if any individual subject's GI value for a particular food is either greater than the group mean (average) value plus two standard deviations or less than the group mean value minus two standard deviations then that value is classified as an outlier and is removed from the dataset. No outlier GI values were observed amongst the subjects' individual responses for any of the three test products. Therefore the final GI values for the three muesli products are the average of 10 subjects' data. The mean ± standard error of the mean (SEM) GI values for the test samples and the reference food are listed in Table 2 and illustrated in Figure 3.

Table 2. The mean ± SEM GI values for the three test products and the reference food.

Test Food	GI value	GI Category
Protein Muesli – Peanut	30 ± 3	Low GI
Protein Muesli – Red Fruits	32 ± 4	Low GI
Protein Muesli – Chocolate	35 ± 4	Low GI
Reference food (glucose sugar)	100 ± 0	High GI

Conclusions

Using glucose as the reference food (GI = 100), foods with a GI value less than 55 are currently considered to be low-GI foods (12, 13). Foods with a GI value between 56-69 are medium- or moderate-GI foods, and foods with a GI value of 70 or more are high-GI foods. The three Protein Muesli products tested in this study produced average GI values of 30 - 35, which place these products well within the low GI category.

Although a low GI value is a desirable nutritional characteristic, other nutritional factors such as the energy density and the fat content must also be taken into consideration when comparing the health properties of different foods. The GI values observed for the products tested in this study are only valid as long as the mueslis' formulations (ingredients and processing methods) remain the same. Any changes made to the formulations of these products are likely to affect their GI values, and therefore any modified formulations may need to have their GI values remeasured.

GI values are measured using portions of foods and drinks that contain between either 25 or 50 grams of digestible carbohydrate, but these may not be similar to the amounts of these products typically consumed by people in normal environments. It is possible to calculate a glycemic load (GL) value for any sized portion of a carbohydrate-containing food, as long as you know its GI value. The GL value for a food or drink is calculated by multiplying the amount of available carbohydrate in the portion of the food or drink by its GI value and then dividing by 100.

Similar to GI values, GL values are useful for helping people identify which types and amounts of foods will produce relatively lower blood glucose responses after consumption – an important consideration for people with diabetes and those at risk of developing it. Currently, the consensus is that GL values of 10 or less are low GL; GL values of 11 – 19 are medium GL values; and GL

values of 20 or more are high GL values (13). The glycemic load values for a standard serve of each of the muesli products tested in this study are listed below:

1. Protein Muesli – Red Fruits (45 g serve): (8.4 x 32)/100 = 3
2. Protein Muesli – Chocolate (45 g serve): (9.3 x 35)/100 = 3
3. Protein Muesli – Peanut (45 g serve): (7.7 x 30)/100 = 2

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The GI values of foods must be tested scientifically. At this stage, only a few research groups around the world currently provide a legitimate testing service. The University of Sydney has been at the forefront of glycemic index research for over a decade and has determined GI values for more than 2500 foods. In 1999, the Human Nutrition Unit established a commercial GI testing unit called 'Sydney University's Glycemic Index Research Service' (SUGiRS) to meet the increasing demand for GI research by local and international food manufacturers and pharmaceutical companies.

Fiona Atkinson and Professor Jennie Brand-Miller are co-authors of *The International Tables of Glycemic Index* published by the scientific journal, Diabetes Care, in 2008. Previous editions of the International Tables (published in 1995 and 2002) have proven to be an important reference for health professionals when planning therapeutic diets for people with diabetes. Dr Brand-Miller's books, *The GI Factor* and related pocket books on diabetes, heart disease and weight reduction, are aimed at lay people and health professionals, and have sold more than 150,000 copies in Australia since 1996. A British edition of *The GI Factor* was released in 1997 and a North American edition (*The Glucose Revolution*) was released in July 1999. Each edition of the book includes tables listing the GI values of more than 350 different foods, many of which were tested at the University' of Sydney. The glycemic index been discussed in a number of best-selling books and in magazine articles in relation to a range of health topics such as diabetes, breast cancer and weight control. Publications such as these and ongoing research promoting the healthy nature of low-GI foods have generated an increasing demand for GI research.