



## The Glycemic Index as a Measure of Health and Nutritional Quality: An Australian Perspective

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Over the past decade, the glycemic index (GI) concept has been embraced by health professionals and consumers in Australia. In a 2005 survey, more than 80% of Australian grocery shoppers were aware of the “GI,” and half were very likely to use the GI rating when choosing food (Tables 1 and 2). When asked which GI rating is most beneficial to general health (low, medium or high GI), nearly 60% of respondents checked the correct answer. Food labels with GI values began appearing in 1990, with an accelerating trend in the past few years. In 2001, the GI Symbol Program was launched as a not-for-profit initiative of the University of Sydney, Diabetes Australia, and the Juvenile Diabetes Research Foundation ([www.gisymbol.com](http://www.gisymbol.com)). Currently, about 100 products on the Australian, New Zealand, and overseas market meet strict nutrient and other quality criteria and are licensed to carry the certified mark (Fig. 1). The long-term goal is to have one internationally recognized GI symbol to ensure that scientifically credible and balanced messages are promoted to the public.

### A Fad or a Science-Based Diet?

Is the GI just a passing fad, similar to the “low carb” phenomenon? The facts argue otherwise. From controversial beginnings in the 1980s, the GI has stood the test of time and scientific scrutiny. Officially, the current recommendations of FAO/WHO (19) and major diabetes associations, including Diabetes UK (32), the Canadian Diabetes Association (14), and Diabetes Australia (17) refer to the

- ▶ The glycemic index (GI), which characterizes the carbohydrates in different foods, is a better marker of health effects than the sugar-starch or simple-complex sugars distinctions.
- ▶ Healthy foods with a low GI provide an additional benefit over and above that achieved by conventional low-fat foods in the management and prevention of diabetes and pre-diabetes.
- ▶ The GI of a food product cannot be guessed; it must be tested according to the standardized *in vivo* method.
- ▶ Many whole-grain products have a high GI.

GI. Most recently, the American Diabetes Association recognized that the use of the GI “can provide an additional benefit over that observed when total carbohydrate is considered alone” (36). The application of the GI in other areas—weight control (18), sports performance (12), cardiovascular disease (11), cancer prevention (22,24) and cognitive function (34) is the subject of ongoing research. Why would the GI be important in so many areas?

### Postprandial Glycemia: The New Risk Factor

Mounting evidence indicates that a high blood glucose concentration, even within the so-called “normal” range, has undesirable consequences (15). “Postprandial hyperglycemia,” or a high blood glucose level within 2–3 hr of a meal, is a strong independent risk factor for morbidity and mortality, particularly from cardiovascular causes (16). A high glucose concentration creates oxidative stress, affecting cellular function, lipid oxidation, protein glycola-

tion, clotting tendency, and inflammatory processes. In the cells lining blood vessels, the result is thickening and hardening, the hallmarks of atherosclerosis. In overweight and insulin-resistant individuals, high blood glucose levels go hand-in-hand with excessively high insulin levels, which in turn stimulate the insulinlike growth factor system and the growth and differentiation of normal and abnormal cells (8). Cancer growth at various sites has been linked to high-GI diets (2,23).

### Defining the Glycemic Index

Carbohydrates are the main component in food responsible for the rise in blood glucose level after eating. But two meals, one with twice the carbohydrate content of the other, can produce similar levels of glycemia (9). Weight for weight, those carbohydrates that are digested and absorbed slowly produce less glycemia and insulinemia than those that are digested rapidly. Distinguishing carbohydrates on this basis (i.e., their glycemic impact) has yielded more useful insights than classification as sugars or starches or as simple vs. complex (indeed, such classifications don’t predict blood sugar responses at all). The GI can be viewed as a property of the carbohydrates in a food, i.e., their ability to raise blood glucose in the hours after consumption. Surprisingly, most whole-grain cereal products, including high-fiber breads and breakfast cereals, have high GI values, while legumes, pasta, dairy products, and many fruits have low GI values (21). The state of gelatinization of the starch in food is a major determinant of the GI. Foods containing sugars display a wide range in GI values from low (e.g., sweetened yogurt) to high (e.g., jelly beans).

GI testing is a standardized procedure undertaken in human subjects who consume food portions containing 50 or 25 g of carbohydrate. The published GI is the average value obtained for about 10 subjects (for details, go to [doi:10.1094/CFW-52-2-0041  
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glycemicindex.com/). Just as with any testing procedure, modifications affect the final values obtained (10), and there is a good case for national and international standards.

### Criticism of the GI

The validity of the GI concept is often challenged. The criticisms include human variability (day-to-day variation in glucose tolerance or differences between individuals) as well as food factors, such as changes due to cooking, processing, or ripeness of the food. Different GI values for the same food can result from true differences (one variety of rice versus another) or be methodological artifacts. These limitations apply equally well to carbohydrate counting and other methods used to manage blood glucose levels. Food composition itself is variable, and the GI should not be held to higher standards than other nutrient factors. In GI testing, repeat testing of the reference food (two or three separate tests) reduces the effect of day-to-day variation, while increasing the number of subjects improves the standard error around the mean GI. Apparent variation *between* different individuals reflects, not real differences among people, but day-to-day variability *within* individuals. With repeated testing of a given food, all individuals move closer to the mean of the group.

The application of GI to “mixed meals” containing two or more carbohydrate sources is also challenged (20). It is clear, however, that if the GI values of the component foods are known, it is possible to accurately predict the relative glycemic response to meals varying widely in energy, fat, protein, and fiber. In a study of 13 typical breakfast meals, the amount of carbohydrate and the GI values of the carbohydrate sources together explained 90% of the variability in glycemic response to a meal (43). The findings of day-long and longer-term studies indicate that mixed meals incorporating low-GI foods reduce

average blood glucose concentrations (7,33).

### Defining Glycemic Load

The GI allows us to compare the relative glycemic effect of foods and meals with approximately the same carbohydrate content, but it does not permit direct comparison when different amounts of carbohydrate are involved. For this purpose, the glycemic load (GL), the product of the GI of a food and its carbohydrate content (GI × carbohydrate content per serving), was introduced (28). Some commentators have suggested that GL is “better than” or makes more sense than the GI because it takes into account the fact that some high-GI foods (e.g., parsnips and pumpkin) contain little carbohydrate and have minimal effects on glycemia. But only a handful of foods belong in this category, and GL can be more readily “misused” to promote foods that contain little carbohydrate.

By definition, GL can be lowered by making low-GI food choices or by reducing the amount of carbohydrate. However, health organizations around the world, in-

cluding the Institute of Medicine, universally recommend that *at least* 45% of energy be from carbohydrate (<http://www.iom.edu/report.asp?id=4340>). Because low-carbohydrate diets are not recommended, lowering the GI, rather than the amount of carbohydrate, is consistent with current nutrition guidelines. A low-GI meal or diet has different qualities than a low-GL meal or diet. A low-GI diet can be high in grains and fruit, while a low-GL diet can't. Thus, two foods with the same GL can have widely different effects on risk factors such as low-density-lipoprotein (LDL) cholesterol (42). At the present time, there appear to be more consistent associations between disease risk and GI than between GL and such risks (3).

### GI and Weight Control

The application of the GI to weight control is perhaps the most controversial aspect at the present time. Higher carbohydrate intake, particularly of refined carbohydrates and those with high GI, has accompanied increases in obesity, type 2 diabetes, and the metabolic syndrome (25,27,30). While

**Table I. Findings of consumer research: Percentage of ~500 representative grocery shoppers surveyed on mainland Australia who answered in the affirmative to the questions addressed to them**

Question	2000 <sup>a</sup>	2003 <sup>b</sup>	2004 <sup>c</sup>	2005 <sup>d</sup>
Awareness of the GI	28	43	63	86
Awareness of the GI symbol	2	11	22	28
Likelihood of using the GI when choosing food	71	72	68	84
Very likely	47	42	39	43
Somewhat likely	24	30	28	41

<sup>a</sup> Baseline Omnibus Study conducted in January 2002 by Newspoll Market Research of main grocery buyers 18 years and over. There were 490 respondents in five mainland capital cities (Brisbane, Sydney, Melbourne, Adelaide and Perth).

<sup>b</sup> Follow-up survey with 477 respondents in January 2003 using the same three questions as in 2002 and same market researcher. Additional questions were asked to gauge understanding of the GI concept.

<sup>c</sup> Follow-up survey with 551 respondents in January 2004 using a different market research company.

<sup>d</sup> Follow-up survey with 498 respondents conducted on-line by A C Nielsen in five mainland capital cities. Additional questions were asked in 2005 to gauge understanding of the GI concept and the influence of the GI Symbol Program.

**Table II. Additional findings of consumer surveys: Percentage of grocery shoppers who agreed with the statement**

Question	2003 <sup>a</sup>	2004 <sup>b</sup>	2005 <sup>c</sup>
Perceived usefulness of low GI foods			
Only for people with diabetes	10	10	4
For everyone	81	85	86
Someone trying to lose weight	45	59	67
Someone concerned about heart disease	41	57	57
Sportspeople after heavy exercise	5	16	...

<sup>a</sup> Follow-up Omnibus survey with 477 respondents in January 2003 conducted by Newspoll Market Research of main grocery buyers 18 years and over in five mainland capital cities (Brisbane, Sydney, Melbourne, Adelaide and Perth).

<sup>b</sup> Follow-up survey using the same questions to 551 respondents in January 2004 using a different market research company. Main grocery buyers 18 years and over in five mainland capital cities (Brisbane, Sydney, Melbourne, Adelaide and Perth) were surveyed.

<sup>c</sup> Follow-up survey with 498 respondents conducted on-line by A C Nielsen in five mainland capital cities. Additional questions were asked in 2005 to gauge understanding of the GI concept and the influence of the GI Symbol Program.



**Fig. 1.** The GI logo is a registered trademark and trademark of the University of Sydney in Australia and other countries.

most health professionals still regard a low-fat diet as “best practice,” emerging evidence suggests higher-protein and low-GI diets provide benefits for weight loss as well as for cardiovascular disease (CVD) risk reduction. To date, eight clinical trials provide support for GI diets in the context of weight loss (1,4,11,18,31,37–39). In a comparison of four diets of varying GL, the low-GI, high-carbohydrate diet was more effective in reducing both body fat and LDL-cholesterol than were high-protein, lower-carbohydrate diets (31).

Low-GI diets might aid weight control by increasing food residence time in the gut lumen, thereby aiding satiety. Adults and children eating low-GI meals often report feeling “fuller” (26,41) and eat fewer kilojoules at a subsequent meal. The effect may be related to the presence of food in the lower small intestine (ileum) and stimulation of gut-brain satiety hormones such as cholecystokinin. Reducing wide fluctuations in blood glucose may independently reduce hunger. In animal and human studies, brief periods of hypoglycemia are associated with meal initiation (13) Alternate mechanisms may also operate. A low-GI diet has been linked to higher metabolic rate during energy restriction (35) and to higher rates of fat oxidation during exercise (40).

### Implementing a Low-GI Diet

Putting the GI into practice is the subject of many popular books (6). Advice is simpler than might be anticipated and takes the form of “eat healthy low-GI foods: low-GI breads, breakfast cereals, and rice, especially those that are also high in fiber; enjoy all types of fruit and vegetables, including beans and plenty of salads with vinaigrette dressings. Reduce the amount of potatoes.” In a prudent diet, it is as simple as swapping a high-GI source of carbohydrate for a low-GI one (“this for that”). Products that contribute the most carbohydrate are the ones that need to be targeted for exchange (not watermelon and other low-carbohydrate foods). Importantly, implementing a low-GI diet requires knowledge of the GI of local foods. It is not possible to guess which products are low or high GI, and there is no substitute for proper *in vivo* GI testing.

### GI Testing

The GI is defined by its *in vivo* methodology. It is not possible to generate a GI value from an *in vitro* method. For this reason, GI testing can be expensive, and, as a result, not all low-GI claims on food labels are valid. At present, there are at least 25 laboratories offering GI testing services

round the world, although not all of them use acceptable methodology. SUGiRS at the University of Sydney ([www.glycemicindex.com](http://www.glycemicindex.com)) and GI Labs in Toronto ([www.gilabs.com](http://www.gilabs.com)) were among the first to offer services to companies worldwide. Although less expensive *in vitro* methods may guide manufacturers in the formulation of low-GI foods, the results are not appropriate for food labeling. Indeed, marked discrepancies between observed and *in vitro* results have been reported (5). A draft standard for GI methodology and food classification is currently under consideration by the International Standards Organization (ISO).

### Implications for the Food Industry

It could be truthfully claimed that the GI of foods lies almost totally in the hands of the food industry. It is manufacturers who control how much a product changes in its journey from paddock to plate. With rising rates of type 2 diabetes, pre-diabetes, and childhood diabetes, it seems certain that major food manufacturers will be called upon to develop nutritious low-GI foods. While the Australian food industry has taken the lead, many other countries are quietly devoting resources to research and development. Ideally, these products will produce not just a lower glycemic response, but also significant slowing in the rate of digestion of carbohydrate and improved insulin sensitivity. It is a challenge to do this without altering palatability because high levels of starch gelatinization, palatability, convenience, and rapid digestion are inextricably linked. The use of viscous gums such as guar, psyllium,  $\beta$ -glucans, and oat gums is helpful. High-moisture doughs, high temperatures and pressures, extrusion cooking, puffing, and popping tend to increase the GI. The use of resistant starch or nondigestible and semidigestible sweeteners such as polydextrose and polyols lowers the glycemic response—but not the GI because the available carbohydrate remains unchanged. Similarly, food manufacturers can replace carbohydrate energy with energy from fats and proteins, but the physiological effects will differ from those that result from reducing the GI. We should be cautious of lowering GI and GL without considering the other components of the food or meal; saturated fat and fiber have separate independent effects on disease risk, perhaps of greater importance than the effects of GI and GL. Fructose has a lower GI than sucrose or high-fructose corn syrups, but many health professionals are concerned about its potential to increase cardiovascular risk.

### Conclusions

Conventional low-fat diets have not served us well in public health outcomes. With falling fat intake and rising carbohydrate, the prevalence of obesity and type 2 diabetes has increased (30). Low-GI diets offer a middle-of-the road compromise between low-carbohydrate diets on one hand, and low-fat eating plans on the other (29). Used correctly, low-GI diets are healthy, flexible, easy to follow, more satisfying, and less psychologically challenging. And because the GI is already popular in some countries, the concept appears to connect on an emotional level, not just in terms of rational argument, which is an important element of success. The challenge to the food industry is to produce a wider range of palatable, nutritious food choices that have a low GI.

### References

1. Agus, M., Swain, J., Larson, C., Eckert, E., and Ludwig, D. Dietary composition and physiologic adaptations to energy restriction. *Am. J. Clin. Nutr.* 71:901-907, 2000.
2. Augustin, L., Dal Maso, L., La Vecchia, C., Parpinel, M., Negri, E., Vaccarella, S., Kendall, C., Jenkins, D., and Franceschi, S. Dietary glycemic index and glycemic load in breast cancer risk: A case control study. *Ann. Oncol.* 12:1533-1538, 2001.
3. Barclay, A., Brand-Miller, J., and Wolever, T. M. S. Glycemic index, glycemic load, and glycemic response are not the same. *Diabetes Care* 28:1839, 2005.
4. Bouché, C., Rizkalla, S., Luo, J., Vidal, H., Veronese, A., Pacher, N., Fouquet, C., Lang, V., and Slama, G. Five-week, low-glycemic index diet decreases total fat mass and improves plasma lipid profile in moderately overweight nondiabetic men. *Diabetes Care* 2:822-828, 2003.
5. Brand-Miller, J., and Holt, S. Testing the glycaemic index of foods: In vivo not in vitro. *Eur. J. Clin. Nutr.* 58:700-701, 2004.
6. Brand-Miller, J., Foster-Powell, K., and Colagiuri, S. *The New Glucose Revolution*. Marlowe and Co., New York, 2003.
7. Brand-Miller, J., Hayne, S., Petocz, P., and Colagiuri, S. Low-glycemic index diets in the management of diabetes: A meta-analysis of randomised controlled trials. *Diabetes Care* 26:2261-2267, 2003.
8. Brand-Miller, J., Liu, V., and Baxter, R. The glycemic index of foods influences postprandial insulin-like growth factor-binding responses in lean young subjects. *Am. J. Clin. Nutr.* 82:350-354, 2005.
9. Brand-Miller, J., Thomas, M., Swan, V., Ahmad, Z., Petocz, P., and Colagiuri, S. Physiological validation of the concept of glycemic load in lean young adults. *J. Nutr.* 133:2728-2732, 2003.
10. Brouns, F., Bjorck, I., Frayn, K., Gibbs, A., Lang, V., Slama, G., and Wolever, T. M. S. Glycaemic index methodology. *Nutr. Rev.* 18:145-171, 2005.

11. Brynes, A., Edwards, M., Ghatei, M., Dornhorst, A., Morgan, L., Bloom, S., and Frost, G. A randomised four-intervention crossover study investigating the effect of carbohydrates on daytime profiles of insulin, glucose, non-esterified fatty acids and triacylglycerols in middle-aged men. *Br. J. Nutr.* 89:207-218, 2003.
12. Burke, L., Collier, G., and Hargreaves, M. Muscle glycogen storage after prolonged exercise: Effect of the glycemic index of carbohydrate feedings. *J Appl. Physiol.* 75:1019-1023, 1993.
13. Campfield, L., and Smith, F. Blood glucose dynamics and control of meal initiation: A pattern detection and recognition theory. *Physiol. Rev.* 83:25-58, 2003.
14. Canadian Diabetes Association. Guidelines for the nutritional management of diabetes mellitus in the new millennium. A position statement by the Canadian Diabetes Association. *Can. J. Diabetes Care* 23:56-69, 2000.
15. Ceriello, A., Bortolotti, N., Motz, E., Pileri, C., Marra, M., Tonutti, L., Lizzio, S., Feletto, F., Catone, B., and Taboga, C. Meal-induced oxidative stress and low-density lipoprotein oxidation in diabetes: The possible role of hyperglycemia. *Metabolism* 48:1503-1508, 1999.
16. DECODE group. European Diabetes Epidemiology Group. Glucose tolerance and mortality: comparison of WHO and American Diabetes Association diagnostic criteria. *Lancet* 354:617-621, 1999.
17. Diabetes Australia NSW. GI symbol program. Online: [http://www.diabetesnsw.com.au/living\\_well\\_with\\_diabetes\\_pages/gi\\_symbol\\_program.asp](http://www.diabetesnsw.com.au/living_well_with_diabetes_pages/gi_symbol_program.asp)
18. Ebbeling, C., Leidig, M., Sinclair, K., Hangen, J., and Ludwig, D. A reduced-glycemic load diet in the treatment of adolescent obesity. *Arch. Pediatr. Adolesc. Med.* 157:773-779, 2003.
19. FAO/WHO Joint Expert Consultation. *Carbohydrates in Human Nutrition*. FAO Food and Nutrition Paper 66. Food and Agriculture Organization, Food and Nutrition, Geneva, 1998.
20. Flint, A., Moller, B., Raben, A., Pedersen, D., Tetens, I., Holst, J., and Astrup, A. The use of glycaemic index tables to predict glycaemic index of composite breakfast cereals. *Br. J. Nutr.* 91:979-989, 2004.
21. Foster-Powell, K., Holt, S. H., and Brand-Miller, J. C. International table of glycemic index and glycemic load values: 2002. *Am. J. Clin. Nutr.* 76:5-56, 2002.
22. Franceschi, S. Intake of macronutrients and risk of breast cancer. *Lancet* 347:1351-1356, 1996.
23. Franceschi, S., Dal, M. L., Augustin, L., Negri, E., Parpinel, M., Boyle, P., Jenkins, D., and La, V. C. Dietary glycaemic load and colorectal cancer risk. *Ann. Oncol.* 12:173-178, 2001.
24. Franceschi, S., Favero, A., and La Vecchia, C. Food groups and risk of colorectal cancer. *Int. J. Cancer* 72:56-61, 1997.
25. Gross, L., Li, L., Ford, E., and Liu, S. Increased consumption of refined carbohydrates and the epidemic of type 2 diabetes in the United States: An ecologic assessment. *Am. J. Clin. Nutr.* 79:774-779, 2004.
26. Holt, S., Brand, J., Soveny, C., and Hansky, J. Relationship of satiety to postprandial glycaemic, insulin and cholecystokinin responses. *Appetite* 18:129-141, 1992.
27. Liu, S., Willett, W., Manson, J., Hu, F., Rosner, B., and Colditz, G. Relation between changes in intakes of dietary fiber and grain products and changes in weight and development of obesity among middle-aged women. *Am. J. Clin. Nutr.* 78:920-927, 2003.
28. Liu, S., Willett, W., Stampfer, M., Hu, F., Franz, M., Sampson, L., Hennekens, C., and Manson, J. A prospective study of dietary glycaemic load, carbohydrate intake, and risk of coronary heart disease in US women. *Am. J. Clin. Nutr.* 71:1455-1461, 2000.
29. Ludwig, D. Dietary glycaemic index and obesity. *J. Nutr.* 130:280S-283S, 2000.
30. McKeown, N., Meigs, J., Liu, S., Saltzman, E., Wilson, P., and Jacques, P. Carbohydrate nutrition, insulin resistance, and the prevalence of the metabolic syndrome in the Framingham offspring cohort. *Diabetes Care* 27:538-546, 2004.
31. McMillan-Price, J., Petocz, P., Atkinson, F., O'Neill, K., Samman, S., Steinbeck, K., Caterson, I., and Brand-Miller, J. Comparison of 4 diets of varying glycaemic load on weight loss and cardiovascular risk reduction in overweight and obese young adults: A randomised controlled trial. *Arch. Intern. Med.* 166:1466-1475, 2006.
32. Nutrition Subcommittee of the Diabetes Care Advisory Committee of Diabetes UK. The implementation of nutritional advice for people with diabetes. *Diabetes Med.* 20:786-807, 2003.
33. Opperman, A., Venter, C., Oosthuizen, W., Thompson, R., and Voster, H. Meta-analysis of the health effects of using the glycaemic index in meal-planning. *Br. J. Nutr.* 92:367-381, 2004.
34. Papanikolaou, Y., Palmer, H., Binns, M., Jenkins, D., and Greenwood, C. Better cognitive performance following a low-glycaemic-index compared with a high-glycaemic-index carbohydrate meal in adults with type 2 diabetes. *Diabetologia* 49:855-862, 2006.
35. Pereira, M. A., Swain, J., Goldfine, A. B., Rifai, N., and Ludwig, D. S. Effects of a low-glycaemic load diet on resting energy expenditure and heart disease risk factors during weight loss. *JAMA* 292:2482-2490, 2004.
36. Sheard, N., Clark, N., Brand-Miller, J., Franz, M., Pi-Sunyer, F. X., Mayer-Davis, E., Kulkarni, K., and Geil, P. Dietary carbohydrate (amount and type) in the prevention and management of diabetes. *Diabetes Care* 27:2266-2271, 2004.
37. Slabber, M., Barnard, H., Kuyil, J., Dannhauser, A., and Schall, R. Effects of a low-insulin-response, energy-restricted diet on weight loss and plasma insulin concentrations in hyperinsulinemic obese females. *Am. J. Clin. Nutr.* 60:48-53, 1994.
38. Sloth, B., Krog-Mikkelsen, I., Flint, A., Tetens, I., Bjorck, I., Vinoy, S., Elmstahl, H., Astrup, A., Lang, V., and Raben, A. No difference in body weight decrease between a low-glycaemic-index and a high-glycaemic-index diet but reduced LDL cholesterol after 10-wk ad libitum intake of the low-glycaemic-index diet. *Am. J. Clin. Nutr.* 80:337-347, 2004.
39. Spieth, L., Harnish, J., Lenders, C., Raezer, L., Pereira, M., Hangen, S., and Ludwig, D. A low-glycaemic index diet in the treatment of pediatric obesity. *Arch. Pediatr. Adolesc. Med.* 154:947-951, 2000.
40. Stevenson, E., Williams, C., and Nute, M. The influence of the glycaemic index of breakfast and lunch on substrate utilisation during the postprandial periods and subsequent exercise. *Br. J. Nutr.* 93:885-893, 2005.
41. Warren, J. M., Henry, J. K., and Simarite, V. Low glycaemic index breakfasts and reduced food intake in preadolescent children. *Pediatrics* 112:414-419, 2003.
42. Wolever, T., and Mehling, C. Long-term effect of varying the source or amount of dietary carbohydrate on postprandial plasma glucose, insulin, triacylglycerol, and free fatty acid concentrations in subjects with impaired glucose tolerance. *Am. J. Clin. Nutr.* 77:612-621, 2003.
43. Wolever, T., Yang, M., Zeng, X., Atkinson, F., and Brand-Miller, J. Food glycaemic index, as given in glycaemic index tables, is a significant determinant of glycaemic responses elicited by composite breakfast meals. *Am. J. Clin. Nutr.* 83:1306-1312, 2006.



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