

Glycemic Index Score of the USANA Nutrimeals

TIM WOOD, PHD* AND TONI MCKINNON, RN, CCRP*

* USANA Health Sciences, Inc. Salt Lake City, Utah, USA.

Glycemic index (GI) was developed to rank different foods according to the extent to which they increase blood glucose following ingestion.¹ Foods with high GI scores contain rapidly digested carbohydrates and produce large rises and falls in blood glucose. Foods with low GI scores contain slowly digested carbohydrates and produce gradual and relatively low rises in blood glucose.

GI scores are currently used in scientific research to examine the role of glycemic impact in defining risk of certain diseases. For example, a growing body of research has shown that long-term consumption of a high-glycemic-impact diet increases the risk of developing diabetes, heart disease, and colon cancer.^{2,3} GI scores are also useful in designing weight- and eating-management programs.^{2,4,5,6}

The objective of this study was to determine GI scores for three variations of USANA's Nutrimeal products, namely Dutch Choco-

late, French Vanilla, and Wild Strawberry (updated 2005 formulas).

Methods

This study was conducted using internationally recognized GI methodology.⁹

Ten healthy subjects were recruited, and each completed four test sessions: one involving the reference food (glucose solution), and three involving the test foods (USANA Dutch Chocolate, Wild Strawberry, and French Vanilla Nutrimeals). At each session, subjects reported to USANA's research center in the morning in a fasting state (10–12 hours overnight). Subjects completed a baseline fullness rating and their fasting blood glucose was measured via finger puncture. A *One Touch Ultra® Blood Glucose Meter* (Johnson and

Johnson) was used. Subjects then consumed a fixed amount of test or reference food. In each case, the test and reference foods each supplied 25 grams of available (digestible) carbohydrate (total carbohydrate varied by formula). Specific nutritional characteristics for the servings of reference and test foods are given in Table 1.

After consumption of the test or reference food, subjects were required to remain seated and refrain from additional eating and drinking for the next two hours.

Table 1

Characteristics of the Test Foods

	Energy (kJ)	Protein (g)	Fat (g)	Carb. (g)
Glucose Reference	400	0.0	0.0	25
Dutch Chocolate Nutrimeal	990	15.5	7.2	33
French Vanilla Nutrimeal	990	15.5	7.2	33
Wild Strawberry Nutrimeal	990	15.5	7.0	33

Additional blood samples were taken at 15, 30, 45, 60, 90, and 120 minutes after the initial meal. Additional fullness ratings were completed after each blood sample.

Results were used to plot two-hour blood glucose response curves, and the area under the curve (AUC) for each plot was calculated. (AUCs indicate the magnitude of total blood glucose response.) GI scores for the three test foods were calculated by dividing two-hour blood glucose AUC values by the subjects' average two-hour blood glucose AUC value for the reference food (glucose solution), then multiplying by 100 to obtain a percentage score.

Results

Figure 1 plots time course data for average two-hour blood glucose response curves following consumption of the reference and

test foods. The three USANA Nutrimeal formulas provide similar macronutrient contents (*i.e.* they contain very similar amounts of carbohydrate, protein, fat and fiber per serving). As such, they yielded very similar glucose response curves; these curves were markedly lower in amplitude than the glucose reference meal curve.

AUC analysis based on the above glucose response curves yielded Glycemic Index scores of 24 for Dutch Chocolate Nutrimeal, 19 for French Vanilla Nutrimeal, and 26 for Wild Strawberry Nutrimeal. Because the base formulas for the three products are virtually identical and because their individual GI scores are so similar (within the limits of precision of the test) we conclude that the most reasonable approach is to assign the average score of 23 to all three formulas.

Discussion

The Glycemic Index scale is continuous from 0–100%. In general, a food is considered high-glycemic if its GI score is greater than 70, moderately glycemic if its GI score is between 56 and 69, and low-glycemic if its GI score is less than 55.⁷ Results from this study show that USANA's Dutch Chocolate, French Vanilla, and Wild Strawberry Nutrimeals are low-glycemic foods.

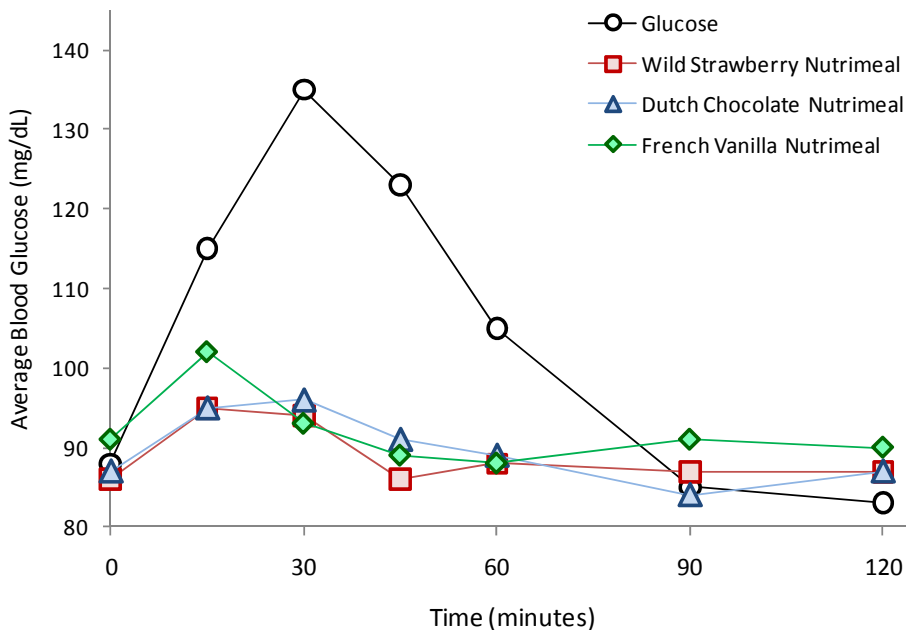
The low Glycemic Index scores for these three formulas are the result of several key formulation decisions. First, Nutrimeals are balanced macronutrient formulas (carbohydrates, protein, and fat). Protein and fat reduce the Glycemic Index of a food. Second, the major sources of digestible carbohydrate in the Nutrimeal formulas are low-glycemic. Third, the three Nutrimeals provide good amounts of dietary fiber (8 grams per serving), and fiber is known to lower the Glycemic Index of a food, likely by slowing the absorption of sugars in the gut. Given these characteristics, it is not surprising that all three USANA Nutrimeal products were found to be low-glycemic.

Regular use of USANA's Dutch Chocolate, French Vanilla, and Wild Strawberry Nutrimeals may help people improve the glycemic characteristics of their diets. Furthermore, regular use of these products as part of a healthy, well-balanced diet should help to reduce certain negative health consequences associated with high-GI diets.

Acknowledgments

This study was conducted at USANA Health Sciences, Inc. Participants were normally healthy

Figure 1
Two-hour blood glucose response curves for USANA's Fibergy Bar and a glucose reference meal. Values are averages for ten (10) subjects.



volunteers. All were employees of USANA.

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