Myo-inositol content of common foods: development of a high-*myo*-inositol diet[1, 2]

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ABSTRACT Since virtually no information is available concerning the *myo*-inositol content of dietary constituents, we have measured the amount of this material present in 487 foods by gas-liquid chromatography. We observed that the greatest amounts of *myo*-inositol were present in fruits, beans, grains, and nuts. Fresh vegetables and fruits were found to contain more *myo*-inositol than did frozen, canned, or salt-free products. The data provided in this report were used to develop diets that contained varying, but known amounts of *myo*-inositol. The *myo*-inositol intake that could be provided by such diets ranged from 225 to 1500 mg/day per 1800 kcal and within this range the agreement between the calculated and measured amounts of this material was excellent ($r = 0.98$). Since abnormalities in the metabolism of *myo*-inositol have been speculated to play a role in the pathogenesis of the polyneuropathies associated with diabetes mellitus and chronic renal failure, it is possible that the natural history of these neuropathies can be altered by modifying the amount of dietary *myo*-inositol that is ingested by patients with these diseases. *Am. J. Clin. Nutr.* 33: 1954–1967, 1980.

During the past several years, considerable evidence has accumulated suggesting an important role of *myo*-inositol and its phospholipid derivatives in the function of peripheral nerves (1). *Myo*-inositol is a 6-carbon, cyclic polyalcohol which is present in measurable concentrations in all living cells (2). The amount of *myo*-inositol present in the 2500 kcal American diet is approximately 900 mg, of which 56% is lipid-bound (3). Virtually all of the ingested *myo*-inositol (99.8%) is absorbed from the human gastrointestinal tract (3). The normal circulating fasting plasma *myo*-inositol concentration has been found to be approximately 0.03 mM and this material turns over with a half-life of 22 min (3).

In contrast with the low concentrations of *myo*-inositol in plasma, the concentration of this material within the normal mammalian peripheral nerve is extraordinarily high (approximately 3.0 mM in the rat) (4). Although the mechanism responsible for the maintenance of this gradient is not known, it is speculated to be related, in part, to the active intracellular transport of *myo*-inositol by the nerve. In acute experimental diabetes in the rat, concentrations of both *myo*-inositol and phosphatidylinositol are markedly decreased in the peripheral nerves (4, 5). Furthermore, the extent of the decrease in peripheral nerve *myo*-inositol content has been found to bear a statistically significant relationship to the impaired peripheral nerve function in this animal model of diabetes mellitus (4). When the nerve *myo*-inositol concentrations of the diabetic rats were normalized by the addition of 1% *myo*-inositol to the diet, the function of the peripheral nerves was found to return to normal despite the persistence of hyperglycemia (4).

The possibility that a similar abnormality in the metabolism of *myo*-inositol in the nerves of humans with diabetes mellitus could be related to the development of distal symmetrical diabetic polyneuropathy has led various investigators to study the effect of dietary *myo*-inositol supplementation upon the peripheral nerve function of human dia-

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betics. We have recently observed that, when the total mean daily dietary intake of *myo*-inositol was increased from 772 to 1648 mg/day, significant improvement in sensory nerve function was achieved in twenty patients with diabetic neuropathy (6, 7). Similarly, Salway et al. (8) have demonstrated that the administration of 1.0 g/day of *myo*-inositol in tablet form resulted in substantial increases in the amplitude of evoked nerve action potentials in diabetic patients. Although other workers have not confirmed these results (9, 10), these data raise the possibility that increased oral intake of *myo*-inositol may have therapeutic potential in the treatment of diabetic neuropathy. Furthermore, they suggest that increased *myo*-inositol intake might be of value in delaying the onset of this complication. If this is the case, we reasoned that the chronic intake of increased amounts of *myo*-inositol would be more readily achieved by dietary means (particularly in children) than by the administration of this material in tablet form. Since little information concerning the *myo*-inositol content of individual foodstuffs is available in the literature, we have determined the total content of this material in 487 individual foods. This information has been utilized to develop diets with high *myo*-inositol contents that could be prescribed for selected patients with diabetes mellitus who are engaged in research programs designed to further clarify the relationship between dietary *myo*-inositol intake and diabetic neuropathy.

Methods

Analysis of the total myo-inositol content of food samples

The foods analyzed for their total *myo*-inositol content were selected from the diabetic exchange lists of the American Diabetes Association (11). In addition, many commonly used varieties of foods were studied. All samples were prepared in duplicate, and if discrepancies were observed in the estimates of their *myo*-inositol content, additional samples were studied until a relatively constant value was obtained for each food. The data presented in Appendix **Table 1** represent the averages of such replicate determinations. The overall SD of the replicate determinations of the 487 foodstuffs analyzed was found to be ±21.4%. Furthermore, since the *myo*-inositol content of different commercially available brands of the same food was occasionally found to vary, in certain instances analyses were performed on samples of several brands and the results given in Appendix Table 1 are the averages values observed for the various brands. An example of the differences between various brands is the observation that the *myo*-inositol content of six different brands of frozen orange juice was found to range from 1.4 to 2.7 mg/g.

All foods were prepared for consumption according to the instructions of the supplier or to commonly accepted methods of preparation. Portions of each food (approximately 100 g) were weighed and homogenized in two volumes of distilled water for five min in a stainless steel Waring Blendor. Immediately after completion of homogenization, a 10-ml sample was removed from the center of the homogenate and frozen for subsequent analysis of its *myo*-inositol content. The samples were labeled with consecutive numbers, and their composition was not known by those persons who performed the analyses.

For analysis of total *myo*-inositol content, the samples were thawed, mixed, and a small portion (100 to 200 mg) removed with a broken-off Pasteur pipet. This portion was placed in a tared 15 × 150 mm Pyrex test tube which contained approximately 40,000 cpm of dry 2-^{3}H-*myo*-inositol (2.84 Ci/mmole, New England Nuclear, Boston, Mass.) After the addition of 6 N HCl (2 ml), the tubes were sealed with a torch and heated at 120 C for 40 hr. The resultant hydrolysate was filtered through Whatman no. 1 filter paper and lyophilized. The trimethylsilyl ether of *myo*-inositol was prepared as perviously described (13) and subjected to gas-liquid chromatography on a 180 cm column of 3% SE-30 on Supelcoport (80/100 mesh, Supelco, Bellefonte, Pa.) isothermally at 185 C. The peak areas were integrated by a Hewlett-Packard Model 3380A Integrator and quantified by comparison with a standard solution of hexa-*o*-trimethylsilyl-*myo*-inositol. Losses of *myo*-inositol during hydrolysis and gas-liquid chromatography were corrected for by the recovery of 2-^{3}H-*myo*-inositol in the final hexane solution. After correction for the dilution, the total *myo*-inositol content of the individual foodstuffs was expressed both on the basis of milligrams per gram of food as well as the basis of milligrams per a typical serving of that food (see Appendix Table 1).

Preparation of diets containing various contents of myo-inositol

To determine whether the data presented in Appendix Table 1 could be used to develop diets containing a known amount of *myo*-inositol, eight diets whose calculated *myo*-inositol content ranged from 225 to 1500 mg were prepared. Each diet was estimated to contain 1800 kcal and was planned according to the food exchange lists of the American Diabetes Association (11). An example of the method used in the estimation of the *myo*-inositol content of such diets is given in **Table 1**. The actual determination of the *myo*-inositol content of these diets was performed by gas-liquid chromatography as described earlier. Each food and beverage was prepared for consumption and 25% portions of each were combined and homogenized for 15 min in 100 ml of distilled water in a Waring Blendor. Four 10-ml aliquots were removed from each homogenate for analysis of *myo*-inositol content and the mean values for these quadruplicate samples are given in Figure 1. The mean variance of these replicate determinations was observed to be 27.7% while the overall standard deviation was ±

TABLE 1
Example of the calculation of the *myo*-inositol content of an 1800 kcal diet

Meal	American Dietetic Association exchange	Food item	Serving wt	*Myo*-inositol
			g	*mg/serving*
Breakfast	Fruit (1)	Grapefruit juice	120	468.8
	Milk (1)	Skim milk	240	10.1
	Starch (2½)	Bran flakes	30	82.2
		Whole wheat bread	25	8.5
	Meat (1)	Ham	30	4.3
	Fat (1)	Margarine	5	
	Beverage	Coffee	200	Trace
Lunch	Meat (2)	Roast beef	60	13.5
	Vegetable (2)	Brussel sprouts	200	80.4
	Starch (2)	Lima beans	100	44.2
		Whole wheat bread	25	8.5
	Fat (1)	Margarine	5	
	Fruit (2)	WP grapefruit sections[a]	200	234.4
	Beverage	Iced tea	200	Trace
PM snack	Meat (1) Fat (2)	Peanut butter	30	91.1
	Starch (1½)	Whole wheat bread	37.5	12.7
	Beverage	Diet drink	200	
Dinner	Meat (2)	Ham	60	8.6
	Starch (2)	Navy beans	100	65.2
		Whole wheat bread	25	8.5
	Vegetable (2)	Tomato, sliced	100	8.4
		Green beans	100	54.8
	Milk (1)	Skim milk	240	10.1
	Fruit (1)	WP fruit cocktail	100	43.2
	Fat (1)	Margarine	5	
	Beverage	Iced tea	200	Trace
HS snack	Meat (1)	Bologna	30	28.0
	Starch (1½)	Whole wheat bread	37.5	12.7
	Beverage	Diet 7-Up	200	
Total calculated *Myo*-inositol content				1290.2
Total measured *Myo*-inositol content				1186 ± 36.3

[a] Abbreviations: WP, water-packed; HS, bedtime.

8.0% (12). The correlation coefficient between the calculated and observed dietary *myo*-inositol content was determined by the method of least squares (12).

Results

The total *myo*-inositol contents of selected foods are given in Appendix Table 1 and are expressed on the basis of weight as well as on the basis of the amount present in a typical serving of the individual food. Within each exchange list, the foods are ranked in decreasing order of *myo*-inositol content per serving. As is evident, the *myo*-inositol content was found to vary considerably among the different exchange groups as well as within each exchange group.

The milk exchange was found to have a relatively low total *myo*-inositol content. Among the vegetables, the highest contents were observed in the beans and the lowest contents in the leafy vegetables. In general, fresh vegetables were found to have higher *myo*-inositol contents than frozen, canned, or salt-free products. Cantaloupe and the citrus fruits (with the exception of lemons) were found to have extraordinarily high contents of *myo*-inositol. As with the vegetables, the *myo*-inositol content of canned fruits was usu-

ally lower than that of the unprocessed fruit. Whole grain breads were found to contain more *myo*-inositol than refined breads, while among the cereals, oats and bran contained more of this material than did cereals derived from other grains. Considerable variation was observed in the *myo*-inositol content of the starchy vegetables. However, beans and peas tended to be high, whereas carrots and corn were low in their content of this material. Relatively little *myo*-inositol was found to be present in the constituents of the meat and fat exchanges (with the exception of nuts), in the commercially-prepared beverages, or in most of the miscellaneous foods. Thus, it appears that foods that consist of seeds (beans, grains, and nuts) provide the most concentrated sources of dietary *myo*-inositol, while most other foods contain rather modest amounts of this material.

When we attempted to design diets with known contents of *myo*-inositol, it was found that we were unable to construct a palatable diet that contained less than 200 mg of *myo*-inositol per 1800 kcal. When the data in Appendix Table 1 were used to prepare diets whose calculated *myo*-inositol content was between 225 and 1500 mg/1800 kcal, there was a remarkably good agreement between the calculated and the observed content of this material (**Fig. 1**). However, once the calculated dietary *myo*-inositol content exceeded 1500 mg, this relationship was no longer observed and the measured *myo*-inositol content was consistently lower than predicted.

Discussion

This report provides information concerning the *myo*-inositol content of many of the foods that are commonly used in the preparation of diets in the United States. In addition, it provides the basis for the calculation and prescription of diets with known contents of this material. Thus, as shown in Table 1 and Figure 1, it is possible to prepare diets in which the content of *myo*-inositol ranges from 35 to 230% of that normally consumed in this country. Our previous experience with such diets (6, 7) has indicated that the palatability of the diet increases with increasing *myo*-inositol content. Thus, despite the fact that most individuals have been willing to consume a low-*myo*-inositol diet for periods as long as

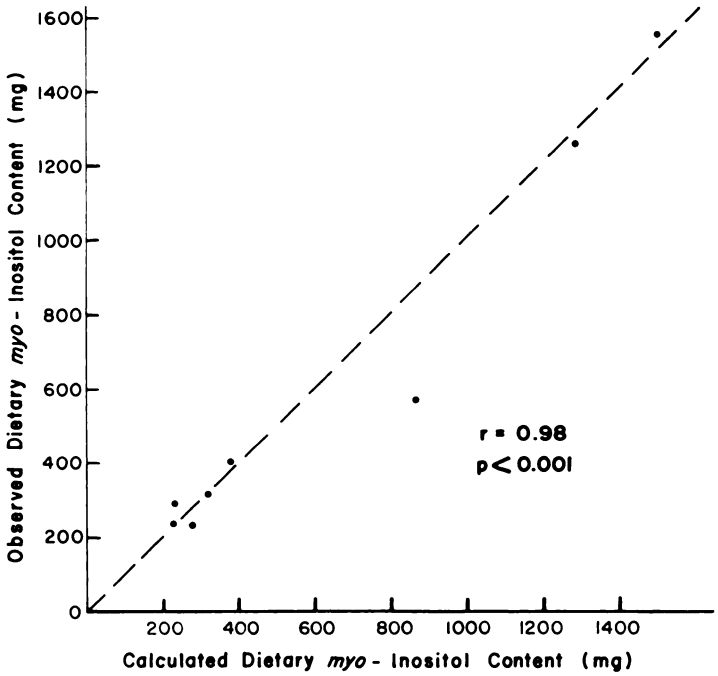

FIG. 1. Relationship between calculated (*horizontal axis*) and measured (*vertical axis*) dietary *myo*-inositol content.

16 weeks, they have found the diet to be somewhat unpleasant. In contrast, most persons found the high-*myo*-inositol diets to be highly palatable.

The range of *myo*-inositol intake that can be achieved by dietary manipulation is relatively small. Thus, we were only able to eliminate approximately two-thirds of the normal dietary *myo*-inositol intake when the diet containing the lowest possible *myo*-inositol content was designed. It is nonetheless possible that such low-*myo*-inositol diets might be effective in lowering the plasma *myo*-inositol concentrations of patients with chronic renal failure since these diets resulted in a lowering of the preprandial plasma *myo*-inositol concentration of six control subjects by 19% (from 50.0 ± 2.2 to 40.6 ± 3.2%, $P < 0.05$) (6). If low *myo*-inositol diets were found to lower the plasma *myo*-inositol concentrations of uremic patients, the use of such diets would not only have therapeutic potential, but might also provide evidence for a role of elevated plasma *myo*-inositol concentrations in the pathogenesis of peripheral nerve dysfunction in patients with chronic renal failure (14–17). As yet, these considerations have not been subjected to clinical trials.

The maximum intake of *myo*-inositol that we were able to achieve in the present study was 1500 mg/1800 kcal. We are unable to explain why the measured *myo*-inositol in diets calculated to contain larger amounts of this material was less than expected. It is possible that some of the discrepancy may been due to factors such as the ripeness of the foods used and the previously discussed variations in *myo*-inositol content among various brands of foods. Despite these limitations, we were nonetheless consistently able to develop diets that provided more than twice the normal dietary amount of this material and such diets have been found to raise the preprandial plasma *myo*-inositol concentrations of control subjects by 21% (6). The excess *myo*-inositol present in such diets is equivalent to the amount of this material that has been found to increase the amplitude of evoked peripheral nerve action potentials in patients with diabetes mellitus who had received *myo*-inositol supplements in the form of tablets (8).

It should be stressed that the hypothesis that abnormalities in the metabolism of *myo*-inositol are directly involved in the pathogenesis of peripheral nerve dysfunction in patients with diabetes mellitus or with chronic renal failure has not been proven. The data presented in the present report may make it possible for investigators to mount clinical trials that are designed to either prove or disprove this hypothesis.

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Appendix

TABLE 1
Total *myo*-inositol content of selected foods

Food	Serving		*Myo*-inositol content	
	Size	Weight		
		g	*mg/g*	*mg/serving*
Milk exchange				
Chocolate milk, low fat	1 C	240	0.19	45.6
Yogurt, strawberry	1 C	240	0.16	38.4
Yogurt, red raspberry	1 C	240	0.16	38.4
Yogurt, coffee	1 C	240	0.09	21.6
Yogurt, vanilla	1 C	240	0.09	21.6
Yogurt, boysenberry	1 C	240	0.07	16.8
Yogurt, plain	1 C	240	0.06	14.4
Skim milk	1 C	240	0.04	9.6
Whole milk, 4% butterfat	1 C	240	0.04	9.6
Sweetened condensed milk	1 T	20	0.26	5.2
Buttermilk, cultured	1 C	240	0.01	2.4
Vegetables				
Beans, green shelled, fresh	½ C	100	1.93	193.0
Beans, pole, frozen	½ C	100	1.75	175.0
Beans, wax, canned	½ C	100	1.44	144.0
Artichoke, fresh	1 Bud	200	0.60	120.0
Okra, canned	½ C	100	1.17	117.0
Artichoke heart, canned, SF[a]	½ C	100	1.16	116.0
Beans, green, fresh	½ C	100	1.05	105.0
Beans, green French style, canned	½ C	100	0.87	87.0
Eggplant, fresh	½ C	100	0.84	84.0
Eggplant, canned	½ C	100	0.84	84.0
Brussel sprouts, frozen	½ C	100	0.81	81.0
Artichoke, frozen	1 Bud	100	0.80	80.0
Cabbage, savory, fresh	½ C	100	0.70	70.0
Asparagus spears, SF, canned	½C	100	0.68	68.0
Pepper, banana, fresh	2 Pods	50	1.35	67.5
Squash, hubbard, fresh	½ C	100	0.66	66.0
Greens, collard, fresh	½ C	100	0.64	64.0
Tomato, juice, canned	½ C	120	0.48	57.6
Pepper, green bell, fresh	½ C	100	0.57	57.0
Beans, green French style, frozen	½ C	100	0.55	55.0
Beans, green, frozen	½ C	100	0.55	55.0
Tomato, fresh	½ C	100	0.54	54.0
Squash, zucchini, fresh	½ C	100	0.53	53.0
Beans, green, canned	½ C	100	0.51	51.0
Beans, snap, frozen	½ C	100	0.49	49.0
Tomato sauce	¼ C	60	0.81	48.6
Tomato puree	¼ C	60	0.77	46.2
Eggplant, frozen	½ C	100	0.44	44.0
Poke salad, fresh	½ C	100	0.43	43.0

TABLE 1 (continued)

Food	Serving		*Myo*-inositol content	
	Size	Weight		
Beans, with pork, canned	¼ C	50	0.86	43.0
Greens, turnip, fresh	½ C	100	0.43	43.0
Tomato, cherry, fresh	½ C	100	0.41	41.0
Tomato, California, canned	½ C	100	0.40	40.0
Tomato, whole, canned	½ C	100	0.38	38.0
Asparagus, white, canned	½ C	100	0.38	38.0
Okra, fried, SF	½ C	100	0.37	37.0
Beans, Italian, canned	½ C	100	0.35	35.0
V8 juice	½ C	120	0.29	34.8
Tomatoes, chopped, canned	½ C	100	0.34	34.0
Okra, fresh	½ C	100	0.33	33.0
Squash, yellow, fresh	½ C	100	0.32	32.0
Broccoli, fresh	½ C	100	0.30	30.0
Peppers, Jalapeno, canned	½ C	100	0.30	30.0
Greens, collard, canned	½ C	100	0.30	30.0
Mushrooms, sliced, canned	½ C	100	0.29	29.0
Asparagus, green, fresh	½ C	100	0.29	29.0
Pepper, green bell, frozen	½ C	100	0.29	29.0
Asparagus, green spears, canned	½ C	100	0.28	28.0
Okra, whole, frozen	½ C	100	0.28	28.0
Cabbage, Chinese, fresh	½ C	100	0.27	27.0
Tomato juice, canned, SF	½ C	120	0.22	26.4
Okra, cut, frozen	½ C	100	0.26	26.0
Spinach, canned	½ C	100	0.25	25.0
Squash, yellow, frozen	½ C	100	0.25	25.0
Mushrooms, stems and pieces, canned	½ C	100	0.24	24.0
Greens, mustard, fresh	½ C	100	0.23	23.0
Lettuce, red leaf	½ C	100	0.22	22.0
Cabbage, white, fresh	½ C	100	0.21	21.0
Lettuce salad, tossed	1 C	100	0.18	18.0
Cauliflower, fresh	½ C	100	0.18	18.0
Greens, mustard, frozen	½ C	100	0.17	17.0
Squash, green, fresh	½ C	100	0.17	17.0
Lettuce, Romaine	½ C	100	0.17	17.0
Greens, collard, frozen	½ C	100	0.16	16.0
Tomato paste	2 T	30	0.51	15.3
Cauliflower, frozen	½ C	100	0.15	15.0
Cucumber, fresh	½ C	100	0.15	15.0
Asparagus, green, frozen	½ C	100	0.15	15.0
Greens, turnip, canned	½ C	100	0.12	12.0
Broccoli, SF	½ C	100	0.12	12.0
Greens, collard, SF	½ C	100	0.12	12.0
Avocado	⅛	25	0.46	11.5
Lettuce, Endive	¼ Head	100	0.11	11.0
Sauerkraut, canned	½ C	100	0.11	11.0
Broccoli, frozen	½ C	100	0.11	11.0
Tomato aspic, SF	½ C	100	0.10	10.0
Radish, red, fresh	½ C	100	0.10	10.0
Greens, mustard, canned	½ C	100	0.09	9.0
Cabbage, purple, fresh	½ C	100	0.09	9.0
Mushrooms, fresh	½ C	100	0.09	9.0
Spinach, fresh	½ C	100	0.08	8.0
Greens, turnip, with turnips, canned	½ C	100	0.08	8.0
Greens, turnip, chopped, frozen	½ C	100	0.08	8.0
Squash, yellow, SF	½ C	100	0.07	7.0
Squash, yellow, canned	½ C	100	0.06	6.0
Spinach, frozen	½ C	100	0.06	6.0
Pepper, hot, fresh	4 Pods	10	0.59	5.9
Celery, fresh	½ C	100	0.05	5.0
Greens, turnip, frozen, SF	½ C	100	0.04	4.0
Parsley	1 T	10	0.22	2.2

TABLE 1 (continued)

Food	Serving		*Myo*-inositol content	
	Size	Weight		
Fruit exchange				
Cantaloupe, fresh	¼	100	3.55	355.0
Orange, fresh	1	100	3.07	307.0
Grapefruit, fresh	½	100	1.99	199.0
Lime, fresh	1	100	1.94	194.0
Blackberry, canned, WP	½	100	1.73	173.0
Mandarin orange, canned	½ C	100	1.49	149.0
Kiwi fruit, fresh	½ C	100	1.36	136.0
Nectarine, fresh	1	100	1.18	118.0
Grapefruit sections, canned	½ C	100	1.17	117.0
Mango, fresh	½	100	0.99	99.0
Prune, dried	2 Medium	20	4.70	94.0
Cherries, dark, canned, WP	10	65	1.27	82.6
Peach, dried	2 Medium	50	1.64	82.0
Pear, fresh	1	100	0.73	73.0
Watermelon, fresh	1 C	200	0.31	62.0
Cherries, black bing, canned, WP	10	100	0.59	59.0
Peach, freestone, fresh	1	100	0.58	58.0
Mixed fruit, canned	½ C	100	0.58	58.0
Apricot, canned, WP	4 Halves	100	0.52	52.0
Mixed fruits, canned, WP	½ C	100	0.49	49.0
Watermelon, midget, fresh	½ C	100	0.48	48.0
Melon, honeydew, fresh	⅛	100	0.46	46.0
Pear, bartlett, canned, WP	½ C	100	0.46	46.0
Fruit cocktail, canned, WP	½ C	100	0.43	43.0
Peach, cling, canned, WP	½ C	100	0.34	34.0
Pineapple, fresh	½ C	100	0.33	33.0
Figs, calmyina, dried	1 Small	35	0.91	31.9
Dates, dried	2	20	1.52	30.4
Plum, large red	2 Medium	100	0.30	30.0
Strawberries, fresh	¾ C	150	0.13	19.5
Apple, yellow delicious, fresh	1	80	0.24	19.2
Peach, cling, fresh	1	100	0.19	19.0
Fruit cocktail, canned	½ C	100	0.19	19.0
Applesauce, canned	½ C	100	0.18	18.0
Pineapple, canned, WP	½ C	100	0.16	16.0
Grapes, green, fresh	20	100	0.16	16.0
Cranberries, fresh	1 C	100	0.15	15.0
Applesauce, canned, WP	½ C	100	0.15	15.0
Apple, Rome, fresh	1 Medium	80	0.15	12.0
Plum, purple, fresh	2 Medium	100	0.11	11.0
Cherries, red, fresh	5 Medium	75	0.14	10.5
Apples, dried, cooked	½ C	100	0.09	8.6
Papaya, fresh	⅓	100	0.08	8.1
Apple, red delicious, fresh	1	80	0.10	7.7
Grapes, purple, fresh	12	50	0.15	7.6
Grapes, green, canned	20	100	0.07	7.0
Cherries, red, canned, WP	10	65	0.05	6.1
Lemon peel, fresh	1 T	14	0.33	4.6
Raisins, dried	2 T	20	0.20	4.0
Plum, red, fresh	8 Small	100	0.03	3.0
Cranberry sauce, SS	1 T	20	0.11	2.2
Cherries, Royal Ann	10	50	0.04	2.0
Cranberry sauce, regular	1 T	20	0.02	0.4
Plum, yellow, fresh	2 Medium	100	<0.01	0.3
Fruit juice				
Grapefruit, frozen, concentrate[b]	½ C	120	3.80	456.0
Orange, frozen, concentrate[b]	½ C	120	2.04	244.8
Orange, canned	½ C	120	2.00	240.0
Grapefruit, canned	½ C	120	0.41	49.2

TABLE 1 (continued)

Food	Serving		*Myo*-inositol content	
	Size	Weight		
Orange, freshly squeezed	½ C	120	0.35	42.0
Apple, frozen, concentrate[b]	⅓ C	90	0.33	29.7
Grape, frozen, concentrate[b]	¼ C	60	0.36	21.6
Apple, canned	⅓ C	90	0.21	18.9
Prune, canned	¼ C	60	0.26	15.6
Apricot nectar, canned	¼ C	60	0.26	15.6
Pineapple, canned	⅓ C	90	0.15	13.5
Prune, unsweetened, canned	¼ C	60	0.22	13.2
Lemon, canned	1 T	14	0.73	10.2
Cranberry cocktail, canned	¼ C	60	0.07	4.2
Lemon, fresh	1 T	14	0.30	4.2
Cranberry, canned	½ C	120	0.03	3.6
Peach nectar, canned	¼ C	60	0.01	0.6
Cranapple, canned	¼ C	60	0.01	0.6
Bread exchange				
Breads				
Wheat, stone ground	1 Slice	25	11.5	287.5
Bun, hamburger	½ Bun	20	4.78	95.6
Pumpernickel	1 Slice	25	1.60	40.0
Wheat, whole	1 Slice	25	1.42	35.5
Pancake, low sodium	1	40	0.67	26.8
Bun, hot dog	½ Bun	20	1.15	23.0
Bran, orowheat	1 Slice	25	0.81	20.3
Grain, mixed whole	1 Slice	25	0.47	11.8
Rye	1 Slice	25	0.47	11.8
Rye, cocktail	2 Slice	30	0.39	11.7
Biscuit	1	35	0.31	10.9
Pancake	1	45	0.23	10.4
Wheat, Roman meal	1 Slice	25	0.38	9.5
Cornbread, dressing, SF	½ C	100	0.08	8.0
French	1 Slice	20	0.34	6.8
Wheat, milled white	1 Slice	25	0.26	6.5
Wheat, milled white, SF	1 Slice	25	0.25	6.3
Biscuit, SF	1	35	0.17	6.0
Cornbread	1 Slice	35	0.14	4.9
Roll, dinner, SF	1	20	0.23	4.6
Waffle	1	20	0.22	4.4
Muffin	1	25	0.15	3.8
French toast (with whole egg)	1 Slice	30	0.08	2.4
Cornbread, SF	1 Slice	35	0.06	2.1
Wheat starch	1 Slice	20	0.01	0.2
Cereals				
Bran, 40% flakes, dry	½ C	20	2.74	54.8
Oatmeal, long cooking, cooked	½ C	100	0.42	42.0
Oatmeal, quick cooking, cooked	½ C	100	0.34	34.0
Bran, raisin	½ C	20	1.07	21.4
Flakes, "Team"	½ C	20	0.93	18.6
Bran, "Cracklin"	½ C	20	0.67	13.4
Grits, corn, cooked	½ C	100	0.10	10.0
Wheat, shredded	1 Biscuit	22	0.35	7.7
Wheat, cream, cooked	½ C	100	0.07	7.0
Wheat, shredded, SF	1 Biscuit	22	0.23	5.1
Corn, flakes	¾ C	20	0.06	1.2
Corn, flakes, SF	¾ C	20	0.06	1.2
Wheat, puffed, SF	¾ C	10	0.08	0.8
Rice, puffed, SF	¾ C	10	0.05	0.5
Barley, cooked	½ C	16	0.03	0.5

TABLE 1 (continued)

Food	Serving		*Myo*-inositol content	
	Size	Weight		
Crackers				
Potato chips	10	30	0.73	21.9
Potato chips, SF	10	20	1.05	21.0
Wheat thins	7	20	0.89	17.8
Potato chips, canned	15	30	0.58	17.4
Cheese nibs	20	7	2.46	17.2
Pop corn, popped	1 C	14	1.07	15.0
Crackers, saltine	5	20	0.47	9.4
Wafers, vanilla	6	20	0.23	4.6
Crackers, soda, SF	5	20	0.13	2.6
Melba toast	1	4	0.59	2.4
Crackers, graham	2	15	0.10	1.5
Crackers, "Escort" snack	6	20	0.05	1.0
Pasta products				
Spaghetti, cooked	½ C	100	0.31	31.0
Rice, brown, cooked	½ C	75	0.30	22.5
Rice, wild, cooked	½ C	75	0.27	20.3
Noodles, egg, cooked	½ C	100	0.18	18.0
Rice, white, SF, cooked	½ C	80	0.17	13.6
Rice, white, cooked	½ C	80	0.15	12.0
Macaroni, cooked	½ C	100	0.05	5.0
Rice, instant, cooked	½ C	75	0.02	1.5
Soups				
Green pea, split, SF	5 oz	150	0.17	25.5
Tomato, SF	7 oz	200	0.07	14.0
Vegetable, SF	7 oz	200	0.06	12.0
Vegetable, homemade, SF	7 oz	200	0.06	12.0
Starchy vegetables				
Beans, Great Northern, canned	½ C	100	4.40	440.0
Beans, Great Northern, dried	½ C	100	3.27	327.0
Beans, pea navy, dried	½ C	100	2.83	283.0
Rutabaga, canned	½ C	100	2.52	252.0
Beans, dark red kidney, canned	½ C	100	2.49	249.0
Peas, large English, canned	½ C	100	2.35	235.0
Peas, small English, canned	½ C	100	1.70	170.0
Beans, green lima, canned, SF	½ C	100	1.46	146.0
Peas, split green, dried	½ C	100	1.28	128.0
Beans, Great Northern, fresh	½ C	100	1.24	124.0
Peas, blackeyed, canned	½ C	100	1.17	117.0
Peas, blackeyed, fresh	½ C	100	1.16	116.0
Beans, small lima, canned	½ C	100	1.10	110.0
Peas and carrots, frozen	½ C	100	0.99	99.0
Peas, purple hull, canned	½ C	100	0.98	98.0
Potato, white, baked, fresh	1	100	0.97	97.0
Peas, large English, frozen	½ C	100	0.95	95.0
Pumpkin, canned	¾ C	150	0.62	93.0
Soybeans, dried	½ C	100	0.88	88.0
Peas, small green, frozen	½ C	100	0.85	85.0
Carrots, canned	1 C	150	0.52	78.0
Peas, small green, canned	½ C	100	0.76	76.0
Peas, crowder, frozen	½ C	100	0.70	70.0
Beans, speckled lima, dried	½ C	100	0.70	70.0
Beans, light kidney, canned	½ C	100	0.69	69.0
Peas, field, frozen	½ C	100	0.68	68.0
Squash, acorn, frozen	½ C	100	0.66	66.0

TABLE 1 (continued)

Food	Serving		*Myo*-inositol content	
	Size	Weight		
Beans, navy, canned	½ C	100	0.65	65.0
Beans, pinto, canned, SF	½ C	100	0.64	64.0
Beans, light kidney, dried	½ C	100	0.60	60.0
Potatoes, hash brown, SF	½ C	100	0.57	57.0
Beans, small lima, dried	½ C	100	0.56	56.0
Beans, speckled lima, frozen	½ C	100	0.55	55.0
Peas, field, canned	½ C	100	0.48	48.0
Beans, lima, frozen, SF	½ C	100	0.48	48.0
Beans, butter, canned	½ C	100	0.48	48.0
Potatoes, white, canned	½ C	100	0.47	47.0
Potato, sweet, baked	¼ C	50	0.92	46.0
Onions, yellow, raw	½ C	100	0.44	44.0
Beans, baby lima, frozen	½ C	100	0.42	42.0
Onions, purple, raw	½ C	100	0.41	41.0
Peas, green, fresh	½ C	100	0.40	40.0
Beets, orange, SF	1 C	200	0.20	40.0
Peas, blackeyed, dried	½ C	100	0.39	39.0
Peas, purple hull, fresh	½ C	100	0.38	38.0
Peas, green, fresh	½ C	100	0.36	36.0
Beans, large lima, canned	½ C	100	0.35	35.0
Beans, large lima, dried	½ C	100	0.33	33.0
Peas, green split, dried	¼ C	50	0.65	32.5
Potatoes, instant	½ C	100	0.30	30.0
Onions, green, fresh	5	100	0.27	27.0
Hominey, white, canned	⅓ C	60	0.43	25.8
Carrots, fresh	1 C	200	0.12	24.0
Beets, fresh	1 C	200	0.12	24.0
Rutabaga, fresh	½ C	100	0.24	24.0
Potatoes, au gratin, SF	½ C	100	0.24	24.0
Onions, white, fresh, cooked	½ C	100	0.24	24.0
Onions, white, fresh, raw	½ C	100	0.23	23.0
Beans, large lima, canned, SF	½ C	100	0.23	23.0
Beans, pinto, canned	½ C	100	0.23	23.0
Lentils, dried	¼ C	50	0.45	22.5
Squash, acorn, fresh	½ C	100	0.22	22.0
Potato, sweet, baked, fresh	¼ C	50	0.42	21.0
Potatoes, instant, SF	½ C	100	0.21	21.0
Carrots, SF	1 C	200	0.10	20.0
Carrots, frozen	1 C	200	0.10	20.0
Corn, yellow, whole kernel canned	⅓ C	80	0.24	19.2
Potatoes, mashed, fresh, SF	½ C	100	0.19	19.0
Beans, lima, frozen	½ C	100	0.17	17.0
Corn, cream style, canned	⅓ C	80	0.20	16.0
Beets, small whole, canned	1 C	200	0.08	16.0
Onion, yellow, cooked	1 Medium	100	0.16	16.0
Mixed vegetable, frozen, SF	½ C	100	0.13	13.0
Corn, yellow, canned, SF	⅓ C	60	0.21	12.6
Corn, yellow cream, frozen	⅓ C	80	0.13	10.4
Hominey, yellow, canned	⅓ C	60	0.17	10.2
Corn, yellow, whole kernel, frozen	⅓ C	80	0.11	8.8
Beets, fresh, SF	½ C	100	0.07	7.0
Corn, white cream, canned	⅓ C	80	0.07	5.6
Mixed vegetable, canned, SF	½ C	100	0.05	5.0
Beets, canned, SF	½ C	100	0.02	2.0
Carrot juice, SF	½ C	120	0.01	1.2
Meat exchange				
Beef				
Liver	1 oz	30	0.64	19.2
Corned beef	1 oz	30	0.39	11.7

TABLE 1 (continued)

Food	Serving		*Myo*-inositol content	
	Size	Weight		
Round, ground, broiled	1 oz	30	0.37	11.1
Meat loaf, SF	1 oz	30	0.30	9.0
Steak, sirloin, SF	1 oz	30	0.30	9.0
Steak, round	1 oz	30	0.15	4.5
Roast, choice	1 oz	30	0.15	4.5
Roast, SF	1 oz	30	0.09	2.7
Hamburger, broiled	1 oz	30	0.08	2.4
Tips, braised	1 oz	30	0.07	2.1
Steak, hamburger, SF	1 oz	30	0.05	1.5
Cheeses				
Cheddar	1 oz	30	0.09	2.7
American	1 oz	30	0.07	2.1
Cream	1 oz	30	0.07	2.1
Parmesan	1 oz	30	0.06	1.8
Swiss	1 oz	30	0.05	1.5
Mozzerella	1 oz	30	0.05	1.5
Cottage, creamed	¼ C	50	0.02	1.0
Muenster	1 oz	30	0.03	0.9
Low sodium	1 oz	30	0.02	0.6
Cottage, low fat	¼ C	50	0.01	0.5
Cold cuts				
Liver cheese	1 oz	30	3.46	103.8
Bologna	1 oz	30	0.94	28.2
Vienna sausage	1 oz	30	0.81	24.3
Souse	1 oz	30	0.54	16.2
Salami	1 oz	30	0.42	12.6
Luncheon loaf, spiced	1 oz	30	0.39	11.7
Luncheon meat, fresh	1 oz	30	0.33	9.9
Pastrami	1 oz	30	0.28	8.4
Liver loaf	1 oz	30	0.22	6.6
Corned beef, sliced	1 oz	30	0.19	5.7
Luncheon meat, canned	1 oz	30	0.18	5.4
Weiners	1 oz	30	0.16	4.8
Ham, spiced	1 oz	30	0.06	1.8
Ham, deviled, canned	1 oz	30	0.04	1.2
Eggs				
Yolk	1	20	0.34	6.8
Whole	1	50	0.09	4.5
Scrambled	1	50	0.08	4.0
White	1	30	0.05	1.5
Fish				
Oysters	4 Medium	45	0.25	11.3
Tuna, WP, SF	¼	60	0.15	9.0
Tuna salad, SF	¼	60	0.12	7.2
Tuna, high protein in oil	¼	60	0.11	6.6
Sardine, herring in oil	1 oz	30	0.20	6.0
Tuna, chunk light, WP	¼ C	60	0.09	5.4
Sardines	1 oz	30	0.12	3.6
Trout, broiled	1 oz	30	0.11	3.3
Shrimp, broiled	5 Small	45	0.07	3.2
Crab	¼ C	30	0.05	1.5
Clam	1 oz	30	0.03	0.9
White fish, broiled	1 oz	30	0.02	0.6
Lamb				
Chop	1 oz	30	0.37	11.1

TABLE 1 (continued)

Food	Serving		*Myo*-inositol content	
	Size	Weight		
Peanut butter				
Creamy	2 T	40	3.04	121.6
Chunky	2 T	40	1.28	51.2
Pork				
Chop, barbecue	1 oz	30	0.42	12.6
Roast	1 oz	30	0.30	9.0
Roast, SF	1 oz	30	0.19	5.7
Liver	1 oz	30	0.17	5.1
Chop, broiled	1 oz	30	0.14	4.2
Chop, baked, SF	1 oz	30	0.06	1.8
Poultry				
Liver, chicken	1 oz	30	1.31	39.3
Chicken leg, baked, SF	1 oz	30	0.39	11.7
Chicken breast, SF	1 oz	30	0.30	9.0
Turkey, baked	1 oz	30	0.23	6.9
Chicken, baked	1 oz	30	0.08	2.4
Turkey breast, SF	1 oz	30	0.08	2.4
Fat exchange				
Nuts				
Almonds	8	15	2.78	41.7
Peanuts, cooked	12	15	1.34	20.1
Peanuts, raw	12	15	1.33	20.0
Walnuts	5	10	1.98	19.8
Cashews	5	15	0.81	12.2
Coconut, grated	1 T	14	0.33	4.6
Sunflower seeds	1½ T	20	0.12	2.4
Other				
Sour cream	2 T	28	0.76	21.3
Salad dressing, Thousand Island	1 T	14	0.50	7.0
Salad dressing, blue cheese, low calorie	1 T	14	0.40	5.6
Bacon	1 Slice	10	0.23	2.3
Salad dressing, French, low calorie	1 T	14	0.08	1.1
Salad dressing, Thousand Island, low calorie	1 T	14	0.08	1.1
Salad dressing, blue cheese	1 T	14	0.08	1.1
Salad dressing, French, SF	1 T	14	0.07	1.0
Salad dressing, zero, low calorie	1 T	14	0.05	0.7
Salad dressing, blue cheese, low calorie	1 T	14	0.04	0.6
Salad dressing, oil and vinegar	1 T	14	0.04	0.6
Mayonnaise, low calorie	1 T	14	0.05	0.6
Mayonnaise	1 t	5	0.04	0.2
Mayonnaise, SS, SF	1 T	14	0.01	0.1
Beverages				
Fruit punch, canned	½ C	120	0.17	20.4
Coffee, instant powder	1 g	1	6.46	6.5
Cocoa mix, instant	1 T	15	0.31	4.7
Fruit punch, SF	½ C	120	0.03	3.6
Lemonade	½ C	120	0.02	2.4
Orange soda, Shasta, SS	1	200	0.01	2.0
Pepsi, diet	1	200	0.01	2.0
Grapefruit soda, SS	1	200	0.01	2.0
Coffee, regular grind	1 t	5	0.05	0.3

TABLE 1 (continued)

Food	Serving		*Myo*-inositol content	
	Size	Weight		
Ginger ale, SS	1	200	<0.01	0.2
Canada Dry soda	1	300	<0.01	0.2
Tea, regular leaves	1 t	5	0.03	0.2
Kool-aid, powder	1 t	5	<0.01	Trace
Ginger ale, SS	1	200	Trace	Trace
Seven-Up	1	200	0	0
Cola drinks	1	200	0	0
Seven-Up, SS	1	200	0	0
Wild raspberry soda, SS	1	200	0	0
Orange soda, Weight Watchers, SS	1	200	0	0
Miscellaneous				
Cakes				
Strawberry shortcake, SF	1 Slice	45	0.69	31.1
Lemon, SF	1 Slice	45	0.19	8.6
Chocolate, SF	1 Slice	45	0.18	8.1
Sugar cookies, SF	1	20	0.34	6.8
Yellow cake, regular with sugar icing	1 Slice	45	0.05	2.3
Angel food	1 Slice	50	0.02	1.0
Dairy products				
Vanilla ice cream	½ C	120	0.09	10.8
Sherbet	¼ C	60	0.07	4.2
Gelatin				
Cubes, SF	½ C	100	0.07	7.0
Cubes, regular	½ C	100	0.07	7.0
Pies				
Pecan, SF	1 Slice	160	0.64	102.4
Lemon ice box, SF	1 Slice	160	0.63	100.8
Chocolate cream, SF	1 Slice	165	0.52	85.8
Cherry cobbler, SF	1 Slice	160	0.30	48.0
Apple, SF	1 Slice	160	0.22	35.2
Sweet potato, SF	1 Slice	160	0.20	32.0
Puddings				
Cranberry, low sodium	½ C	120	0.01	1.2
Lemon, low sodium	½ C	120	<0.01	0.2
Syrups				
Honey	1 T	14	0.33	4.6
Pancake, SS	1 T	14	0.14	2.0
Table, SS	1 T	14	0.09	1.3
Pancake, regular	1 T	14	0.01	0.1
Table, regular	1 T	14	<0.01	0.1
Others				
"Figurines" diet bar	1	20	2.12	42.4
Carob bar	1 oz	30	1.41	42.3
Cucumber pickles, SF	1 Slice	30	0.30	9.0
Catsup	1 T	14	0.38	5.3
Boullion cube, SF	1	5	0.41	2.1
Olives, ripe	2 Large	20	0.10	2.0
Olives, Spanish manzanilla	5 Small	30	0.06	1.8
Hot sauce	1 t	5	0.25	1.3
Olives, Spanish	5 Small	25	0.02	0.5
Coffee Rich creamer	1 T	14	0.01	0.1

[a] Abbreviations: SF, salt free; C, cup (240 ml); T, tablespoon (15 ml); WP, water-packed; SS, sugar substitute; t, teaspoon (5 ml); and oz, ounce (30 ml). [b] Reconstituted 3 parts water with 1 part concentrate.