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The Food Supply and Dietary Fiber: Its Availability and Effect on Health

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Effect of Dietary Fiber on the Health of Americans

Nutrition and health experts agree that dietary fiber is important to the maintenance of health and that consumption of dietary and certain functional fibers improves fecal bulk and laxation. In addition, fiber is reported in the scientific literature to provide many other health benefits, including decreased risk of some types of cancer, obesity, cardiovascular disease, and diabetes. According to the Institute of Medicine (IOM) (2002), dietary reference intake (DRI), an adequate intake for total fiber, is set at 38 and 25 gram (g) per day for young men (age 14-50 years) and women (age 19-50 years), respectively.

Dietary fiber is one of the many nutrients estimated in the *Nutrient Content of the U.S. Food Supply* series by the USDA Center for Nutrition Policy and Promotion (CNPP). Per capita nutrient estimates of the food supply play a key role in nutrient monitoring to evaluate changes in the American diet and assessing nutritional needs. The IOM defines *fiber* (commonly called bulk or roughage) as nondigestible food plant carbohydrate and lignin that is not digested or absorbed in the human small intestine. Functional and certain *added fibers* consist of isolated, nondigestible carbohydrate that is added to processed foods for their beneficial effects. Together, both dietary fiber and added fiber constitute *total fiber*.

Sources of Dietary Fiber

In general, dietary fiber is consumed as a component of processed, whole, or fortified foods. Table 1 summarizes the major food sources contributing dietary fiber in the U.S. food supply. These include grain products; vegetables; legumes, nuts, and soy; and fruits. As indicated, white flour, white potatoes, and legumes are the major contributors to dietary fiber in the food supply. Since 1995, the availability of dietary fiber from grain products and fruit has remained steady, while fiber availability from vegetables, legumes, nuts, and soy declined in 2005. Although white flour has only about 40 percent of its original fiber content, it remains a major contributor of dietary fiber in the food supply.

Table 1: Major sources¹ of dietary fiber in the U.S. food supply (>1% of total)

Fiber sources and selected specific foods within group	Percent in food supply, 5-year intervals		
	1995	2000	2005
Grain products	36.00	36.30	35.50
White flour	16.91	17.14	15.55
Ready-to-eat cereals	4.11	3.62	3.60
Whole wheat flours	1.42	1.26	1.20
Rice	1.20	1.25	1.36
Vegetables	27.50	25.90	24.70
White potatoes	8.57	8.57	8.57
Tomatoes	3.90	3.90	3.90
Deep-yellow vegetables	2.69	2.42	2.03
Dark-green vegetables	1.46	1.80	1.67
Legumes, nuts, and soy	14.10	14.00	12.90
Legumes	7.14	6.82	5.54
Nuts	3.69	4.03	4.22
Soy products	3.24	3.11	3.10
Fruits	11.10	11.20	10.00
Bananas, fresh	2.20	2.22	1.95
Citrus fruit	2.21	2.23	2.15
Apples, fresh	2.09	1.87	1.99
Miscellaneous foods²	11.30	13.60	16.70

¹The order in which fiber food sources are listed is based on how much fiber is provided in the U.S. food supply and not as they are consumed.

²Spices, cocoa, tea, and coffee.

Source: *Nutrient Content of the U.S. Food Supply, 2005 and Interactive Food Supply*. USDA Center for Nutrition Policy and Promotion.

Using the nutrient-density approach (fiber expressed as a percentage of calories or per 1,000 kilocalories [kcal]), IOM in 2002 recommended that Americans of all ages consume 14 g of total fiber for each 1,000 kcal. For the purpose of this analysis and to understand whether the amount of fiber available in the food supply could match this dietary recommendation, CNPP used the nutrient-density approach to convert per capita fiber in the food supply into the Estimated Average Requirement (EAR). The EAR is the amount of a nutrient that is sufficient to meet the requirements of healthy individuals within a group. The data were weighted. The EARs (table 2) were then expressed as percent of kcal, compared with DRIs (fig. 1). As shown in table 2, the weighted EAR ranged from 28 to 30 g, while available fiber in the food

Table 2. Comparison of weighted¹ availability versus per capita availability of dietary fiber in the U.S. food supply

Year	EAR (g)	Food Supply (g)	Difference (%)
1995	28	24	14
1996	30	25	17
1997	28	24	11
1998	28	25	11
1999	30	25	17
2000	28	25	11
2001	28	25	11
2002	28	24	14
2003	28	25	11
2004	28	25	11
2005	28	25	11

¹ EAR age/gender-based weights.

Source: *Nutrient Content of the U.S. Food Supply, 2007, and Interactive Food Supply*. USDA Center for Nutrition Policy and Promotion.

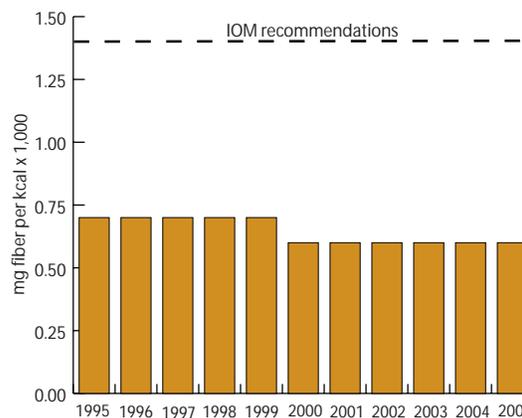
supply was 24 to 25 g per capita. On average, the difference between per capita fiber in the food supply and that required to meet the EAR was 12.6 percent over the last 10 years. Scientific reports (Alaimo et al., 1994) suggest that the median fiber intake for Americans (16.5 to 17.9 g per day for men and 12.1 to 13.8 g per day for women), on average, is less than 50 percent of dietary recommendations.

Why is this so, when the age/gender EAR for fiber of 28 to 30 g per capita would appear to meet fiber needs? It is important to understand that although the fiber available for consumption in the food supply meets recommended intake levels for most age/gender groups, available kcal far exceed intake recommendations. Thus, the nutrient-density approach (fig. 1) shows that the percentage of fiber to kcal is only half of the IOM recommendation. Therefore, with an EAR of 28 to 30 g of fiber and 3,600 to 4,000 kcal per capita available, the food supply data reflect what Americans consume—less fiber-rich and more caloric-rich foods.

Is There Enough Fiber To Meet Demand?

Based on the calculated EAR mentioned above, if Americans made healthful choices and doubled their consumption of fiber-rich foods, there will be enough fiber in the food supply to meet demand. Fiber lost during the processing of fruits and vegetables is accounted for in the data used by CNPP; however, this is not the case for convenience foods, such as whole wheat flour, and hot and cold breakfast cereals. For convenience foods, such as these, the fiber content may be

Figure 1. Available fiber as a percentage of kilocalories in the U.S. food supply, compared with the IOM recommendation



Note: The IOM recommends 28 g per 2,000 kcal for fiber. The U.S. food supply reported available fiber per total kcal per capita from 1995 to 2005 was 24-25 g per 3,600-4,000 kcal.

underestimated—something that could affect the availability of fiber as a whole and per capita fiber estimates in particular. Data on fiber enrichment and related commodities would improve these estimates.

Summary and Conclusions

Dietary fiber is an essential component of a healthful diet. It is consumed by Americans in processed, whole, and fiber-enriched foods, such as grain products; fruits; vegetables; and legumes, nuts, and soy products. Although per capita fiber in the food supply data show that available fiber may not meet the DRIs for Americans, when expressed as EAR, the data suggest that the nutrient content of the U.S. food supply contains enough fiber to meet demand.

References

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