



Nutrition for Family Living

Susan Nitzke, Nutrition Specialist; susan.nitzke@ces.uwex.edu
Sherry Tanumihardjo, Nutrition Specialist; sherry.tan@ces.uwex.edu
Amy Rettammel, Outreach Specialist; arettamm@facstaff.wisc.edu

October, 2004 Topics

What salad dressing do I choose?
Where's the Fiber?

What salad dressing do I choose?

A research summary by Zhifang Yang and Sherry Tanumihardjo

The situation: You are closely watching your weight, or striving to lower your blood cholesterol or simply want to eat healthier. Concerned about the risk of developing diseases such as cardiovascular disease or type 2 diabetes, you decide to eat a diet lower in fat and calories. While dining at a restaurant, you order a big salad with greens, carrots and tomatoes and with fat-free ranch salad dressing. You ask the waiter not to put the cheese on it because you know that also contains fat. You are eating a healthy meal, with plenty of vegetables and little or no fat. But what is missing in this picture?



Fat-free salad dressing: Vegetables and fruits are good sources of carotenoids, which are phytochemicals (derived from plants) associated with a decreased risk of coronary heart disease, certain types of cancers, and certain eye diseases such as age-related macular degeneration, and cataract. The five most abundant carotenoids found circulating in the human body are lutein, beta-cryptoxanthin, lycopene, alpha-carotene and beta-carotene. As carotenoids are fat-soluble, in order to be absorbed, you need to have a small amount of fat in your digestive system at the same time as the vegetables. Because there is practically no fat in this meal example (salad with non-fat dressing), fat-free salad dressing may not be the best choice.

A teaspoon of fat promotes carotenoid absorption, but just how much fat you need to optimally absorb the carotenoids from your vegetables is still an area of active research. A recent study compared carotenoid absorption after eating salads with dressings containing varied levels of fat. In this study, seven healthy men and women ate salad mixes of spinach, romaine lettuce, cherry tomatoes, and carrots topped with Italian dressing containing 0, 6, or 28 grams of canola oil on different occasions during a 12-week period. The researchers found that the salad carotenoids appearing in the blood increased proportionally to the amount of fat in the salad dressing.

Lutein from food versus supplements: Another study found that blood lutein concentration was significantly higher after consuming lutein-enriched eggs than after lutein from supplements or cooked spinach. Several epidemiological studies have linked lutein blood concentrations with a decreased risk of age-related macular degeneration. The cholesterol and fats in egg yolks appear to enhance lutein absorption. In addition, the composition of the fat in egg yolks which are low in polyunsaturated fatty acids may also contribute to a higher lutein response in the blood. Lutein bioavailability from vegetables is expected to be lower than from supplements because it is "trapped" inside the structure of the plant. However, in this study, spinach was cooked and therefore it is not surprising that lutein absorption from the spinach was equivalent to a supplement. This is very encouraging evidence that lutein from foods that we eat, i.e., eggs and cooked spinach, is absorbed better than or just as well as lutein from a supplement.



Nutrition for Family Living October, 2004

Carotenoids as nutrients: To date, no specific carotenoid has been classified as an essential nutrient. Essential nutrients are defined as substances that must be obtained from the diet because the body cannot make the active form. Essential nutrients are necessary in order for the body to grow, maintain health, and repair tissue. In addition, to be classified as a nutrient, studies must be done to determine the essentiality of the substance and its specific function in the body. A variety of phytochemicals contained in fruits and vegetables, including carotenoids, are beneficial in a healthy diet, even though the technical information is not sufficient to officially classify carotenoids as essential nutrients.

Implications for educators: As advised by the 2005 *Dietary Guidelines for Americans* advisory committee meeting report (to be released in final form next year), "To meet nutrient adequacy recommendation, a range of 5-13 servings of fruits and vegetables each day is recommended for daily energy intakes of 1200-3200 calories. For a 2000 calorie daily energy intake, 9 servings (4 ½ cups) are recommended." Encouraging consumers to eat lots of fruits and vegetables daily as part of a balanced diet is therefore extremely important. Selecting a wide variety of fruits and vegetables will ensure that different important nutrients and phytochemicals are consumed. Considering that salads are often consumed with other foods containing fat, reduced-fat dressing is usually a sound option. In our example, adding 5 grams of fat (one teaspoon) to the salad could be achieved by having 2 tablespoons of shredded cheese or a hard-boiled egg, adding about 75 calories, or replacing the fat-free with reduced-fat ranch dressing, adding only 30 more calories. Each of these choices would improve the absorption of carotenoids from the salad vegetables.

References:

Brown, M.J., Ferruzzi, M.G., Nguyen, M.L., Cooper, D.A., Eldridge, A.L., Schwartz, S.J. and White, W.S. (2004) Carotenoid bioavailability is higher from salads ingested with full-fat than with fat-reduced salad dressings as measured with electrochemical detection. *Am. J. Clin. Nutr.* 80: 396-403.

Chung, H-Y., Rasmussen, H.M. and Johnson, E.J. (2004) Lutein bioavailability is higher from lutein-enriched eggs than from supplements and spinach in men. *J. Nutr.* 134: 1887-1893.

Related articles in Nutrition for Family Living:

February 2004: Straight from the Tanumihardjo Laboratory: What about commercial lutein supplements?

August 2003: Bioavailability of lutein from yellow carrots

April 2002: Sherry's Holiday Functional Food: Eggs



Where's the Fiber?

The 2005 edition of the *Dietary Guidelines for Americans* will give more attention to the importance of consuming foods that are good sources of fiber than previous versions of the Guidelines. However, following advice to improve your diet by eating more fiber can be confusing because there is so much variation among foods, even within the same food group. A recent study can help reduce some of this confusion. The U.S. Department of Agriculture purchased and prepared 70 commonly-consumed foods that provide fiber in the American diet and analyzed them for fiber and other forms of carbohydrate. Following is an abbreviated list, rearranged in order from high to low, based on the percentage of total dietary fiber. (Note that these are shown as % fiber, not grams per serving).

Grain foods

Bread, whole wheat, firm	6.71 % (g fiber/100 grams of food, as eaten)
Tortilla, corn	5.50
Bread, seedless rye	4.46
Brown rice, cooked	3.33
Bagel, plain	2.46
Tortilla, flour	2.37
Spaghetti, cooked	2.06
Oatmeal, regular, cooked	1.65
Bread, white, soft	1.54
White rice, cooked	0.34

Fruits

Peach, with skin	2.85
Orange	2.35
Apple, raw with skin	2.21
Banana, raw	1.79
Grapefruit, raw	0.89
Grapes	0.60
Orange juice	0.31

Vegetables and legumes

Beans, canned (pork and beans)	5.40
Broccoli, fresh, cooked	4.66
Beans, fresh green, cooked	4.31
Potatoes, French fried*	4.11
Carrots, fresh, cooked	3.87
Peas, cooked from frozen	3.54
Spinach, raw	3.20
Potato, boiled without skin*	2.05
Pepper, green, raw	1.52
Tomatoes, raw	1.34
Lettuce, raw iceberg	0.98

*Note that French fries contain about half as much moisture as boiled potatoes, so direct percentage comparisons can be misleading.



Nutrition for Family Living October, 2004

Implications for Extension educators: The Dietary Guidelines Advisory Committee's report states that "Most Americans of all ages need to increase their fiber intake. The recommended intake of dietary fiber is 14 grams per 1000 calories." This is more than double the amount that many Americans are now eating. The Dietary Guidelines Advisory Committee also states, "The goal for whole grain intake is at least three servings (3 ounces) per day, preferably by eating whole grain in place of refined grains." Helping learners increase their intakes of whole grains, vegetables (especially legumes like cooked dried beans and lentils that currently provide 9% of the total fiber in the overall US diet) and fruits while respecting budget limitations, taste preferences, availability and convenience will remain an important challenge for our nutrition education programs.

Sources: Li, B.W., Andrews, K.W., and Pehrsson, P.R. 2002. Individual Sugars, Soluble, and Insoluble Dietary Fiber Contents of 70 High Consumption Foods. *J Food Comp Anal*, 15(6):715-723. Available online at http://www.nal.usda.gov/fnic/foodcomp/Data/Other/jfca15_715-723.pdf

and

Cotton, P.A., Subar, A.F., Friday, J.E., and Cook A. 2004. Dietary sources of nutrients among US adults, 1994 to 1996. *J Am Diet Assoc*. 104:921-930 (food sources of fiber, table 9, only available online).

Related article in *Nutrition for Family Living*: April 2004: "Whole Grain: What's That?"