

Second International Nuts and Health Symposium, 2007: Introduction^{1,2}

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The first international nuts and health symposium was held in 1995 at the USDA, ARS Western Human Nutrition Research Center in San Francisco. Fifty scientists and nut industry representatives attended the 1.5-d meeting. As a result of the expansion in research of nuts and health, the second symposium, held in 2007 at the Western Human Nutrition Research Center at Davis, lasted 2.5 d. The objectives of the symposium were to 1) review current patterns of nut consumption and how to incorporate nuts into a healthy diet, 2) review new findings on nuts and health, 3) describe potential mechanisms for the role of nuts in reducing chronic disease, and 4) identify new emerging areas of research on nuts. Current health claims for nuts and the potential for modifying the claims were also discussed. Research findings on all varieties of tree nuts and peanuts were included in the symposium. Hereafter, the term "nut" is used to refer to both tree nuts and peanuts.

In the first session (1), patterns of nut consumption, the position of nuts in the diet, and nut nutrient and phytonutrient composition were discussed. On any 1 d, about one-third of Americans report eating nuts. Most of the nuts were consumed as snacks (60%), and peanuts were eaten more frequently than any other nut. In Europe, the number of individuals reporting nuts in their diet was lower than that in the United States, ~7%, but the amount of nuts consumed at any 1 time was larger, 31 g vs. 21 g. The density of several nutrients per 1000 kcal (4184 kJ) is higher in the diets of consumers than in those of noncon-

sumers. The phytonutrients in nuts also increase dietary antioxidant levels.

Session 2 of the meeting focused on the impact of nuts on satiety and body weight (2). Although nut consumers tend to have higher energy intakes, epidemiological and clinical studies show that the body weight of consumers is not higher than that of nonconsumers. Potential mechanisms accounting for the dissipation of nut energy include 1) the satiety value of nuts and the spontaneous reduction in food intake, 2) loss of nut energy in the feces, and 3) an increase in resting energy expenditure with chronic nut consumption. Further studies are needed to determine how nut energy is dissipated in nut consumers.

The role of nuts in reducing the risk of cardiovascular disease was first reported in 1992 (3). Since then, that finding has been verified by a number of studies (4). Including nuts in a heart-healthy diet enhances the cardioprotective effects beyond merely lowering cholesterol levels. Potential mechanisms for the profound effect of nuts on cardiovascular disease risk were explored in session 3. The unique fat and nonfat composition (i.e., tocopherols and phenolic antioxidants) of nuts likely affects oxidative stress, inflammation, and vascular reactivity and thereby reduces cardiovascular disease.

Although the U.S. health claim for nuts emphasizes their role in reducing the risk of cardiovascular disease, the role of nuts in reducing the risk of diabetes and cancer has recently been identified. In session 4 of the meeting, epidemiological studies were reviewed, showing that frequent nut consumption (5 or more times/wk) was associated with reduced risk of developing diabetes as well as cardiovascular disease (5). Clinical trials substantiating this finding are not yet available. However, the role of nuts in reducing oxidative stress and inflammation may contribute to their impact on diabetes incidence as well as heart disease. Furthermore, preliminary studies suggest that consuming nuts with bread lowers the glycemic response. In session 5, several small, observational studies suggesting that nuts may play a role in preventing cancer were reviewed (6). Those data were primarily from cell culture or animal studies, and human epidemiological and clinical trials are needed to confirm an association between nut consumption and cancer risk.

In 2003, the FDA approved 2 qualified health claims for nuts, 1 for nuts in general (7) and another for walnuts (8). The approved language is as follows: "scientific evidence suggests but does not prove that eating 1.5 oz (42 g) per day of most nuts, such as [name of specific nut], as part of a diet low in saturated fat and cholesterol may reduce the risk of heart disease. [See nutrition information for fat content.]" (7). This health claim

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language was consumer tested and found to be ranked significantly higher than the FDA generic claim for clarity and understandability (9). In order for a food to qualify for the health claim, the product must contain 11 g or more of whole or chopped nuts per reference amount customarily consumed (a standardized serving size). Any nuts labeled with the claim must contain <4 g saturated fat per 50 g. A food product containing nuts must be low in saturated fat and cholesterol. Eligible nuts for the claim include almonds, hazelnuts, peanuts, pecans, some pine nuts, pistachio nuts, and walnuts.

In December 2006, the European Community published a new regulation on nutrition and health claims, which was enacted 1 July 2007 [Regulation (EC) No 1924/2006]. This new regulation specifies 3 different types of claims: 1) nutrition claims, 2) health claims, and 3) disease-risk reduction claims. The European regulation does not foresee any qualified health claims for specific categories of foods, such as nuts. Also, all proposed health claims must comply with specific nutrient profiles, to be released by the European Food Safety Authority 31 January 2008. Critical nutrients with respect to nutrient profiles are fat, saturated fatty acids, *trans*-fatty acids, sugars, and salt/sodium. If the nutrient profile is not met, a health claim will not be permitted.

Given the emerging evidence that nuts play a critical role in reducing the risk of chronic disease, the attendees debated how to improve the position of nuts in the diet and their overall consumption. Although the health claim recommends 1.5 oz (42 g)/d of nuts, most consumers eat less. Total intake may be underestimated, however, because nuts are frequently consumed as snacks, and quantifying snack intakes is difficult. The attendees concluded that a modification of the U.S. health claim or approval of a European health claim for nuts was unlikely in the near future.

At the conclusion of the meeting the attendees developed a list of important research topics that need to be addressed to advance our understanding of the impact of nuts on health. Those research topics are summarized in the article by Allen et al. (10). Also, several other topics were recommended for further thought and discussion. Additional work is needed on the effects of processing, particularly roasting, on the biological and functional properties of nuts. To date, most human dietary intervention studies demonstrating beneficial health effects of nut consumption have been conducted with natural (unprocessed or slightly processed) nuts. The effects of processing or of additions of other components (salt, flavorings, sugar, etc.) on these health effects have not been investigated rigorously. Similarly, there is a lack of scientific studies on complex processed

foods containing nuts and the impact of the food matrix on the health effects of nuts. Also, evidence is accumulating that the gut microbial flora plays an important role not only in relation to gut health but also with respect to the development of obesity. Thus, the effect of regular nut consumption on the gut microbial flora needs attention, as do the effects of nuts on the endocrine functions of adipose tissue and body composition. The beneficial effects of nuts on cardiovascular disease have been well documented, but it is not known if these beneficial effects are caused exclusively by the nut fat content or if other components of nuts such as nut proteins or phytochemicals play a role.

In summary, the articles presented at this symposium showed that we are just beginning to understand how the properties of nuts influence health, even though they have been part of the human diet for thousands of years.

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