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REVIEW ARTICLE

NUTS AND HEALTHY LIFE: A BRIEF REVIEW

***Nirmala Halligudi**

Department of Pharmacy, Oman Medical College, Muscat, Oman

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ABSTRACT

Nuts are an important source of nutrients for both humans and wildlife.Tree nuts are a rich source of tocopherols and total phenols and contain a wide variety of flavonoids and proanthocyanidins. In addition to being a rich source of several essential vitamins and minerals, mono- and polyunsaturated fatty acids,and fiber, most tree nuts provide an array of phytochemicals that may contribute to the health benefits attributed to this whole food. Although many of these constituents remain to be fully identified and characterized, broad classes include the carotenoids, hydrolyzable tannins, lignans, naphthoquinones, phenolic acids, phytosterols, polyphenols, and tocopherols. These phytochemicals have been shown to possess a range of bioactivity, including antioxidant, antiproliferative, anti-inflammatory, antiviral, and hypocholesterolemic properties. Nuts (or seeds generally) are also a significant source of nutrition for wildlife. This is particularly true in temperate climates where animals such as jays and squirrels store acorns and other nuts during the autumn to keep them from starving during the late autumn, all of winter, and early spring.

Many nuts are good sources of vitamins E and B_2 (riboflavin, an antioxidant), and are rich in protein, folate, fiber, and essential minerals such as magnesium, phosphorus, potassium, copper, and selenium. Raw or unroasted walnuts are considered the healthiest, with twice as many anti-oxidants as other nuts.

Nuts such as almonds, walnuts, pea nuts may have beneficial effects on cardiovascular risk factors. Epidemiological studies, suggested that nut eating was associated with diminished risk of coronary artery disease (CAD).

In reviewing the history, nutrient composition, and the epidemiological and clinical studies of nuts, the need to make nuts and oil-rich seeds a more important part of modern, healthy diets should become evident to the reader.

KEY WORDS: nuts, antioxidant, healthy life, vitamins

INTRODUCTION:

The health benefits of a plant-based, vegetarian-type diet, in which nuts are considered a source of high quality protein, are well recognized by a growing number of people. Notwithstanding the fact that nuts are an intrinsic part of the diets of some Mediterranean regions where both serum cholesterol levels and the incidence of heart disease are low[1,2], in recent years consumers have felt and still feel that low-fat foods are the ultimate choice for a healthy diet, weight control and disease prevention.

Based on the evidence from epidemiological and controlled clinical studies, nut consumption is not associated with higher body weight[3-8] In fact; the epidemiological evidence indicates consistently that nut consumers have a lower BMI than nonconsumers. With respect to clinical studies, the evidence is nearly uniform that their inclusion in the diet leads to little or no weight gain [9-13]. Moreover, adherence to a moderate-fat, weight loss diet vs. a low-fat weight loss diet in free-living subjects is better and the nutrient profile of the moderate-fat diet is superior [14] Moderate-fat diets that contain nuts elicit a more favorable lipid and lipoprotein profile after maintenance of weight loss as well [15] The evidence supporting these observations is outlined below.

Data from large observational studies show that regular nut consumption is associated with a reduced risk of several conditions in which oxidative stress may play a role, including coronary heart disease,[16-18] hypertension,[19] type 2 diabetes,[20] inflammation and endothelial dysfunction. [21,22]

Almonds, Brazil nuts, cashews, chestnuts, hazelnuts, macadamias, pecans, pine nuts, pistachios and

*Corresponding author: Nirmala Halligudi | Email: drnirma@yahoo.co.in

walnuts are all nuts that are packed full of beneficial nutrients for good health. Enjoying nuts regularly as part of a healthy diet has been shown to benefit the heart [23-27] and may reduce the risk of developing type 2 diabetes [28–30] and help with weight management[31] Eating a small regular serve of nuts can have benefits for weight management and nuts naturally contain a broad range of important vitamins, minerals, antioxidants and other phytochemicals helping you achieve a balanced diet. [32-33]

HISTORICAL PERSPECTIVE:

Throughout history, nuts have been part of the diet around the world. Records of eating pistachios date back to the Stone Age of 7000 BC. Early descriptions of diets and food intakes indicate that the Romans, Persians, and Arabs all used ground nuts to thicken stews and sauces; that practice later extended to Europe. During exploration of Asia, nuts made their way from Persia to China and became a highly prized delicacy. In the Scandinavian countries, nuts were dried and stored as a food to use in the long, harsh winters [34]

Sunflower seeds and peanuts, both protein- and oil-rich seeds, played important roles in the diet of the Incas at the peak of their civilization: ancient Peruvian peanut shells indicate that Incas roasted these seeds and nuts, similar to what we do currently[35-36]. Walnuts were used by the Greeks at least four centuries BC, and ancient fossil remains of hazelnuts (filberts) have been found in Sicily. Pistachios were considered a precious food in Persia in the sixth century BC, and from there this nut spread throughout Asia and Europe. The *Book of Genesis* in the Bible talks about almonds, and in Roman times Apicius wrote frequently about roasted almonds. In fourteenth-century English cookbooks [36], almond milk was used extensively after it had been brought to northern Europe from Asia and the Middle East. In tropical and subtropical regions, coconuts continue to be considered a primary source of food, while Brazil nuts are part of the native Brazilian Amazon flora and are an ancient food of that region. Cashews are another nut native to the Amazons, but currently the largest producers are India and East Africa. Macadamia nuts are native to the rain forests of Australia, whereas pecans belong to the walnut family and are of North American origin where they were a staple of native Americans of the southern regions. Acorns are the "nut" of the oak tree and at one time were a staple food of native Americans.

COMPOSITION:

Nuts (ground and tree) are rich sources of multiple nutrients and their consumption is associated with health benefits. The protein content of nuts ranges from 10 percent in walnuts to 17 percent in
Almonds; the dietary fiber ranges from 5 percent in macadamia nuts to 10–14 percent in almonds and pistachios. The fat content of nuts ranges from about 35 percent in coconuts to over 70 percent in macadamia nuts. Most nuts are rich sources of monounsaturated fatty acids, with the exceptions of coconuts which contain predominantly saturated fat and walnuts which contain primarily polyunsaturated fat .

Nuts also supply important micronutrients as well as other beneficial biologically active constituents [28,37] Some tree nuts, especially almonds and hazelnuts, are good sources of vitamin E and other tocopherols, while nuts also provide some niacin, B6, folic acid, magnesium, zinc, copper, and potassium. Phytochemicals, many of them antioxidants such as phenolic compounds, add to protective properties of nuts. Additionally, peanuts, similarly to soy beans, also contain phytoestrogens, which recent research suggests may play important health protective roles

Figure I: Cashews, Wall nut, Almonds and pistachios

Table 1: The nutritional profile of commonly consumed, whole, natural nuts (per ounce/28 grams) [38].

	Almonds	Cashews	pecans	Pistachios	walnuts
Total energy,k Cal	163	157	196	159	185
Protein, g	6	5.2	2.6	5.8	4.3
Carbohydrates,g	6.1	8.6	3.9	7.8	3.9
Fiber,g	3.5	0.9	2.7	2.9	1.9
Sugars,Total,g	1.1	1.7	1.1	2.2	0.7
Total lipids,g	14	12.4	20.4	12.9	18.5
Saturated fatty acids, g	1.1	2.2	1.8	1.6	1.7
Monosaturated fatty acids, g	8.8	6.7	11.6	6.8	2.5
Polysaturated fatty acids, g	34	2.2	6.1	3.9	13.4
Phytosterols,g	34	44.8	28.9	60.7	20.4
Minerals,mg(Ca)	75	10	20	30	28
Iron	1.1	1.9	0.72	1.1	0.8
Sodium	0	3	0	0	1
Potassium	200	187	116	291	125
Magnesium	76	83	34	34	45
Phosphorus	137	168	79	139	98
Zinc	1	1.6	1.3	0.6	0.9
Copper	0.3	0.6	0.3	0.4	0.5
Manganese	0.7	0.5	1.3	0.3	1
Selenium	0.7	5.6	1.1	2	1.4
Vitamins, mg Vit C	0	0.1	0.3	1.6	0.4
Thiamin	0.1	0.1	0.2	0.2	0.1
Riboflavin	0.3	0	0	0	0
Niacin	1	0.3	0.3	0.4	0.3
Pantothenic acid	0.1	0.2	0.2	0.1	0.2
Vitamin B-6, mg	0	0.1	0.1	0.5	0.2
Folate, total, mg	14	7	6	14	28
Vitamin B-12	0	0	0	0	0
Vitamin A,	0	0	16	118	6
Vitamin E(total tocopherols)	7.7	1.9	7.6	7.3	6.7

NUTS & CARDIOVASCULAR DISEASE:

Nuts are rich in unsaturated fatty acids and most contain substantial amounts of monounsaturated fatty acids (MUFA); walnuts are especially rich in both (n-6) [linoleic acid (LA)] and (n-3) [a-linolenic acid (ALA)] PUFA. Healthy fats (i.e. unsaturated fatty acids) in nuts contribute to the beneficial associations of frequent nut intake observed in epidemiologic studies [prevention of coronary heart disease (CHD), diabetes, and sudden death], effects in short-term feeding trials (cholesterol lowering), and decreases in other CVD risk factors. However, nuts are complex food matrices that also are sources of other bioactive compounds, namely: macronutrients, such as vegetable protein and fiber; other nutrients, such as potassium, calcium, magnesium, and tocopherols; and phytochemicals, such as phytosterols and phenolic compounds, among other bioactive compounds, such as resveratrol and arginine [39] Collectively, the individual nutrients and composite of cardio protective nutrients explain the beneficial effects of nuts on CVD.

NUTS AND OXIDATIVE STRESS:

Recently, walnuts were shown to contain substantial amounts of melatonin, which contributed a significant antioxidant effect in an experimental rat model [40]. Nuts also are a source of PUFA, especially walnuts. Whereas research has shown that PUFA are more susceptible to oxidation than MUFA[41], nuts are a rich source of many antioxidants that protect the PUFA in vivo against oxidative modification. Oxidative markers after feeding of MUFA-rich nuts have been examined in several clinical trials. Results have been inconsistent in studies involving almonds. Berry et al. [42] showed that oxidation of plasma and LDL lipids in healthy volunteers were less after an almond diet compared with a low-fat diet. Jenkins et al. [43], in a dose-response study comparing 2 doses of almonds

with a low-fat diet in hyperlipidemic subjects, observed a 14% reduction in plasma oxidized LDL levels after the higher dose (average 73 g/d).

NUTS AND SATIETY:

First, several lines of evidence demonstrate that nuts have high satiety properties. The provision of fixed energy loads of nuts (peanuts, almonds, and chestnuts have been tested to date) leads to sharp reductions in self-reported hunger on questionnaires [44] Loads matched on weight and volume to peanuts, but low in energy, were not as effective at suppressing hunger, indicating these are not the relevant properties. Fatty acid saturation does not exert a dominating role. The low glycemic index of nuts has also been proposed as a mechanism by which they modulate appetite[45]. This assumes plasma insulin or glucose causally influence appetite. However, euglycemic clamp studies did not confirm this [46] and high concentrations of insulin in the brain suppress feeding [47]. At this time, no single attribute accounts for the high, self-reported satiety value of nuts.

NUTS AND INFLAMMATION:

Plasma high-sensitivity CRP, an accepted measure of systemic low-grade inflammation, was a Secondary outcome in several controlled nut feeding trials carried out in hypercholesterolemia subjects with almonds [48,49,50] or walnuts [51,52]. Inclusion of almonds in the dietary portfolio might have contributed to the anti-inflammatory response observed. Obviously,the specific dietary constituent that contributed to CRP lowering cannot be determined because of the multiple dietary changes that were made.

NUTS AND DIABETES:

Because there is no currently available cure for diabetes, primary prevention through diet and lifestyle modification is of paramount importance. One part of this strategy may be an increase in dietary vegetable protein and fat in the form of nuts. As well as providing vegetable protein and unsaturated [monounsaturated fatty acids (MUFA) [53] and PUFA] fatty acids, nuts provide other nutrients that may improve lipid risk factors for heart disease and also glucose and insulin homeostasis.

These data, together with evidence that nut consumption is also associated with reduced LDL cholesterol concentrations and possibly raised HDL cholesterol levels [53,54], have reversed the proscription against nut consumption for those at risk of CHD.

NUTS AND GALLSTONE DISEASE:

Gallstone disease, as an associated metabolic syndrome disease, also appears to be influenced favorably by nut consumption in both men and women. Gallstone disease is associated with all the individual components of the metabolic syndrome, e.g. low HDL, high triglycerides, high blood pressure, insulin resistance, and impaired glucose tolerance or type 2 diabetes. Recent data suggest that the prevalence of gallstone disease is markedly elevated among subjects with the metabolic syndrome, increased insulin resistance, or fatty liver (even after taking BMI into account) [55,56.] Recently, nut consumption (peanuts, other nuts, and peanut butter) was studied prospectively in relation to the risk of cholecystectomy, a surrogate of symptomatic gallstone disease, in the Nurses' Health Study and Health Professionals' Follow-up and showed that higher consumption of nuts was associated with lower risk of gallstone disease in both men and women [57,58.]

NUTS AND POSTPRANDIAL GLYCEMIA:

The effect of nuts on postprandial events may not be confined to reducing glycemia and insulinemia but may also influence postprandial oxidative damage. Nuts in general contain very little available carbohydrate and therefore contribute little to the postprandial glycemic response. However, by virtue of the content of fat and protein, and possibly of related phytochemicals (e.g. phytates and phenolics in the skin), nuts depress the glycemic response to a standard carbohydrate load in a dose-dependent fashion [59.]

When almonds were fed with bread, the destruction (i.e. oxidation) of serum protein thiols, as a maker of oxidative stress, was less than when bread was taken alone or when potato and rice were both fed with butter and cheese to equalize the fat and protein in the almond plus bread meal.

CONCLUSION:

Nuts are believed to be one of the most concentrated sources of fibre. They are said to contain unsaturated fats, which are believed to provide energy and carbohydrates.

Nuts are reported to contain a high amount of Vitamin E and minerals and are thought to protect against antioxidant damage and many other stresses in the body. Many people are believed to be allergic to nuts.

Nuts are rich in the healthy fats. Eating a variety of nuts will help to provide the right balance of healthy fats in our daily eating plan. Nuts have many potential advantages in allowing recommended macronutrient test targets to be met while fitting well into a heart-healthy diet. Incorporation of almonds into a healthy diet has beneficial effects on adiposity, glycemic control, and the lipid profile, thereby potentially decreasing the risk for cardiovascular

disease in patients with type 2 diabetes mellitus. Nuts are a positive addition to a healthy eating pattern for managing weight.

Use of almonds into a healthy diet has beneficial effects on adiposity, glycemic control, and the lipid profile, thereby potentially decreasing the risk for cardiovascular disease in patients with type 2 diabetes mellitus. Healthy fats are monounsaturated or polyunsaturated fats which can help regulate blood cholesterol. More intervention studies are required to demonstrate the therapeutic potential of nuts to complement data indicating their preventive potential against CHD and diabetes.

And of course people enjoy eating nuts so they stick to weight loss diets for longer. So get cracking and enjoy a handful of nuts everyday to get your healthy smart fats.

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