The Latest Scoop on Tree Nuts

Maureen Ternus, M.S., R.D.
International Tree Nut Council
Nutrition Research & Education Foundation
Nuts Have Come a Long Way...

1995 Presidio Meeting

2003 Qualified Health Claim for Nuts
RESEARCH PRIORITIES

- Healthy Diet
- Heart Disease
- Weight Management
- Phytochemicals
Testimony
- NREF submitted 5 sets of comments and 170 published papers

Final 2010 Dietary Guidelines for Americans
- Nuts are mentioned in the recommendation to shift food patterns to a more plant-based diet
Most adults (ages 19+) need 5-6 ounces of protein or protein equivalents per day

½ ounce of nuts or seeds can be considered as 1 ounce equivalent from the Protein Foods Group
Pooled Analysis

Nut Consumption and Blood Lipid Levels
A Pooled Analysis of 25 Intervention Trials

Joan Sabaté, MD, DrPH; Koji Oda, MA, MPH; Emilio Ros, MD, PhD
Pooled Analysis Media Results

- Stories in a variety of U.S. media outlets: *Wall Street Journal*, *New York Times*, Reuters and UPI wire services; online articles on *WebMD* and *Yahoo! News*; and numerous TV and radio news programs.

- Internationally: BBC and France-2 TV; *El Mundo*—a leading Spanish newspaper.

- Over 50 online articles in Australia, Canada, China, Dubai, Ghana, India, Iran, Ireland, Islamabad, New Zealand, Nigeria, Philippines, Singapore and the UK.
Pooled Analysis Media Results

Herald Sun
Going nuts in your diet cuts cholesterol - study
Eating Nuts May Help Cholesterol Levels

Vital Signs | Roni Caryn Rabin
Study Finds Eating Nuts Helps Cholesterol
and even Alzheimer’s

Top News
Nuts Help Lower Cholesterol Levels
Researchers have found eating various types of nuts not only improves cholesterol and other blood lipid levels, it also helps lower heart disease

NutHealth.org
Nuts and Diabetes Study

Nuts as a Replacement for Carbohydrates in the Diabetic Diet

David J.A. Jenkins, MD, Cyril W.C. Kendall, PhD,
Monica S. Banach, MSC, Korbuw Srithaikul, MSC,
Edward Vidgen, BSC, Sandy Mitchell, RD, Tina Parker, RD,
Stephanie Nishi, BSC, Balachandran Bashyam, PhD,
Russell De Souza, SD, RD, Christopher Ireland, BSC,
Robert G. Josse, MB, BS
Nuts and Diabetes Study

- 117 type 2 diabetic subjects
- Subjects randomized to 1 of 3 treatments for 3 months: ~2 oz. mixed nuts, healthy muffin control, or half portions of each

HbA1c was reduced & lipid profiles improved with NO WEIGHT GAIN for the nuts only group

“A 'Nutty' Solution To Type 2 Diabetes Management”
Diabetes Study Media Results

- Over 100 stories in print and electronic media
- Over 35 million in circulation
- The study appeared in media reports in 17 countries: U.S., Australia, Bangladesh, Canada, China, Egypt, France, India, Ireland, Netherlands, New Zealand, Nigeria, Pakistan, Philippines, Singapore, South Africa and the United Kingdom
2011 Mixed Tree Nut Publicity

Articles specifically mentioning:

- INC NREF: 6 million circ
- Nut qualified health claim: 1.5 million circ
- NREF diabetes study: 35 million circ
- General mixed nut articles: 127 million circ
- Total: 170 million circ

All touting the positive attributes of mixed tree nuts
Nut Consumption Analysis

Original Research

Nut Consumption Is Associated with Decreased Health Risk Factors for Cardiovascular Disease and Metabolic Syndrome in U.S. Adults: NHANES 1999–2004

Carol E. O’Neil, PhD, MPH, RD, Debra R. Keast, PhD, Theresa A. Nicklas, DrPH, Victor L. Fulgoni III, PhD

Louisiana State University Agricultural Center, Baton Rouge, Louisiana (C.O’N.), Food & Nutrition Database Research Inc., Okemos, Michigan (D.R.K.), USDA/ARS Children’s Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston, Texas (T.A.N.), Nutrition Impact, LLC, Battle Creek, Michigan (V.L.F.)

Key words: tree nuts, nutrient intake, diet quality, health risk factors, metabolic syndrome, NHANES

Background: Few recent epidemiologic studies have assessed the effect that nut consumption (including tree nuts and peanuts) has on health risks, including metabolic syndrome (MetS).

Objective: This study compared the health risk for cardiovascular disease, type 2 diabetes, and MetS of nut consumers with that of nonconsumers.

Design: Adults 19+ years (n = 13,292) participating in the 1999–2004 National Health and Nutrition Examination Survey were used. Intake from 24-hour recalls was used to determine intake. Nut/tree nut consumers consumed ≥½ ounce per day. Covariate-adjusted means, standard errors, and prevalence rates were determined for the nut consumption groups.

Results: The prevalence of nut consumers was 18.6% ± 0.7% and 21.0% ± 0.9% in those 19–50 years and 51 years and older, respectively. Nut consumption was associated with a decreased body mass index (27.7 kg/m² ± 0.2 vs 28.1 ± 0.1 kg/m², p < 0.05), waist circumference (95.6 ± 0.4 cm vs 96.4 ± 0.3 cm, p < 0.05), and systolic blood pressure (121.9 ± 0.4 mmHg vs 123.20 ± 0.3 mmHg, p < 0.01) compared with nonconsumers. Tree nut consumers also had a lower weight (78.8 ± 0.7 kg vs 80.7 ± 0.3 kg, p < 0.05). Nut consumers had a lower percentage of two risk factors for MetS: hypertension (31.5% ± 1.0% vs 34.2% ± 0.8%, p < 0.05) and low high density lipoprotein-cholesterol (HDL-C) (29.6% ± 1.0% vs 34.8% ± 0.8%, p < 0.01). Tree nut consumers had a lower prevalence of four risk factors for MetS: abdominal obesity (43.6% ± 1.6% vs 49.5% ± 0.8%, p < 0.05), hypertension (31.4% ± 1.2% vs 33.9% ± 0.8%, p < 0.05), low HDL-C (27.9% ± 1.7% vs 34.5% ± 0.8%, p < 0.01), high fasting glucose (11.4% ± 1.4% vs 15.0% ± 0.7%, p < 0.05), and a lower prevalence of MetS (21.2% ± 2.1% vs 26.6% ± 0.7%, p < 0.05).

Conclusion: Nut/tree nut consumption was associated with a decreased prevalence of selected cardiovascular disease, type 2 diabetes, and MetS.
Nut Consumption Analysis

- Researchers compared risk factors for heart disease, type 2 diabetes and metabolic syndrome of nut consumers versus those who did not consume nuts.

- 13,292 men and women (19+ years) participating in the 1999-2004 National Health and Nutrition Examination Surveys (NHANES)
Nut Consumption Analysis

Compared to nonconsumers, tree nut consumers had:

- Lower body weight
- Lower body mass index (BMI)
- Lower waist circumference
- 5% percent lower prevalence of metabolic syndrome
- Lower prevalence of four risk factors for metabolic syndrome: abdominal obesity, high blood pressure, high fasting glucose (blood sugar) levels and low high-density lipoprotein-cholesterol levels.
Tree nut phytochemicals: composition, antioxidant capacity, bioactivity, impact factors. A systematic review of almonds, Brazil nuts, cashews, hazelnuts, macadamias, pecans, pine nuts, pistachios and walnuts

Bradley W. Bolling, C.-Y. Oliver Chen, Diane L. McKay and Jeffrey B. Blumberg

1Department of Nutritional Sciences, University of Connecticut, 3524 Horsebarn Road Extension, Unit 4017, Storrs, CT 06269, USA
2Antioxidants Research Laboratory, Jean Mayer USDA Human Nutrition Research Center on Aging, Tufts University, 711 Washington Street, Boston, MA 02111, USA

Abstract
Tree nuts contain an array of phytochemicals including carotenoids, phenolic acids, polyphenols and polyphenol compounds such as flavonoids, proanthocyanidins (PACs) and stilbenes, all of which are included in vitamin databases, as well as phytosterols, squalignoloids, stigmasterol, phytostanols and lignans, which are not. The phytochemical content of tree nuts can vary considerably by nut type, genotype, pre- and post harvest conditions, as well as storage conditions. Genotype affects phenolic acids, flavonoids, stilbenes and polyphenols, but data are lacking for many other phytochemical classes. During the mailling process, tree nut infusolanes, flavonoids and flavanols were found to be more resistant to heat than the anthocyanins, PACs and stilbenes. The choice of solvent used for extracting polyphenols and polyphenols significantly affects their quantification, and studies validating these methods for tree nut phytochemicals are lacking. The phytochemicals found in tree nuts have been associated with antioxidant, anti-inflammatory, anti-atherosclerotic, anti-thrombotic, hypolipidemia and hypolipidemic actions, all of which are known to affect the initiation and progression of several pathogenic processes. While tree nut phytochemicals are bioavailable and bioaccessible in humans, the number of intervention trials conducted to date is limited. The objectives of the present review are to assess current tree nut phytochemical (1) phytochemicals, (2) phytochemical content included in national databases and current publications, (3) phytochemicals affected by pre- and post-harvest conditions and analytical methodology, and (4) bioactivity and health benefits in humans.

Key words: Antioxidants; Polyphenols; Phytochemicals; Tree nuts

Phytochemical databases with tree nuts

Definition of phytochemicals
The term ‘phytochemical’ broadly refers to all plant-derived chemicals. Hence, macroconstituents such as plant carbohydrates (excluding dietary fibre), lipids and proteins could be categorised as phytochemicals. However, for the purposes of the present report, we use the term ‘phytochemical’ to refer to small non-essential nutrients with putative health-promoting actions. We categorised phytochemicals into six broad classes: algaloids, carotenoids, phenolics, carbohydrates, non-nutritive proteins and lipids (Fig. 2).

Tree nut phytochemical classes
Tree nuts contain the majority of phytochemical classes. To date, we are not aware of reports of organosulfur or non-carbohydrate proteins (for example, antioxidant enzymes) in tree nuts. The present report examines the content of total phenols, flavonoids, proanthocyanidins (PACs), stilbenes, polyphenols, carotenoids and other classes in tree nuts.

Total phenols
Phenolics are a major phytochemical class, and include the broad term ‘polyphenol’, meaning a molecule with one or more phenolic groups. The Poli–Glutamid assay is commonly used as a non-specific measure of total phenols or total polyphenols. However,
Table 2. Total phenols content of 9 tree nuts reported in the USDA and Phenol-Explorer databases.

<table>
<thead>
<tr>
<th>Tree Nuts</th>
<th>USDA mg GAE/100 mg</th>
<th>Phenol-Explorer mg GAE/100 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almonds</td>
<td>418</td>
<td>287</td>
</tr>
<tr>
<td>Brazil nuts</td>
<td>310</td>
<td>244</td>
</tr>
<tr>
<td>Cashews</td>
<td>269</td>
<td>233</td>
</tr>
<tr>
<td>Hazelnuts</td>
<td>835</td>
<td>687</td>
</tr>
<tr>
<td>Macadamias</td>
<td>156</td>
<td>126</td>
</tr>
<tr>
<td>Pecans</td>
<td>2016</td>
<td>1816</td>
</tr>
<tr>
<td>Pine nuts</td>
<td>68</td>
<td>58</td>
</tr>
<tr>
<td>Pistachios</td>
<td>1657</td>
<td>1420</td>
</tr>
<tr>
<td>Walnuts (English)</td>
<td>1556</td>
<td>1576</td>
</tr>
</tbody>
</table>
Phytonutrients – an emerging area of nutrition research

- Composition of foods
- Dietary intake
- Associations with risk of chronic diseases
- Impact on biomarkers of chronic disease risk
- Chemical form and physical location in foods
- Metabolic fate
- Impact on physiological processes
- Plausible mechanisms of action
- Individual differences
- Interactions with other dietary components

Dietary Advice
Current/Future Projects
AHA Heart Check Program

The nuts that will now be allowed to carry the heart check on their labels include: almonds, hazelnuts, peanuts, pecans, pistachios, walnuts and some pine nuts.
Adventist Health Study-2

- Among the largest epidemiological data sets available and includes both men and women.
- It has a large cohort of Black/African American participants.
- Compared with the previous Adventist Health Study, overall nut consumption has increased more than 50%, but the range of nut intake is very wide, from never, to two or more times daily.
Dr. Joan Sabaté will look at associations between nut consumption and weight, diabetes, metabolic syndrome and food intake patterns:

1. How does nut consumption affect the risk of obesity or body-weight change over time?

2. Does eating nuts protect against diabetes and metabolic syndrome?
Adventist Health Study-2

3. In a health-oriented population, are there differences in nut consumption by race, gender, socio-demographic data, weight, age or exercise pattern?

4. Do nut-eaters differ in nutrients and food intake compared to those who do not eat nuts?
More than 40 studies published between 1993 and 2002 showed that nuts can dramatically reduce the risk of heart disease.
Announcing one of the first FDA-authorized qualified health claims for a food—July 14, 2003
Scientific evidence suggests but does not prove that eating 1.5 ounces per day of most nuts as part of a diet low in saturated fat and cholesterol may reduce the risk of heart disease.
Next Step... An Unqualified Health Claim

- 115 studies on nuts and heart disease since 1992 (clinical, epi and review papers)

- Conduct a systematic review of the literature

- Publish review and decide whether or not to file a petition
Follow-up to the Nuts and Diabetes Study

Proposal to analyze frozen blood samples from the original study to look at 4 markers to determine if tree nuts have additional benefits in terms of heart health:

- LDL particle size
- Plasma fatty acids
- Urinary isoprostanes
- Clotting factors
INTERNATIONAL MEETINGS

5 Papers Published

Asia Pacific Journal of Clinical Nutrition

Editor-in-Chief
Mark Wahlqvist
Co-Editor
Duo Li
Kiyoshi Tamaka

With
Health Benefits of Tree Nuts

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www.healthyeatingclub.org/APCN/V

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NutHealth.org
Pecans

This native American tree nut is a member of the hickory family. Long before the arrival of the Europeans to the New World, pecans (pih-KAHNS; pih-KANS; PEE-kans) were an important food in the diet of the Indian tribes of the central and southern regions of the United States.

Nutrition Research

Nut consumption and blood lipid levels: A pooled analysis of 25 intervention trials

Learn More

Nuts and healthy body weight maintenance mechanisms

Learn More


Learn More

Featured Recipe

Cajun Spiced Walnuts
A spicy kick makes these spiced walnuts a perfect pre–dinner nibble with drinks. Prepare them a day ahead if you can, as the flavors blend and mellow overnight.

What’s New?
A recent study published in the Archives of Internal Medicine shows the important role of tree nuts in a heart healthy diet.
Pecans

This native American tree nut is a member of the hickory family. Long before the arrival of the Europeans to the New World, pecans [pih-KAHNS; pih-KANS; PEE-kans] were an important food in the diet of the Indian tribes of the central and southern regions of the United States. Two famous people partial to pecans were George Washington, who frequently carried them in his pockets, and Thomas Jefferson, who dedicated part of his time to their cultivation.

Pecans have a smooth shell and the kernel makes up 40-60% of the in-shell. The principle producing countries are the U.S., Mexico, Australia and Israel. Pecans are marketed in in-shell or shelled form and can be eaten raw or roasted. They're used in the bakery, confectionery and dairy industry, in chocolate and ice creams. Pecans are also added to cereals, breads, pastries and cookies, and are great in salads, main dishes, as toppings on desserts and as a snack.

The wood of the pecan tree is highly appreciated for its timber and is often used as decorative paneling.


» View research for Pecans
» View recipes for Pecans

**Featured Recipe**

Pacific Rim Pecan Crusted Turkey Cutlets

Give an ordinary dish some Pacific flare by adding Oriental hoisin sauce. You can make it as spicy or as mild as you wish.

» View Recipe

**PECAN NUTRITION FACTS**

SERVING SIZE
1 OZ. (28.35G) APPROX 19 HALVES

<table>
<thead>
<tr>
<th>Amount Per Serving</th>
<th>%Daily Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories 200</td>
<td>Calories from Fat 180</td>
</tr>
<tr>
<td>Total Fat 20g</td>
<td>Saturated Fat 2g</td>
</tr>
<tr>
<td>Polyunsaturated Fat 6g</td>
<td>Monounsaturated Fat 12g</td>
</tr>
<tr>
<td>Cholesterol 0mg</td>
<td>Sodium 0mg</td>
</tr>
<tr>
<td>Potassium 116mg</td>
<td>4g</td>
</tr>
<tr>
<td>Total Carbohydrate 4g</td>
<td>Dietary Fiber 3g</td>
</tr>
<tr>
<td>Protein 3g</td>
<td>Vitamin A 0%</td>
</tr>
<tr>
<td>Calcium 2%</td>
<td>Iron 4%</td>
</tr>
<tr>
<td>Vitamin E 2%</td>
<td>Thiamin 10%</td>
</tr>
<tr>
<td>Vitamin B₆ 2%</td>
<td>Folate 2%</td>
</tr>
<tr>
<td>Phosphorus 8%</td>
<td>Magnesium 8%</td>
</tr>
<tr>
<td>Zinc 8%</td>
<td>Selenium 2%</td>
</tr>
<tr>
<td>Copper 15%</td>
<td>Manganese 60%</td>
</tr>
</tbody>
</table>

*Percent Daily Values are based on a 2,000 calorie diet. Daily Values may be higher or lower depending on your calorie needs. Data from the USDA National Nutrient Database for Standard Reference Release 22 (2009).

**Pecans nuts are unsalted and unroasted.

For more information on all 9 tree nuts, click the links below:

» Tree Nut Flavonoids & Phytosterols Fact Sheet
» Nutrients and % DV in 1 Ounce of Tree Nuts
» Nutrients in 100 Grams of Tree Nuts
THANK YOU FOR YOUR ATTENTION

‘If you don’t eat your nuts, you won’t grow up to have low cholesterol like your dad’