

Antioxidants



Source:

<http://silvieandmaryl.com/tag/antioxidants/>

<http://www.newchapter.com/targeted-herbal-formulas/supercritical-antioxidants>

<http://thedermblog.com/wp-content/uploads/2008/03/vitamin-e.jpg>

Antioxidants

Introduction

The topic I chose to research for my fact sheet is antioxidants. The topic seemed interesting to me because there have been claims that antioxidants are the remedy for a wide variety of ailments by the media. I wanted to know what these so-called antioxidants actually were, what effects they have on the human body, and in what foods I could find them. In addition, I wanted to know if there are any health concerns associated with taking antioxidant supplements and who oversees the production of these supplements.

Section 1: Background and Problem Statement

- **Web site #1 Name: MedlinePlus (Healthy People 2020 turn up no information on topic)**
- **Web address: <http://www.nlm.nih.gov/medlineplus/antioxidants.html>**
- **Background Information:**
 - Free radicals are molecules produced when your body breaks down food, or by environmental exposures like tobacco smoke and radiation. Free radicals can damage cells, and may play a role in heart disease, cancer and other diseases. The word "Antioxidant" is the collective name for the vitamins, minerals, carotenoids, and polyphenols that protect the body from harmful free radicals. The most well known antioxidants include the vitamins A, C, E, and the mineral selenium. The carotenoids beta-carotene, lutein, and lycopene also have high antioxidant activity and are responsible for adding color to many fruits and vegetables.

- **Web site #2 Name: National Cancer Institute (NCI)**
- **Web address: <http://www.cancer.gov/cancertopics/factsheet/prevention/antioxidants>**
- **Background Information:**
 - Free radicals are molecules with incomplete electron shells which make them more chemically reactive than those with complete electron shells. In humans, the most common form of free radicals is oxygen. When an oxygen molecule (O₂) becomes electrically charged or "radicalized" it tries to steal electrons from other molecules, causing damage to the DNA and other molecules. Over time, such damage may become irreversible and lead to disease including cancer. Antioxidants are often described as "mopping up" free radicals, meaning they neutralize the electrical charge and prevent the free radical from taking electrons from other molecules.

- **Web site #3 Name: National Center for Complimentary and Alternative Medicine (NCCAM)**
- **Web address: <http://nccam.nih.gov/health/antioxidants/introduction.htm>**
- **Background Information:**
 - There are a number of different antioxidants found in foods and are available as dietary supplements. Instead of consuming antioxidant rich

foods, many people opt to take antioxidant supplements in an effort to improve their health and to prevent various diseases. These are taken by mouth, in forms such as tablet, capsule, powder, softgel, gelcap, or liquid.

Section 2: Research

- **Web site #1 Name: The Lancet (Article found through SciDirect database)**
- **Web address: <http://www.sciencedirect.com/science/article/pii/S0140673603136379>**
- **Summary of the research:**
 - It is thought that oxidation of a low density lipoprotein in the blood contributes to heart disease, and initial studies found that people taking Vitamin E supplements had a lower risk of developing heart disease. As a result, many large clinical trials were conducted to test the effects of antioxidant supplementation of Vitamin E, in doses ranging from 50 to 600 mg per day. None of these trials found a statistically significant effect of Vitamin E on overall number of deaths or on deaths due to heart disease. Further studies have also been negative. It is not clear if the doses used in these trials or in most dietary supplements are capable of producing any significant decrease in oxidative stress. This is just one of many types of clinical trials scientists and companies have been conducting. A fraction of the trials have results that show little to no effects of antioxidant supplementation in disease prevention.

- **Web site #2 Name: PubMed**
- **Web address: <http://www.ncbi.nlm.nih.gov/pubmed/21860805>**
- **Summary of the research:**
 - Another trial which yielded non-conclusive results was the Chinese Cancer Prevention Study, published in 1993. It was the first large randomized trial on antioxidants and cancer risk. This trial investigated the effect of a combination of beta-carotene, vitamin E, and selenium on cancer in healthy Chinese men and women at high risk for gastric cancer. The study showed a combination of beta-carotene, vitamin E, and selenium significantly reduced incidence of both gastric cancer and cancer overall. However, the 1996 Physicians' Health Study found no change in cancer rates associated with beta-carotene and aspirin taken by U.S. male physicians. Similarly, the 1999 Women's Health Study tested effects of vitamin E and beta-carotene in the prevention of cancer and cardiovascular disease among women age 45 years or older. Among apparently healthy women, there was also no benefit or harm from beta-carotene supplementation.

- **Web site #3 Name: Archives of Internal Medicine**
- **Web address: <http://archinte.ama-assn.org/cgi/content/abstract/164/21/2335>**
- **Summary of the research:**
 - While several trials have investigated supplements with high doses of antioxidants, the *Supplémentation en Vitamines et Minéraux Antioxydants*

trial, tested the effect of supplements with doses comparable to that of a normal healthy diet. Over 12,500 French men and women took either low doses of ascorbic acid, vitamin E, beta carotene, selenium, and zinc, or placebo pills for an average of 7.5 years. The study concluded that the low doses of antioxidant supplements lowered the total cancer incidences and “all-cause” mortality in men but not in women. The supplements may be effective in men only because of their lower natural levels certain antioxidants, such as of beta carotene. This clinical trial seems to show promising results, yet still does not prove the claims that antioxidants is the “all heal” remedy they claimed to be.

Section 3: Statistics

- **Web site #1 Name: Colorado State University**
- **Web address: <http://www.ext.colostate.edu/pubs/foodnut/09338.html>**
- **Summary of the statistics:**
 - The average total supplement sales in the United State are over \$23.7 billion a year. The body can only take in so much, so the majority of the supplements people take are excreted and go down the drain. Some of the megavitamins on the markets today may contain 10 to over 100 times the Dietary Reference Intake (DRI) for a vitamin or mineral. This mean that Americans are ingest tremendous quantities of these antioxidants and supplement.

- **Web site #2 Name: PubMed**
- **Web address: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2841576/>**
- **Summary of the statistics:**
 - A national survey conducted in 2007 found that 17.7 percent of American adults had used "natural products" to supplement their diet with antioxidants in the past 12 months. In another national survey covering all types of dietary supplements, approximately 52 percent of the adult respondents said they had used some type of supplement in the last 30 days. The most commonly reported were multivitamins/multiminerals, vitamins E and C, calcium, and B-complex vitamins.

- **Web site #3: United States Drug Administration & Agricultural Research Service**
- **Web address: http://www.nal.usda.gov/fnic/foodcomp/Data/Other/AICR05_AntioxidantSupp.pdf**
- **Summary of the statistics:**
 - In a survey which looked at 1900 supplement products, more than 900 or 47% contained at least one antioxidant. A total of more than 3000 survey respondents, representing about 37% of US population, reported taking at least one of these products. Vitamins C and E were the top 2 reported antioxidant ingredients. Other commonly reported antioxidants in rank order were selenium, beta-carotene, and flavonoids, which were present in

about 280, 260 and 150 products. More than 50% of respondents who reported taking multivitamins took multivitamins containing Vitamin C or E at 100% Daily Value (DV) levels. Figures 3 and 4 show that for multivitamins containing Vitamins E and C. Approximately 54% and 61% of the population surveyed respectively reported taking a product with a labeled level of 100% DV of Vitamin E and Vitamin C. From this we can get a picture of just how prevalent antioxidants are in American supplements and how many people take the supplements.

Section 4: Consumer Information

- **Web site #1 Name: National Center for Complimentary and Alternative Medicine (NCCAM)**
- **Web address: <http://nccam.nih.gov/health/antioxidants/introduction.htm>**
- **Summary of the information:**
 - Antioxidants in foods are generally considered safe, and studies of antioxidant supplements generally have not reported adverse effects. However, the research does point to some potential concerns; for example, beta-carotene supplements may increase the risk of lung cancer in smokers, and vitamin E supplements may increase the risk of bleeding in certain individuals. Federal regulations for dietary supplements are very different from those for prescription and over-the-counter drugs. For example, a dietary supplement manufacturer does not have to prove a product's safety and effectiveness before it is marketed. If you are thinking about using a dietary supplement, first get information on it from reliable sources. Remember that dietary supplements might interact with medications or other dietary supplements and may contain ingredients not listed on the label.

- **Web site #2 Name: National Institutes of Health- Office of Dietary Supplements**
- **Web address: http://ods.od.nih.gov/HealthInformation/DS_WhatYouNeedToKnow.aspx**
- **Summary of the information:**
 - While there are many new and emerging products, it is best to remember that vitamin and mineral supplements are not to be used as substitutes for a healthy, well-balanced diet. Due to many conflicting studies on the effects of antioxidant supplements, the American Heart Association does not currently recommend using antioxidant vitamin supplements. It is also important to note that we can "over-supplement" our bodies, taking much more than the recommended daily value of certain vitamins and minerals. Vitamins such as A and E are fat soluble, this means that excess amounts are stored in the liver and fatty tissues, creating a risk of toxicity.

- **Web site #3 Name: Colorado State University**
- **Web address: <http://www.ext.colostate.edu/pubs/foodnut/09338.html>**
- **Summary of the information:**

- Dietary supplement labels may carry certain types of health-related claims. Manufacturers are permitted to say, for example, that a dietary supplement addresses a nutrient deficiency, supports health, or is linked to a particular body function like immunity or heart health. Such a claim has to be followed by the words, "This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease."

Section 5: Solutions to the Problem (or Issue)

- **Web site #1 Name: National Cancer Institute (NCI)**
- **Web address: <http://www.cancer.gov/cancertopics/factsheet/prevention/antioxidants>**
- **Summary of the information:**
 - The one safe way to make sure you ingest exceptional levels of antioxidants is to have a well balanced diet rich in colorful fruits and vegetables. Beta-carotene is found in many foods that are orange in color, including sweet potatoes, carrots, cantaloupe, squash, apricots, pumpkin, and mangos. Some green, leafy vegetables, including collard greens, spinach, and kale, are also rich in beta-carotene. Lutein, best known for its association with healthy eyes, is abundant in green, leafy vegetables such as collard greens, spinach, and kale. Lycopene is a potent antioxidant found in tomatoes, watermelon, guava, papaya, apricots, pink grapefruit, blood oranges, and other foods. Major dietary sources of selenium in most countries are rice and wheat. Animals that eat grains or plants grown in selenium-rich soil have higher levels of selenium in their muscle. Brazil nuts also contain large quantities of selenium. Vitamin A is found in liver, sweet potatoes, carrots, milk, egg yolks, and mozzarella cheese. Vitamin C is found in high abundance in many fruits and vegetables and is also found in cereals, beef, poultry, and fish. Vitamin E is found in many oils including wheat germ, safflower, corn, and soybean oils. It is also found in mangos, nuts, broccoli, and other foods.
- **Web site #2 Name: The Food & Drug Administration (FDA)**
- **Web address: <http://www.fda.gov/food/dietarysupplements/default.htm>**
- **Summary of the information:**
 - The Food & Drug Administration (FDA) regulates both finished dietary supplement products and dietary ingredients. FDA is responsible for taking action against any unsafe dietary supplement product after it reaches the market. Generally, manufacturers do not need to register their products with FDA, nor get FDA approval before producing or selling dietary supplements. Manufacturers must make sure that product label information is truthful and not misleading. In addition, the manufacturer, packer, or distributor whose name appears on the label of a dietary supplement marketed in the United States is required to submit to FDA all serious adverse event reports associated with use of the dietary supplement in the United States.

- **Web site #3 Name:**
- **Web address:**
- **Summary of the information:**

The FDA has limited resources to analyze the composition of food products, including dietary supplements. It heavily focuses these resources first on public health emergencies and on products that may have caused injury or illness. Their enforcement priorities then go to products thought to be unsafe or fraudulent or in violation of the law. The remaining funds are used for routine monitoring of products pulled from store shelves or collected during inspections of manufacturing firms. The FDA does not analyze dietary supplements before they are sold to consumers. The manufacturer is responsible for ensuring that the "Supplement Facts" label and ingredient list are accurate, that the dietary ingredients are safe, and that the content matches the amount declared on the label. FDA does not have resources to analyze dietary supplements sent to the agency by consumers who want to know their content. Instead, consumers may contact the manufacturer or a commercial laboratory for an analysis of the content. This is why it is important to be an informed consumer and do research on product which you plan in using.

Conclusions

From creating this fact sheet I have learned that most of the research indicates that there are overall health benefits from antioxidant-rich foods consumed in the diet. The results of clinical trials with antioxidant supplements have yet to provide a definite indication of health benefits. With this new information, I can now make sure my daily diet consists of many colorful fruits and vegetables. In addition, I should be consuming grains such as rice and wheat. While conducting my research I found out that the current recommendations by the U.S. government and health organizations are to consume a varied diet with at least 5 servings of fruits and vegetables per day and 6-11 servings of grains per day, with at least three of those being whole grains.

Five-minute Twitter Brief

Tweet:

“One safe way to make sure you ingest exceptional levels of antioxidants is to have a well balanced diet rich in colorful fruits and vegetables.”

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