

TEA

Introduction

The topic I chose to do my fact sheet about was Tea. The reason why I chose this topic was because I stopped drinking coffee all the time and started drinking tea. The reason I did this was because my doctor told me that because I drank so much coffee, it stunted my growth and the caffeine wasn't health for me. I needed a drink that I could have more than once a day without worrying about bad side effects. Little did I know there is more to tea than all the good things you read and hear about it.

Section 1: Background and Problem Statement

- **Web site #1 Name:** Herbal Medicine
- **Web address:** <http://www.worldwidehealth.com/health-article-Problems-With-Green-Tea.html>
- **Background Information:** The use of green tea as an aid to health may prove to be a disaster. The problem is that today's green tea is not the same as it was hundreds of years ago. The plant is the same. The antioxidants are there. But there is also something else in today's green tea in quantities which are unprecedented and quite troublesome: fluoride. Despite what many of the nutrition texts tell us, fluoride has no recognized, essential use in the human body. It is simply a poisonous substance one of the most toxic known to man. What's more, green tea is becoming increasingly more contaminated with fluoride than ever before. But how much fluoride could there possibly be in a cup of green tea?
- **Web site #2 Name:** Tea and Chronic Disease Prevention
- **Web address:** <http://lpi.oregonstate.edu/f-w02/tea.html>
- **Background Information:** Tea, one of the most popular beverages in the world, is an infusion of the leaves of the *Camellia sinensis* plant. Although it has been consumed for centuries, tea is currently touted as a beverage that can promote health and help prevent a number of diseases. While scientists are very interested in the potential for tea and its constituents, particularly polyphenols, to prevent diseases, evidence that tea consumption actually prevents chronic disease in humans is limited.
- **Web site #3 Name:** Green Tea
- **Web address:** <http://www.umm.edu/altmed/articles/green-tea-000255.htm>
- **Background Information:** There are three main varieties of tea green, black, and oolong. The difference between the teas is in their processing. Green tea is made from unfermented leaves and reportedly contains the highest concentration of powerful antioxidants called polyphenols. Antioxidants are substances that scavenge free radicals damaging compounds in the body that alter cells, tamper

with DNA (genetic material), and even cause cell death. Free radicals occur naturally in the body, but environmental toxins (including ultraviolet rays from the sun, radiation, cigarette smoke, and air pollution) also give rise to these damaging particles. Many scientists believe that free radicals contribute to the aging process as well as the development of a number of health problems, including cancer and heart disease. Antioxidants such as polyphenols in green tea can neutralize free radicals and may reduce or even help prevent some of the damage they cause.

Section 2: Research

- **Web site #1 Name:** Rainforest Alliance
- **Web address:** http://www.rainforest-alliance.org/profiles/documents/tea_fact_sheet.pdf
- **Summary of the research:** Tea gardens dense emerald carpets shimmering in the tropical light please the eyes, but upon closer inspection, all is not so green. Like any tropical crop, tea farming can have a downside both for the environment and for workers. Biodiversity-rich tropical forests have been replaced with a single-species monoculture. Tea cultivation can lead to soil erosion, competition for water and pollution from fertilizers, and the need for firewood to fuel tea dryers can result in further deforestation. Also, many tea workers lack employment security, health care, decent housing and the right to organize. The global tea industry is also beset with problems. As demand has fallen behind supply, the price of tea has been dropping steadily for more than two decades, making it difficult for farmers to earn a living.
- **Web site #2 Name:** PubMed
- **Web address:** <http://www.ncbi.nlm.nih.gov/sites/entrez/1614995?dopt=Abstract&holding=f1000,f1000m,isrctn>
- **Summary of the research:** Tea is grown in about 30 countries but is consumed worldwide, although at greatly varying levels. It is the most widely consumed beverage aside from water with a per capita worldwide consumption of approximately 0.12 liter per year. Tea is manufactured in three basic forms. Green tea is prepared in such a way as to preclude the oxidation of green leaf polyphenols. During black tea production oxidation is promoted so that most of these substances are oxidized. Oolong tea is a partially oxidized product. Of the approximately 2.5 million metric tons of dried tea manufactured, only 20% is green tea and less than 2% is oolong tea. Green tea is consumed primarily in China, Japan, and a few countries in North Africa and the Middle East. Fresh tea leaf is unusually rich in the flavanol group of polyphenols known as catechins which may constitute up to 30% of the dry leaf weight. Other polyphenols include flavanols and their glycosides, and depsides such as chlorogenic acid, coumarylquinic acid, and one unique to tea, theogallin (3-galloylquinic acid). Caffeine is present at an average level of 3% along with very small amounts of the other common methylxanthines, theobromine and theophylline. The amino

acid theanine (5-N-ethylglutamine) is also unique to tea. Tea accumulates aluminum and manganese. In addition to the normal complement of plant cell enzymes, tea leaf contains an active polyphenol oxidase which catalyzes the aerobic oxidation of the catechins when the leaf cell structure is disrupted during black tea manufacture. The various quinones produced by the enzymatic oxidations undergo condensation reactions which result in a series of compounds, including bisflavanols, theaflavins, epitheaflavic acids, and thearubigens, which impart the characteristic taste and color properties of black tea. Most of these compounds readily form complexes with caffeine. There is no tannic acid in tea. Thearubigens constitute the largest mass of the extractable matter in black tea but their composition is not well known. Proanthocyanidins make up part of the complex. Tea peroxidase may be involved in their generation. The catechin quinones also initiate the formation of many of the hundreds of volatile compounds found in the black tea aroma fraction. Green tea composition is very similar to that of the fresh leaf except for a few enzymatically catalyzed changes which occur extremely rapidly following plucking. New volatile substances are produced during the drying stage. Oolong tea is intermediate in composition between green and black teas.

- **Web site #3 Name:** Personal Health Zone
- **Web address:**
http://www.personalhealthzone.com/herbal_medicine/side_effects/green_tea_side_effects.html
- **Summary of the research:** Green Tea can cause allergic reactions. Green tea contains caffeine which has been shown to increase anxiety and impair sleep. Caffeine can interfere with many prescription medications causing adverse reactions or dangerous interactions. Overconsumption may cause irritability, insomnia, nervousness, and tachycardia. Because studies on its possible teratogenic effect are inconclusive, caffeine consumption is contraindicated during pregnancy. Lactating women should also limit caffeine intake to avoid sleep disorders in infants.

Section 3: Statistics

- **Web site #1 Name:** Tea Association of the USA Inc.
- **Web address:** <http://www.teausa.com/general/TEAFACETSHEET-updated2-10-06.pdf>
- **Summary of the statistics:** Tea is the most widely consumed beverage in the world next to water, and can be found in almost 80% of all U.S. households. It is the only beverage commonly served hot or iced, anytime, anywhere, for any occasion. On any given day, over 127 million Americans are drinking tea. In 2005, Americans consumed well over 50 billion servings of tea, or over 2.25 billion gallons. About 87% of all tea consumed was Black Tea, 12.5% was Green Tea, and a small remaining amount was Oolong Tea. On any given day, about one half of the American population drinks tea. On a regional basis, the South and Northeast have the greatest concentration of tea drinkers.

- **Web site #2 Name:** MMWR
- **Web address:** <http://www.cdc.gov/mmwr/PDF/wk/mm4411.pdf>
- **Summary of the statistics:** During March 1994, the New York City Department of Health (NYCDOH) investigated seven cases of anticholinergic poisoning in members of three families; three of the seven ill persons required emergency treatment for characteristic manifestations. For all cases, manifestations occurred within 2 hours after drinking tea made from leaves purchased commercially and labeled as Paraguay tea—an herbal tea derived from the plant *Ilex paraguariensis*, which is native to South America. This report summarizes the investigation of these cases.

- **Web site #3:** PubMed
- **Web address:** <http://www.ncbi.nlm.nih.gov/pubmed/16311246>
- **Summary of the statistics:** Experimental studies have shown that tea and tea polyphenols have anti-carcinogenic properties against breast cancer. A number of epidemiologic studies, both case-control and cohort in design, have examined the possible association between tea intake and breast cancer development in humans. This meta-analysis included 13 papers which examined populations in eight countries and provided data on consumption of either green tea or black tea, or both in relation to breast cancer risk. Summary odds ratios (ORs) for highest versus non/lowest tea consumption level were calculated based on fixed and random effects models. Heterogeneity between studies was examined via the Q statistics. For green tea, the combined results from the four studies indicated a reduced risk of breast cancer for highest versus non/lowest intake (OR = 0.78, 95% CI = 0.61-0.98). For black tea, conflicting results were observed in case-control versus cohort studies. The combined results from the eight case-control studies showed a minor inverse association between black tea consumption and risk of breast cancer (OR = 0.91, 95% CI = 0.84-0.98). This inverse association was stronger in hospital-based (OR = 0.77, 95% CI = 0.50-1.19) than population-based case-control studies (OR = 0.94, 95% CI = 0.81-1.09). Five cohort studies demonstrated a modest increase in risk associated with black tea intake (OR = 1.15, 95% CI = 1.02-1.31). The results of this meta-analysis indicate a lower risk for breast cancer with green tea consumption. Available data suggest a possible late-stage, promotional effect of black tea on breast carcinogenesis.

Section 4: Consumer Information

- **Web site #1 Name:** NCCAM
- **Web address:** <http://nccam.nih.gov/health/greentea/index.htm>
- **Summary of the information:** Green tea is safe for most adults when used in moderate amounts. There have been some case reports of liver problems in people taking concentrated green tea extracts. This problem does not seem to be connected with green tea infusions or beverages. Although these cases are very rare and the evidence is not definitive, experts suggest that concentrated green

tea extracts be taken with food, and that people should discontinue use and consult a health care practitioner if they have a liver disorder or develop symptoms of liver trouble, such as abdominal pain, dark urine, or jaundice. Green tea and green tea extracts contain caffeine. Caffeine can cause insomnia, anxiety, irritability, upset stomach, nausea, diarrhea, or frequent urination in some people. Green tea contains small amounts of vitamin K, which can make anticoagulant drugs, such as warfarin, less effective. Tell your health care providers about any complementary and alternative practices you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care.

- **Web site #2 Name:** Specialty Food
- **Web address:** <http://www.specialtyfood.com/do/news/ViewNewsArticle?id=152>
- **Summary of the information:** The March issue of Consumer Reports provides taste tests of 19 green teas (with highest ratings going to Tazo China Green Tips and TenRen Dragon Well) under the title "Tonic in a Teapot. According to the article, "Increased availability of bottled and gourmet teas has helped double annual tea sales since 1990, to nearly \$5 billion.

- **Web site #3 Name:** Mayo Clinic
- **Web address:** http://www.mayoclinic.com/health/green-tea/NS_patient-green_tea
- **Summary of the information:** Historically, tea has been served as a part of various ceremonies and has been used to stay alert during long meditations. A legend in India describes the story of Prince Siddhartha Gautama, the founder of Buddhism, who tore off his eyelids in frustration at his inability to stay awake during meditation while journeying through China. A tea plant is said to have sprouted from the spot where his eyelids fell, providing him with the ability to stay awake, meditate, and reach enlightenment. Turkish traders reportedly introduced tea to Western cultures in the 6th Century.

Section 5: Solutions to the Problem (or Issue)

- **Web site #1 Name:** Peace Health
- **Web address:** <http://peacehealthsleepcenter.org/kbase/cam/hn-2102007.htm>
- **Summary of the information:** Green tea contains volatile oils, vitamins, minerals, and caffeine, but the primary constituents of interest are the polyphenols, particularly the catechin called epigallocatechin gallate (EGCG). The polyphenols are believed to be responsible for most of green tea's roles in promoting good health. Green tea has been shown to mildly lower total cholesterol levels and improve the cholesterol profile (decreasing LDL "bad" cholesterol and increasing HDL "good" cholesterol) in most, but not all, studies. Green tea may also promote cardiovascular health by making platelets in the blood less sticky. Green tea has also been shown to protect against damage to LDL ("bad") cholesterol caused by oxygen. Consumption of green tea increases antioxidant activity in the blood. Oxidative damage to LDL can promote

atherosclerosis. While population studies have suggested that consumption of green tea is associated with protection against atherosclerosis, the evidence is still preliminary.

- **Web site #2 Name:** Prevention
- **Web address:** http://www.prevention.com/cda/article/green-tea-alternatives/ef62323b0b803110VgnVCM20000012281eac____/health/health.experts/andrew.weil.md/
- **Summary of the information:** Research finds that regular tea drinkers are at lower risk of cancer, coronary heart disease, stroke, osteoporosis and even bacterial and viral infections. Experiment with different teas and try to drink 4 cups a day. You can cut back on caffeine by pouring boiling water over tea leaves and letting the mixture stand for 30 to 45 seconds. Then drain the water and brew normally. This removes much of the caffeine, which is very water soluble, but leaves the more durable polyphenols.

- **Web site #3 Name:** Food Editorials
- **Web address:** http://www.streetdirectory.com/food_editorials/beverages/teas/green_tea_a_healthy_alternative_to_soda.html
- **Summary of the information:** However you chose to drink your green tea it is a nice refreshing change from soda and good for your health. It will not only quench your thirst but rejuvenate you too. As our world grows smaller we are becoming more aware of different types of foods and beverages. As more research is being done on this increasingly popular drink we will see even more benefits to our health. It is recommended to drink at least 3 cups or more per day to enjoy the health giving properties of green tea.

Conclusions:

After all my research, reading different articles and such, I realized that too much tea consumption can be harmful just as other drinks. It does help with many health risks and decreases the chances of things such as cancer. Although there are side effects to drinking tea, I found out that it is a much healthier drink than coffee and sodas. I will monitor my consumption, but I think I am on the right path with what I drink.

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