

Green Tea: How much should we drink, and what brand?

Ted Gault
Beloit College, Beloit, WI

Abstract

Benefits of green tea such as reduced problems with heart disease, lower rates of some cancers and a decrease in tooth decay have all been proven in critical trials. The ideal dosage of green tea is being determined. In this poster, I cite studies exemplifying the direct benefits of green tea in relation to dosage. There is a general number of cups of tea that should be consumed each day for ideal benefits. An ideal number of cups is known to maximize specific benefits associated with green tea. In addition, a study shows the best consumer brands of tea to buy based on antioxidant levels, a likely cause of most benefits.

Introduction

Green tea is known to contain caffeine and many beneficial antioxidants, especially one called epigallocatechin gallate. Antioxidants are known for battling free radicals, which are rebel molecules in the body that can disrupt and mutate bodily function. Green tea is especially rich in the catechin group of antioxidants, which have been proven to take part in the killing of bacteria, the blocking of cancer cells, and the reduction of cholesterol levels among other things (4). Studies have shown that green tea may help battle a variety of ailments including heart disease, cognitive decline and obesity (2,4,5). Green tea has even been show to increase lifespan (4). Only 8% of Americans drink green tea five or more times a week and the per capita intake of green tea is less than 1/3 cup a day (7). Furthermore, the antioxidant levels of different tea brands vary greatly (1). So far there is no evidence to support a possible overdose of green tea (7). I hypothesized that there is a dosage (in cups) of green tea that will maximize benefits and that a widespread consumption of this dosage will improve the general health of Americans.

Method

Countless studies have proven the benefits of green tea, but an ideal dosage has not been discovered. Studies of people comparing different dosages of green tea for certain effects are rare. I have therefore used what direct human studies I could find in relation to cups per day and supplemented this information with animal studies that are adjusted to humans as accurately as possible. I used many peer-reviewed sources, which included *The British Journal of Nutrition*, *The American Journal of Clinical Nutrition*, *The International Journal of Cancer*, and *Annals of Nutrition and Metabolism*.

Health Studies:

Body Fat Reduction:

A study conducted by Health Care Products Research Laboratories No. 1 of the Kao Corporation found that men who consumed 690 mg of green tea catechins a day for twelve weeks had a "significant" reduction in body fat as measured by body weight, BMI, waist circumference, body fat mass, and subcutaneous fat area. 690 mg roughly translates to about **3.5 cups of green tea a day**(3).

Breast Cancer:

In a study of 1095 Asian women, women drinking at least 85.7 ml of green tea a day had a 47% reduced risk of breast cancer and those drinking between 1.0 ml and 85.7 ml of green tea a day had a 29% reduced risk compared to non-drinkers. 85.7 ml translates to about **half a cup of green tea day** (8).

Cognitive Decline:

A cross-sectional study performed by the Tsurugaya Project and published in the American Journal of Clinical Nutrition found that green tea prevents some cognitive decline in adults over age 70. One cup of green tea a day was found to reduce cognitive decline by 38% and **3 cups of green tea a day** was found to reduce decline by 54% (5).

Glucose Levels (Diabetes Factor):

A study conducted by the National Food Research Institute found that mice given a small amount of green tea extract (0.03%) over a period of seven months had lower plasma glucose concentrations than mice given a placebo. Higher plasma glucose levels have been linked to an increased risk of diabetes. I estimate that **one cup of green tea a day** would infer the benefit discovered in this study (6).

Heart Attacks:

According to Dr. Katan, a speaker at the Linus Pauling Diet and Optimal Health Meeting, drinking two cups of green tea a day reduces the average risk of a 2nd heart attack by 20%, and drinking **four cups of green tea a day** reduces risk by 45% (4).

Longevity:

At a lecture given at an American Aging Association meeting in 2003, a study reported that animals that received a dosage of green tea equivalent to **four cups a day** for humans lived an average 10% longer (4).

Weight Loss:

A study conducted by the *British Journal of Nutrition* found that a combination of green tea's caffeine and its primary catechin, epigallocatechin-3-gallate (EGCG), increase energy expenditure due to thermogenesis. The caffeine amount was standardized at 200 mg while EGCG was varied at 90, 200, 300 and 400 mg. Subjects consumed the supplement thirty minutes before a standardized meal, three times a day. Daily energy expenditure increased by 750 kJ. This expenditure was the same for all doses of EGCG. It would take only **one cup of green tea** to meet the **EGCG requirement**, but almost **seven cups of green tea** to meet the **caffeine requirement** of this study (2).

Summary of Research

4 Cups of Green Tea

45% lower risk of second heart attack and 10% increase in longevity

3 ½ Cups of Green Tea

Reduction in body fat

3 Cups of Green Tea

54% reduced cognitive decline after 70



1 Cup of Green Tea

Lower plasma glucose levels and 750 kJ of extra energy expenditure

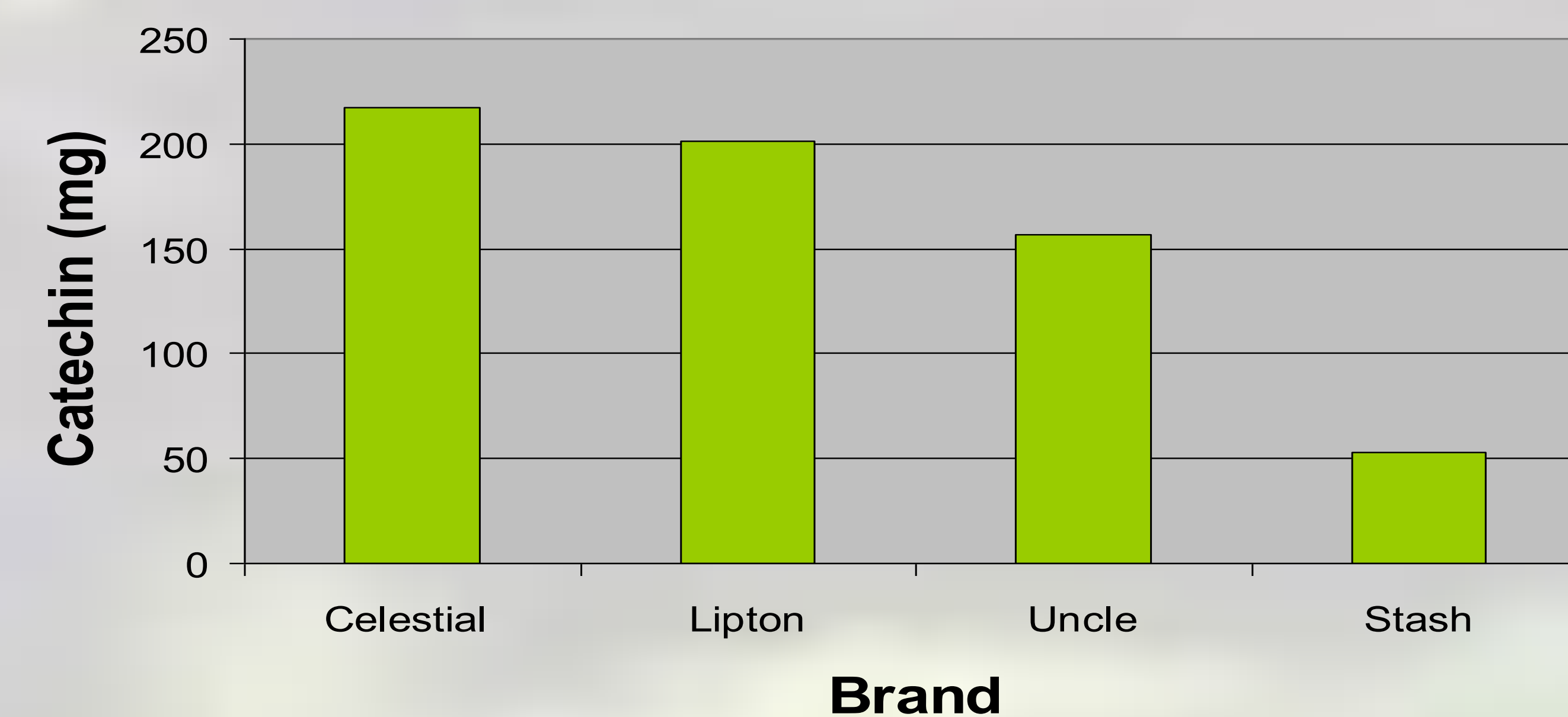
½ Cup of Green Tea

47% reduced risk of breast cancer

Tea Brands

Four green tea brands were analyzed and found to have vastly different amounts of catechins (a type of antioxidant) (1).

Tea Brand Catechin Levels



Celestial Seasoning Green Tea (217 milligrams)
Lipton Green Tea (201 milligrams)
Uncle Lee's Green Tea (157 milligrams)
Stash Premium Green Tea Decaf (53 milligrams)

Discussion:

As the research has shown, the benefits of green tea are varied in both type and necessary dosage. While there is still much research to be done pertaining both the workings of green tea antioxidants and to optimal dosages of green tea for certain affects, **four cups a day** seems to be a reasonable and greatly beneficial general quantity. With this dosage one achieves great protection against breast cancer, cognitive decline, heart attacks, and a slew of other unwanted ailments (4, 5, 8). There has been no evidence to support the notion that great quantities of green tea can harm a person so one might as well drink as much as possible to obtain the many benefits it has to offer.

References

- "Antioxidant levels of common teas vary widely." *Reuters*. 27 February 2002. 9 February 2006. <<http://www.heartcenteronline.com/myheartdr/News_about_the_heart/Antioxidant_levels_of_common_teas_vary_widely.html>>
- Berube-Parent, S., et al. "Effects of encapsulated green tea and Guarana extracts containing a mixture of epigallocatechin-3-gallate and caffeine on 24 h energy expenditure and fat oxidation in men." *The British Journal of Nutrition* 94 (2005): 432-6.
- Nagao, T., et al. "Ingestion of a tea rich in catechins leads to a reduction in body fat and malondialdehyde-modified LDL in men." *American Journal of Clinical Nutrition* 81 (2005): 122-9.
- Ordman, Roc. "NOTES ABOUT TEA-GREEN TEA IS NEARLY MAGICAL!" *Beloit College*. 1 June 2005. 9 February 2006. << <http://www.beloit.edu/~nutritio/tea.htm> >>
- Shinichi, Kuriyama, et al. "Green tea consumption and cognitive function: a cross-sectional study from the Tsurugaya Project." *American Journal of Clinical Nutrition* 83 (2006): 355-61.
- Shirai, N., and Suzuki, H. "Effects of Western, Vegetarian, and Japanese dietary fat model diets with or without green tea extract on the plasma lipids and glucose, and liver lipids in mice. A long-term feeding experiment." *Annals of nutrition & metabolism* 48 (2004): 95-102.
- "Survey: In U.S., Green Tea Ranks Last." *American Institute for Cancer Research*. 14 July, 2005. << http://www.aicr.org/site/News2?abbr=pr_&page=NewsArticle&id=8207>>
- Wu, AH, et al. "Green tea and risk of breast cancer in Asian Americans." *International Journal of Cancer* 106 (2003): 574-9.

Images:
<http://www.apolloherbs.com/breath13.jpg>
<http://www.spicediscounters.com/bulkteabagpict.jpg>