

Green Tea Aids in Overall Health

Nöelle Norman

Dr. Darla O'Dwyer (Advisor)

Stephen F. Austin State University

SPRING 2011

Abstract

Green tea is highly effective in aiding in overall health if consumed on a daily basis and can reduce incidence of cardiovascular disease, obesity, type 2 diabetes, and certain types of cancer. The primary compounds found in green tea are polyphenols which include catechins, epicatechin (EC), epigallocatechin (EGC), epicatechingallate (ECG), and epigallocatechingallate (EGCG). Five research studies were analyzed to verify the validity of the hypothesis that green consumption is beneficial in overall health. In these studies, green tea was found to aid in weight loss with those who consumed green tea regularly, as well as having effects on thermogenesis and fat oxidation to control weight maintenance. There was also a beneficial inverse association between green tea, coffee, and caffeine consumption and the risk of diabetes, cardiovascular disease, and mortality rates. The EGCG in the green tea was considered to be the primary ingredient that reduced mortality rates. Green tea is known to contain powerful antioxidants that help fight off diseases such as cancer. Green tea was statistically proven to contain the highest antioxidant content compared to other teas such as black tea, oolong tea, and roasted tea ($p < 0.001$). The possible health benefits from green tea consumption have been suggested by many epidemiologic studies and supported by laboratory data and therefore have a positive effect in aiding overall health.

What is in Green Tea?

Derived from the plant *Camellia sinensis*

High concentration of antioxidants: reduces oxidative DNA damage, lipid peroxidation and free radical generation.

Primary compound: Polyphenols.

- Catechins
- Epicatechin (EC)
- Epigallocatechin (EGC)
- Epicatechingallate (ECG)
- Epigallocatechingallate (EGCG)

Green tea is 20% to 45% polyphenols by weight, of which 60% to 80% are catechins.



Research Studies: Significant Findings

Research study 1:

Regular consumption of green tea (270 mg) resulted in greater thermogenesis and fat oxidation when combined with 150 mg caffeine.

Research Study 2:

Green tea ranked highest in phenol content, ferric ion and free radical reduction capabilities, lipid oxidation, and antioxidant content when compared to oolong, black, and roasted tea.

Research Study 3:

Cohort study in Japan indicated those who consumed more than 6+ cups of green tea as well as 3+ cups of coffee per day had a 33% and 42% lower risk for developing diabetes.

Research Study 4:

Fat oxidation contribution was higher in green tea treatment, 50mg caffeine and 90 mg EGCG, (45%) compared to the placebo, cellulose, (32%) which helps place a role in weight maintenance.

Research Study 5:

A cohort study over a period of 11 years found that those who consumed 5+ cups of green tea has a 16% lower risk of all-cause and CVD mortality.

Green Tea



- Harvested: Not oxidized
- Phenolic content: $62.5 \pm .03$
- Reduces ferric ions
- Caffeine content: 30mg per 100mL
- Has 2.5-fold greater reducing power
- Most effective in lipid oxidation
- Highest percent in DPPH radical scavenging



Oolong Tea



- Harvested: Short oxidation stage
- Phenolic content: 50.2 ± 0.3
- Caffeine Content: 38 mg per 100mL

Black Tea



- Harvested: Long oxidation stage
- Phenolic content: $44.2 \pm .3$
- The catechin content is only 20% to 30%
- Caffeine content: 51mg per 100mL

Interesting Facts

- Green tea is over 100 times more effective in neutralizing free radicals than vitamin C
- Green tea is manufactured by inactivating the enzymes in the leaves either by firing or steaming.
- 25 times more potency than vitamin E in protecting cells and DNA
- 2 – 3 cups a day (240-320 mg polyphenols) or 100-750 mg per day of standardized green tea extract is recommended for adults.
- No association was found between the consumption of oolong or black teas and risk for diabetes.
- Bottled teas are not equivalent to brewed teas.