Green Tea

Description

Green tea is the second-most consumed beverage in the world (water is the first) and has been used medicinally for centuries in India and China. A number of beneficial health effects are attributed to regular consumption of green tea and dried/powdered extracts of green tea are available as dietary supplements. Green tea is prepared by picking, lightly steaming and allowing the leaves to dry. Black tea, the most popular type of tea in the U.S., is made by allowing the leaves to ferment before drying. Due to differences in the fermentation process, a portion of the active compounds are destroyed in black tea, but remain active in green tea. The active constituents in green tea are a family of polyphenols (catechins) and flavonols which possess potent antioxidant activity. Tannins, large polyphenol molecules, form the bulk of the active compounds in green tea, with catechins comprising nearly 90%. Several catechins are present in significant quantities; epicatechin (EC), epigallocatechin (EGC), epicatechin gallate (ECG) and epigallocatechin gallate (EGCG). EGCG makes up about 10-50% of the total catechin content and appears to be the most powerful of the catechins – with antioxidant activity about 25-100 times more potent than vitamins C and E. A cup of green tea may provide 10-40mg of polyphenols and has antioxidant activity greater than a serving of broccoli, spinach, carrots or strawberries. A number of commercial green tea extracts are standardized to total polyphenol content and/or EGCG content.

Claims

- Anti-atherogenic / Reduces cholesterol & triglycerides
- Reduces blood clotting
- Enhances immune function
- Enhances weight loss
- Anti-cancer

Theory

Because the active compounds, the catechins, found in green tea are known to possess potent antioxidant activity, they may provide beneficial health effects by protecting the body from the damaging effects of oxidative damage from free radicals. A number of chronic disease states have been associated with free radical induced oxidative damage, including cancer, heart disease, suppressed immune function and accelerated aging.

Scientific Support

Although numerous laboratory investigations have shown the powerful antioxidant activity of green tea and green tea extracts, prospective clinical studies in humans are few. From the laboratory findings, it is clear that green tea is an effective antioxidant, that is provides clear protection from experimentally induced DNA damage and that it can slow or halt the initiation and progression of cancerous tumor growth. There is also

evidence from some studies that green tea provides significant immunoprotective qualities, particularly in the case of cancer patients undergoing radiation or chemotherapy. White blood cell count appears to be maintained more effectively in cancer patients consuming green tea compared to non-supplemented patients. Several epidemiological studies show an association between consumption of total flavonoids in the diet and the risk for cancer and heart disease. Men with the highest consumption of flavonoids (from fruits and vegetables) have approximately half the risk of heart disease and cancer compared with those with the lowest intake. The primary catechin in green tea, EGCG, appears to inhibit the growth of cancer cells as well as play a role in stimulating apoptosis (programmed cell death), both of which are crucial aspects for cancer prevention. In terms of heart disease protection, the potent antioxidant properties of polyphenols would be expected to reduce free radical damage to cells and prevent the oxidation of LDL cholesterol – both of which would be expected to inhibit the formation of atherosclerotic plaques. Aside from the clear benefits of green tea as an antioxidant, recent studies have suggested a role catechins in promoting weight loss. In one animal study, the anti-obesity effect of green tea was evaluated by feeding different levels of green tea (1-4% in their diets) to female mice for 4 months. The study found that the mice receiving the green tea in their diets had a significant suppression of food intake, body weight gain and fat tissue accumulation. In addition, levels of cholesterol and triglycerides were lower in mice receiving the green tea diet. Perhaps the most interesting finding from this study was that Leptin levels in serum showed a decrease with green tea treatments – indicating that green tea may have a direct effect on the regulation of body weight (downward). In some studies, green tea is associated with a mild increase in thermogenesis (increased caloric expenditure) – which is generally attributed to its caffeine content. At least one study has shown that green tea extract stimulates thermogenesis to an extent that is much greater than can be attributed to its caffeine content per se – meaning that the thermogenic properties of green tea may be due to an interaction between its high content of catechin-polyphenols along with caffeine. A probable theory for the thermogenic effect of green tea is an increase in levels of norepinephrine – because catechin-polyphenols are known to inhibit catechol-O-methyl-transferase (the enzyme that degrades norepinephrine). One study examined this theory, and the effect of green tea extract on 24-hour energy expenditure, in 10 healthy men – who each consumed 3 treatments of green tea extract (50mg caffeine and 90mg epigallocatechin gallate), caffeine (50 mg), and placebo (at breakfast, lunch, and dinner). The results of the study showed that, relative to placebo, the green tea extract resulted in a significant (4%) increase in 24-hour energy expenditure (approximately 800 calories per day) and a significant increase in the body's use of fat as an energy source (24-h Respiratory Quotient). In addition, the 24-hour urinary norepinephrine excretion was 40% higher during treatment with the green tea extract than with the placebo. It is interesting to note that treatment with caffeine in amounts equivalent to those found in the green tea extract (50mg) had no effect on energy expenditure of fat oxidation – suggesting that the thermogenic properties of green tea it due to compounds other than its caffeine content alone.

Safety

Green tea consumption of as much as 20 cups per day has not been associated with any significant side effects. In high doses, teas that contain caffeine may lead to restlessness, insomnia, and tachycardia. Decaffeinated versions of green tea and green tea extracts are available – but due to differences in caffeine extraction methods, the amounts of phenolic/catechin compounds can vary between extracts. Be sure to choose an extract that is decaffeinated as well as standardized for total polyphenol content and/or catechin concentrations. In addition, individuals taking aspirin or other anticoagulant medications (including vitamin E and ginkgo biloba) on a daily basis should be aware of the possible inhibition of platelet aggregation (blood clotting) associated with green tea (in some cases, green tea may prolong bleeding times).

Value

Especially beneficial to individuals at high risk for cancer (e.g. family history) or those undergoing chemotherapy or radiation treatment. Also beneficial as a general protective measure and dietary "insurance" of adequate polyphenol intake. Recent data provides strong evidence that green tea may be effective in stimulating thermogenesis, increasing

caloric expenditure, promoting fat oxidation and controlling body weight.

Dosage

Typical dosage recommendations are for 125-500mg/day – preferably of an extract standardized to at least 60% polyphenols and/or EGCG as a marker compound (this should be equivalent to 4-10 cups of brewed green tea).

Related Supplements

Antioxidants, Polyphenols

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