



Camellia sinensis – Green Tea

Camellia sinensis 1:2 Fluid extract

Common Names: Green tea

Botanical family: Theaceae

Part Used: Leaf

Dosage: 20-60 ml per week

Primary Active Constituents: Catechins (epigallocatechin-3-gallate (EGCG), epigallocatechin (EGC), epicatechin gallate (ECG), epicatechin (EC)); kaempferol, quercetin, myricetin; proanthocyanidins; xanthine alkaloids (caffeine, theobromine, theophylline); amino acids (theanine, glutamic acid); tannins.

Cautions & contraindications: Caution in those with marked iron-deficient anaemia due to the theoretical inhibitory effect of tannins on non-haem iron absorption. High doses of caffeine may exacerbate pre-existing anxiety and hyperthyroidism, interact with various medications, and should be avoided in pregnancy & lactation.

Actions: Anti-inflammatory, antioxidant, immunomodulatory, antimicrobial, cardioprotective, hypolipidaemic, anti-atherosclerotic, anti-diabetic, anti-obesity, anticarcinogenic, neuroprotective, antiaging.

Main Indications: Obesity, diabetes, metabolic syndrome, cardiovascular disease, cancer, neurodegenerative diseases, aging, cataracts, infections, periodontal diseases, liver and kidney disease, inflammatory bowel disease, autoimmune conditions, topically for photo-aging and genital warts.

Historical Use & Research Summary

Tea has a long history of medicinal and culinary use dating back over 5000 years in a number of Asian countries. It was used in traditional Chinese and Ayurvedic medicine systems for a variety of health conditions, from heart health and regulating body temperature and blood sugar, to improving digestion, mental function and eyesight¹.

Green tea, the unoxidised leaf of *Camellia sinensis*, contains nearly 4000 bioactive compounds, with the health promoting effects largely attributed to the most-therapeutically active catechins (flavanols), together with the flavonols (predominately kaempferol, quercetin, and myricetin), which collectively make up approximately 30-40% of green tea fresh leaf dry weight^{2,3,4}. Green tea contains a higher polyphenol and lower caffeine content than black tea (which is fully-oxidised, therefore a higher caffeine content), with approximately 2-5% caffeine of dried leaf weight⁵.

Green tea consumption has been suggested to improve the healthy functioning of several body systems, particularly with regards to diseases that have an underlying inflammatory or immune-dysregulated pathogenesis, such as cardiovascular, autoimmune and neurodegenerative diseases, and cancers⁶.

Cardiovascular disease (CVD)

Regular green tea consumption is beneficial to cardiovascular health, with various *in vitro*, *in vivo* and epidemiological studies demonstrating its effect at reducing cholesterol, improving lipid metabolism and excretion,

Research Summary continued

improving endothelial health and vascular function, increasing vascular relaxation, reducing vascular inflammation and smooth muscle cell proliferation, reducing reactive oxidative species, as well as reducing platelet aggregation and thrombosis^{7,8,9,10}.

Green tea was shown to reduce CVD mortality by 22-33% in a large epidemiological study of 40,000 Asian subjects consuming 500ml of green tea daily over 11 years¹¹. Another study demonstrated a 46% reduced risk of developing hypertension in subjects who drank between 120-599ml of green tea daily, and a 65% reduced risk in those who drank 600ml daily over 1 year⁷. A 4-week study in smokers demonstrated green tea consumption also reduced C-reactive protein, an inflammatory marker of increased CVD risk, and a reduction of plasma levels of soluble P-selectin, an endothelial adhesion molecule implicated in atherogenesis⁷.

Obesity / Diabetes

Green tea consumption has been associated with decreased leptin levels, reduced calorie intake, enhanced energy expenditure, increased fat oxidation and thermogenesis, and therefore a reduction in body weight^{2,12,13}.

Short term interventional studies have demonstrated positive effects for a catechin and caffeine combination, with this demonstrating increased energy expenditure and fat oxidation over 24 hours in healthy men compared to both caffeine-only and placebo controls¹². Longer-term studies demonstrated a standardised (25% catechins) green tea ethanolic extract reduced weight in moderately obese subjects by 4.6% and waist circumference by 4.5% after three months¹⁴.

Green tea and its extracts have been shown to modify glucose metabolism beneficially in experimental models of type 2 diabetes mellitus, with *in vitro* evidence demonstrating ECGC mimics insulin, reduces gluconeogenic gene expression and cytokine induced beta-cell damage. *In vivo* studies have demonstrated its ability to downregulate hepatic glucose production, improve insulin sensitivity, and reduce lipogenic enzymes and circulating triglyceride and cholesterol levels^{1,2}.

Cancer

Green tea exhibits anticarcinogenic and antimutagenic activity for a variety of cancers in preclinical studies, whilst chemopreventative activity has been suggested from a number of epidemiological studies, particularly with regards to reducing the risk of colorectal, liver, pancreatic, breast, ovarian, endometrial and prostate cancers and leukaemia. Green tea polyphenols appear to exert various anti-cancer effects at multiple stages of carcinogenesis^{15,16,17,18,19}.

Infections

Epidemiological and clinical studies have provided evidence that green tea and in particular the catechin ECGC has anti-infective properties demonstrated against a range of bacterial, viral and fungal pathogens. Both bactericidal and bacteriostatic action has been demonstrated, with ECGC shown to disrupt the lipid layers of the bacterial cell wall, disrupt biofilm formation and reduce bacterial adhesion to cells^{20,21,22}.

Green tea's strong antibacterial activity has been

demonstrated against a variety of oral pathogenic bacteria. It has been shown to reduce periodontal and gingival inflammation, inhibit bacterial and salivary amylase, inhibit acid production and prevent tooth enamel demineralisation^{23,24,25}.

Autoimmunity & inflammation

Animal models of autoimmune diseases have demonstrated green tea and ECGC to have immune and inflammatory modulating effects, particularly for T-cell mediated autoimmune conditions such as rheumatoid arthritis, inflammatory bowel disease (IBD), Sjogren's syndrome, Type 1 diabetes and a murine model of human multiple sclerosis^{26,27}. ECGC has the ability to affect both innate and adaptive immunity to varying degrees, with a particular effect on T-cell functions such as T-cell activation, proliferation, differentiation and production of cytokines²⁶.

Neurodegeneration

Green tea was traditionally valued as a CNS stimulant to improve cognition, mental alertness and memory. A recent Japanese prospective epidemiological study involving 13,645 participants over 5.7 years found green tea consumption to be significantly associated with a lower risk of incident dementia²⁸.

References

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Suggested Combinations

CVD, diabetes, metabolic syndrome, obesity

🍃 Kudzu, Bitter Melon

Aging, cataracts, cognitive decline

🍃 Ginkgo, Saffron

Autoimmunity, inflammation, cancer

🍃 Cats Claw, Baical Skullcap