



Green tea and black tea combine a powerful punch against cholesterol

Can green teas darker cousin the black tea improve cholesterol reduction? The answer is Yes! **In combination there is synergy.**

Tea is the most consumed drink in the world after water, well ahead of coffee, beer, wine and carbonated drinks¹. Tea from the leaf of the *cameilla sinensis* as the unfermented green tea or as the fermented black tea is rich in flavonoids.

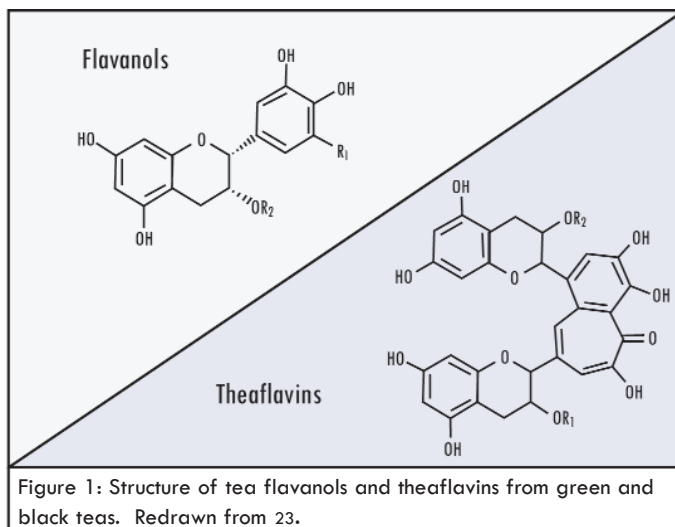
Flavonoids, of which there are several thousand and divided into six main classes², are abundantly present in the plant kingdom including roots, rhizomes, bark, stems, flowers, fruit, seeds and leaves. The diverse phenolic like structures from the flavonoids are thought to be responsible for imparting the many health benefits ascribed to tea³.

Many in-vitro studies show that the flavonoids possess strong antioxidant and metal chelating properties and may therefore protect cells and tissue structures- lipids, proteins and DNA against reactive oxygen species (ROS) (e.g. hydroxyl, superoxide anions, singlet oxygen and nitrogen reactive species: peroxy nitrates). All these free radical species initiate the following pathologic conditions⁵:

- Oxidation of LDL which is thought to be the initiating event in atherosclerosis^{6,7}.
- Carcinogenesis⁸.
- Diabetes due to the destruction of the B-cells in islets of Langerhans in the pancreas⁹.
- Insulin resistance and reduced activity¹⁰.
- Rheumatoid arthritis by releasing the various inflammatory mediators¹¹.
- Asthma¹².

- Cataracts by causing protein damage in the lens¹³.
- Neurodegenerative diseases- Alzheimers, Parkinsons, Huntingtons chorea etc.
- Coronary Artery disease¹⁴.

The body's endogenous antioxidant defenses are not always sufficient to completely counteract ROS and nitrogen species. Diet derived antioxidants are important in protecting against chronic diseases¹⁵. The principal



polyphenols found in green tea are catechins (particularly epigallo catechin (EGC), and epigallocatechin gallate (EGCG)) and flavins which undergo further polymerization in black tea following fermentation to yield theaflavins (TF) and thearugabins¹⁶.

It is commonly believed that green tea contains more antioxidants since green tea is further oxidized to make black tea. However, a comprehensive HPLC separation and measurement found that the total polyphenols were the same in both green and black teas¹⁷. Indeed, measurements of oxidization – reduction reaction using the Folin reagent and by the Trolox equivalent antioxidant

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capacity (TEAC) method have shown no difference between green and black teas. A recent study has shown the theaflavins and catechins to be equally effective antioxidants.

The pharmacokinetics of tea are well studied and key biomarkers of oxidative damage have been identified in urine, bile and plasma¹⁸. By monitoring such biomarkers it is possible to determine the effects of different phenolic compounds. The most studied parameter of tea has been

their antioxidant activity which is assumed to be responsible for the beneficial effects of tea drinking¹⁹.



Several epidemiological and animal studies have shown association between increased tea consumption and reduced incidence of cardiovascular diseases (CVD). However, human studies have not been clear cut and have shown contradictory results from a positive lowering of systolic blood pressure in Norwegian men consuming black tea to no reduction in Japanese consuming green tea, or Australians consuming five cups of green or black tea. A British study showed that men or women consuming six cups of black tea showed no lowering in blood pressure. Recently, several carefully controlled studies with particular attention to confounding factors of dietary lifestyles showed an inverse relationship between increased tea consumption and CVD^{21, 22, 23}.

Researchers have postulated that the reason some studies with green tea showed no possible health correlation was due possibly because of absence of theaflavins. A possible synergy between catechins from green tea and theaflavins from black tea was suspected.

Recently, researchers at Vanderbilt University in Tennessee have reported cholesterol lowering effect of a theaflavin-enriched green tea extract²⁴. In this double-blind, randomized, placebo controlled multicentre trial in China with a total of 240 patients (male and female) with moderate hypercholesterolaemia received 375mg of total flavonoids (75mg of theaflavins, 150mg of catechins and 150mg of other tea phenols). After 12 weeks, the mean decrease in cholesterol was 11% and 16% in LDL-cholesterol. No significant adverse events were observed.

Theaflavins combine the benefits of green tea phytochemicals and black tea to give a synergistic effect for optimal cardiovascular health.

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