

Effect of tea consumption on blood pressure , total cholesterol, body weight and fat in healthy volunteers

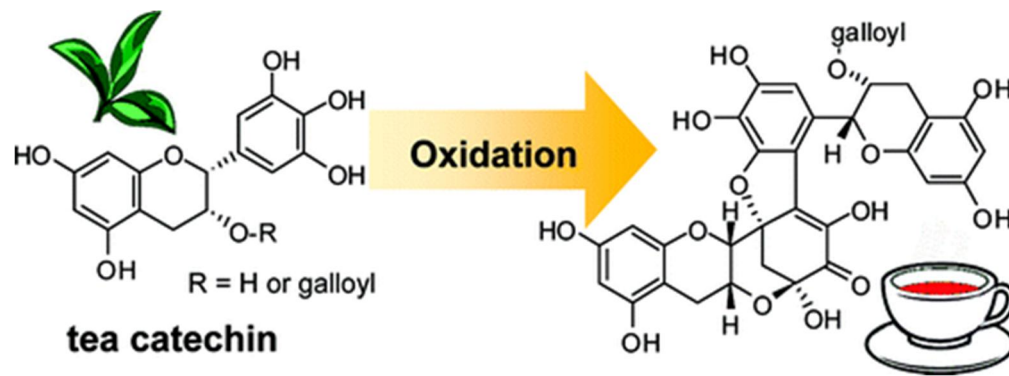
.Introduction

Tea, derived from leaves of the plant *Camellia sinensis*, is the most widely consumed beverage in the world and can be categorized into three main types depending on the level of oxidation: green



Composition of Tea (% , dry weight basis)

Constituent	Fresh Tea	Black Tea	Black Tea Brew *
Phenolic compounds	30	5	4.5
Oxidized phenolic compounds	0	25	15
Protein	15	15	Traces
Amino acids	4	4	3.5
Caffeine	4	4	3.2
Crude fiber	26	26	0
Other carbohydrates	7	7	4
Lipids	7	7	Traces
Pigments (chlorophyll and carotenoids)	2	2	Traces
Volatile compounds	0.1	0.1	0.1
Minerals	5	5	4.5



Tea is the most consumed drink in the world after water. Green tea is a ‘non-fermented’ tea, and contains more catechins, than black tea or oolong tea. Catechins are *in vitro* and *in vivo* strong antioxidants. In addition, its content of certain minerals and vitamins increases the antioxidant potential of this type of tea. Since ancient times, green tea has been considered by the traditional Chinese medicine as a healthful beverage. Recent human studies suggest that green tea may contribute to a reduction in the risk of cardiovascular disease and some forms of cancer, as well as to the promotion of oral health and other physiological functions such as anti-hypertensive effect, body weight control, antibacterial and antivirasic activity, solar ultraviolet protection, bone mineral density increase, anti-fibrotic properties, and neuroprotective power. Increasing interest in its health benefits has led to the inclusion of green tea in the group

of beverages with functional properties. However, although all the evidence from research on green tea is very promising, future studies are necessary to fully understand its contributions to human health.

Effect of tea on cholesterol

tea consumption can significantly reduce plasma LDL-C and TC concentrations. In addition, the meta-analysis based on observational studies found that tea consumption including green tea, black tea, or oolong tea is significantly associated with the reduction of CVD risk Cholesterol Reduction.

•Researchers from the United States Department of Agriculture

studied the effect of tea on 15 mildly hypercholesterolemic adult participants following a “Step I” type diet moderately low in fat and cholesterol, as described by the American Heart Association and the National Cholesterol Education Program. After three weeks, researchers found that five servings of Black Tea per day reduced 6% LDL (“bad”) cholesterol by 11.1 percent and total cholesterol (TC).

Analysis of differences between before and after the experiment of volunteers with the intake of 6- gram black tea per day for a period of 2 months

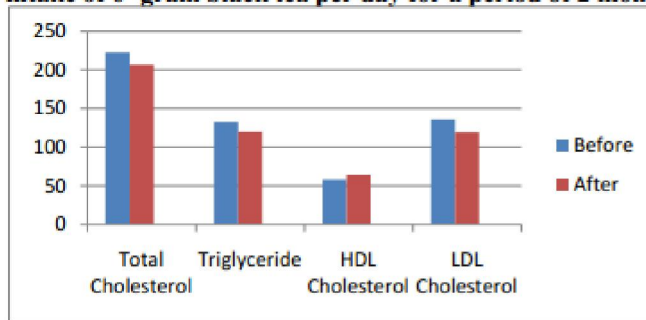


Figure 2 shows the average of blood lipid before and after the experiment of volunteers who drank 6 grams of black tea per day for a period of 2 months

The results can be concluded from the blood lipid profile before and after the experiment of the volunteers who drank 6 grams of black tea per day for 2 months. The findings suggest that, after the experiment, the level of Total Cholesterol (sig. = 0.003) decreases significantly at 0.05 level, HDL-cholesterol (sig. = 0.002) increases significantly at 0.05 level, LDL-cholesterol (sig. = 0.012) decreases significantly at 0.05 level. As for Triglyceride (sig. = 0.218), there is no difference.

Research Results

Analysis of differences between before and after green tea-drinking experiment of volunteers with the intake of 6 grams per day for 2 months

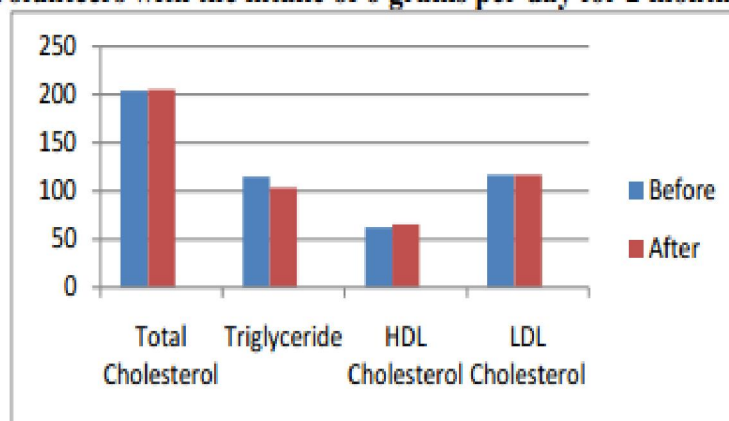


Figure 1 shows the average of blood lipid before the experiment (Before) and after test (After) of the volunteer group that drank 6 grams of green tea per day for a period of 2 months.

The results can be concluded from blood lipid profile before and after the experiment of the volunteers who drank 6 grams of green tea per day for 2 months. It is found that there is no difference in the levels of Total Cholesterol (sig. = 0.766), Triglyceride (sig. = 0.133), HDL-cholesterol (sig = 0.133), LDL-cholesterol (sig. = 0.595).

Analysis of differences before green tea and black tea – drinking experiment

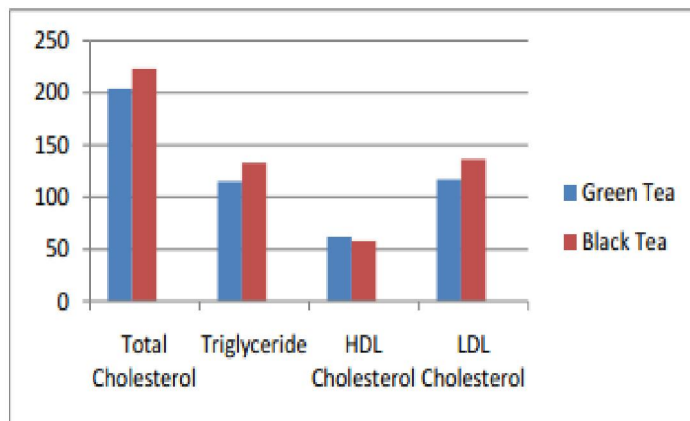


Figure 3 shows the average of blood lipid before the experiment between the group of volunteers that drank green tea and the group of volunteers that drank black tea.

The result conclusion indicates that, before green tea and black tea – drinking experiment of both groups, the levels of Total Cholesterol (sig. = 0.108), HDL-cholesterol (sig. = 0.426), LDL-cholesterol (sig. = 0.108) and Triglyceride (sig. = 0.444) are not statistically different because the sig value is greater than 0.05.

Cardiovascular Disease (CVD) Risk Factors

Tea consumption improves endothelial function by increasing nitric oxide bioavailability and enhancing vasorelaxation. Tea catechins, epigallocatechin-3-gallate and epicatechin, provided at concentrations achievable in human tissues, relaxed blood vessel tone of isolated arterial walls in an animal model.

effect of tea on blood pressure

In a randomized, double-blind, placebo-controlled study of 19 males (daily Black Tea consumption increased flow mediated dilation) FMD) from an average of 7.8 percent to up to 10.3 percent, depending on flavonoid dosages. The flavonoids in as little as one cup of tea (about 100 mg flavonoids) were found to improve FMD. Black Tea decreased systolic blood pressure by 2.6 mm/Hg and diastolic by 2.2mm/Hg.

A recent clinical study showed that short- and long-term consumption of Black Tea by subjects with coronary artery disease restored endothelial and blood vessel function to levels similar to those of healthy subjects. Endothelial function is the ability of the inner lining of blood vessels to dilate in response to increased blood flow. While researchers are still examining the various mechanisms by which tea flavonoids function, some studies suggest multifunctional mechanisms, meaning that several mechanisms work in tandem to collectively improve markers for cardiovascular health. Important areas of tea and cardiovascular health research include blood vessel and endothelial function, or the ability of the blood vessels to dilate to allow for proper blood flow, serum cholesterol levels and Low Density Lipoprotein (LDL) cholesterol oxidation and cardiovascular disease. Study findings in the area of tea and the

reduction in cardiovascular disease risk include the following,

While researchers are still examining the various mechanisms by which tea flavonoids function, some studies suggest work in tandem to collectively improve markers for cardiovascular health. Important areas of tea and cardiovascular health research include blood vessel and endothelial function, or the ability of the blood vessels to dilate to allow for proper blood flow, serum cholesterol levels and Low Density Lipoprotein (LDL) cholesterol oxidation. Each of these factors impacts the risk of myocardial infarctions (heart attacks), stroke and cardiovascular disease. Study findings in the area of tea and the reduction in cardiovascular disease risk include the following:

Tea and Metabolism, Obesity and Body composition

Several studies suggest drinking calorie-free tea may help with weight management. Preliminary research suggests that tea flavonoids help elevate metabolic rate, increase fat oxidation and improve insulin activity metabolism that may improve weight loss and maintenance. Tea catechins can also provide modest shifts in Key findings include the following :Using the National Health and Nutrition Examination surveys of 1-2003-2006 , researchers identified a correlation between hot tea consumption and lower mean waist circumference and lower BMI among adult tea drinkers versus non-tea drinkers. In addition, hot tea drinkers had higher HDL .cholesterol, lower C-reactive protein and

women had lower levels .2- In a meta-analysis including six published tea research studies, 24-hour energy expenditure increased by 4.7 percent or 102 calories over hours with a catechin-caffeine mixture and fat oxidation increased during the same period, revealing that tea may aid weight loss.3-In a meta-analysis of 11 published clinical studies, catechins or epigallocatechin gallate (EGCG)-caffeine mixture have a modest positive effect on weight loss and weight maintenance.4-Green Tea extract was found to significantly increase 24-hour energy expenditure and fat oxidation in healthy men.5-Green Tea extract was found to significantly increase 24-hour energy expenditure and fat oxidation in healthy men.6- Japanese researchers found that in a 12-week, double-blind and placebo-controlled study, Green Tea catechins led to a reduction in body fat, blood pressure and LDL cholesterol compared to the control group. The authors suggest that Green Tea catechins may help prevent obesity and reduce risk for cardiovascular disease.

Discussion

1-effect on cholesterol :

tea consumption can significantly reduce plasma LDL-C and TC concentrations researchers found that five servings of Black Tea per day reduced LDL (“bad”) cholesterol by 11.1 percent and total cholesterol (TC).

2. effect on blood pressure:

Tea decreased systolic blood pressure by 2.6 mm/Hg and diastolic by 2.2mm/Hg. Endothelial function is the ability of the inner lining of blood vessels to dilate in response to increased blood flow While researchers are still examining the various mechanisms by which tea flavonoids function, some studies suggest multifunctional mechanisms, meaning that several mechanisms work in tandem to collectively improve markers for cardiovascular health.

3. effect on body weight :

tea flavonoids help elevate metabolic rate, increase fat oxidation and improve insulin activity metabolism that may improve weight loss.

4. effect on fat metabolism:

Long-term feeding of tea catechins suppressed body fat accumulation in high-fat diet-induced obesity. Consecutive intake of tea catechins (588 mg/day) reduced body fat, especially abdominal fat in humans. These results demonstrate that intake of tea catechins is beneficial for body fat accumulation.

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