

## EFFECTS OF GREEN TEA (CAMELLIA SINENSIS) ON SERUM CHOLESTEROL

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### Abstract

Green tea (*Camellia Sinensis*) has become a subject of interest because of its beneficial effect on human health. It is a widely consumed beverage in the world and contains anti-oxidant such as catechin. Epidemiological studies have reported that it has a multi-functional component that is involved in lowering of serum cholesterol, anti cancer activities, neuroprotection, weight loss, increase thermogenesis. Etc and these effect are mainly ascribed to the gallate eaters of catechin which are the (-) catechin gallate, (-) epicatechin gallate, (-) epigallocatechin gallate and (-) gallic acid. The result further showed that green tea has a hypercholesterolemia effect although it was statistical insignificant ( $p < 0.05$ ).

**KEYWORDS:** *Camellia Sinensis*, Caffeine, Polyphenol and Hypercholesterolemia

### INTRODUCTION

Cholesterol is a lipidic waxy steroid found in the cell membrane and transported in the blood plasma of all animals (Emma Leah, 2009). It is an essential component of mammalian cell membranes where it is required to establish proper membrane permeability and fluidity. Cholesterol is the principal sterol synthesized by animals but small quantities are synthesized in other eukaryotes such as plants and fungi. It is almost completely absent among prokaryotes which includes bacteria. (Budin *et al.*, 2003).

Green tea is a type of tea made solely with the leaves of *Camellia sinensis* that has undergone minimal oxidation during processing. Green tea originates from China and has become associated with many cultures in Asia from the Middle East. Many varieties of green tea have been created in countries where it is grown. These varieties can differ substantially due to variable growing conditions, processing and harvesting time.

Over the last few decades green tea has been subjected to many scientific and medical studies to determine the extent of its health benefits with some evidence suggesting regular green tea drinkers may have lower risk of heart disease and developing certain types of cancer. (Doss-Mx. *et al.*, 2005).

Green tea contains minerals, vitamins, oils, caffeine and polyphenols particularly the epigallocatechin gallate (EGCG) which is probably the key active ingredient. (Suzuki, *et al.*, 2005).

Catechins contained in green tea consist mainly of epicatechin, epigallocatechin, epicatechin gallate (ECG) and epigallocatechin gallate (EGCG). It is also known that about half of the catechins are gallic acid during heat treatment and sterilization. Physiological functions of tea catechins are mainly ascribed to gallate esters which are the ECG and EGCG. (Kakuda *et al.*, 2005).

### MATERIAL AND METHOD

#### INSTRUMENT

- Micro-pipette
- Test-tube
- Disposable hand gloves
- Test-tube holders

#### EQUIPMENT

1. Centrifuge (AA320, Surgifriend Medical England)
2. Automated pipette (Roche Diagnostics (GMBH) D68298 Mannheim Germany [www.Roche.com/poc](http://www.Roche.com/poc)).
3. Digital colorimeter

## CHEMICAL / REAGENT

Cholesterol kit (Randox laboratories ltd, United Kingdom, Bt294Q4).

## RESEARCH DESIGN AND POPULATION (ANIMAL TREATMENT)

Twenty (20) mister mice weighing about 80-100kg were used for study and were given a cholesterol rich diet (normal feed and egg yolk) for about 3 weeks. Blood samples were collected from 4 mice to determine their initial serum cholesterol level as control.

## PREPARATION OF GREEN TEA

Green tea solution was prepared daily cheeping the tea bag into 35ml of water for about 15minutes and cooled to room temperature before it is been administered to the mice orally with the aid of a canula

## ANALYSIS

Blood samples was collected into test-tube and centrifuged, after which serum cholesterol level was determined using an enzymatic and end point method (randox cholesterol kit) and data was collected with the aid of a digital colorimeter.

## PROCEDURE

First the blood sample is collected and centrifuged after which you label the test tubes BLANKS, STANDARD AND SAMPLE. 1m of reagent is placed in each test tube respectively and then 10 $\mu$ L of standard into the test tube labeled standard, and 10 $\mu$  of sample to test tube labeled sample.

After which you mix and incubate for 10 minute then the absorbance of the sample is measured against reagent black at a wavelength of 540nm.

## RESULT

### EFFECT OF GREEN TEA ON SERUM

The result is represented as mean  $\pm$  standard deviation. From the table, it shows that green tea has hypocholesterolemic effect on serum cholesterol because the value gotten from the control was higher than the sample (i.e. green tea fed mice).

	Green tea effect mean $\pm$ SD	p-value
Control n = 4	183.7 $\pm$ 0.7	P, 0.05
Sample n = 16	174.2 $\pm$ 2.3	P < 0.05

## DISCUSSION

The result obtained (table 1), shows that the values of cholesterol for subject taking green tea was higher than the values for control. Although, this difference was statistically insignificant (P<0.05).

Evidence from previous studies shows that green tea lowers the total cholesterol level and also improves cholesterol profile. (Tsubono *et al*, 2005). Also, there is research indicating that drinking green tea lowers total cholesterol levels as well as in proving the ratio of good (HDL) cholesterol to bad (LDL) cholesterol. Also, reports shows that green tea extracts may reduce LDL cholesterol levels (Inann *et al*, 2007).

Green tea catechin inhibits oxidation of low density lipoprotein hence total serum cholesterol levels. (Tsubono *et al*, 2005).

## CONCLUSION

The results obtained demonstrate that green tea catechins exert hypercholesterolemia effect in cholesterol fed mice in other words green tea catechins can however, lower cholesterol even when they are deliberately fed a diet designed to raise their cholesterol level.

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