Comparison of the Effectiveness of Green and Black Tea on Lowering Blood Lipid Level

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Abstract

Currently, a trend in high-cholesterol patients is continually rising. Living habits and inappropriate diet lead to risk of dyslipidemia, resulting in the cardiovascular disease. Moreover, the rate of fatalities related to cardiovascular disease seems to increase. In Thailand, green tea and black tea have played a major role in the beverage market from the past 10 years and the consumption of both has skyrocketed. It reflects that green tea and black tea are widely popular among consumers in every gender and age. This study aims at researching the effectiveness of green and black tea in lowering blood lipid level and the comparison between the effectiveness of both teas. An experimental model involves 30 volunteers divided into 2 groups. The first group consumed 2 g of green tea per meal for 8 weeks and 3 meals a day without dietary control, while the latter group consumed black tea with the same pattern and quantity as the first group. Fasting blood samples were collected from volunteers before and after these 8 weeks. The result shows that consumption of black tea significantly decreases the level of total cholesterol (sig.=0.003), and declines low-density lipoprotein cholesterol (sig.=0.012). More importantly,the black tea essentiallyincreases high-density lipoprotein cholesterol (sig.=0.002). However, the result does not show difference in triglyceride (sig.=0.218) between black tea and green tea. In conclusion, this study demonstrates that consumption of black tea could reduce blood lipid profiles whereas consumption of green tea could not. The comparison of the effectiveness between green and black teas in lowering blood lipid level indicates no difference.

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In the group that drank 6 grams of black tea per day for 8 weeks, it is possible to lower the levels of Total Cholesterol and LDL-cholesterol, increase the level of HDL-cholesterol. Nevertheless, there is no effect on Triglyceride level. In the group that drank 6 grams of green tea per day for 8 weeks, there is no effect on lowering blood lipid profile in all parameters. When these two groups were brought for comparing the results of blood lipid after the intake of green tea and black tea for 8 weeks, it is not feasible to indicate which type of tea is more effective in lowering blood lipid profile because there is no statistical difference.

Keywords: Green Tea/Black Tea/Lipid Profiles

Introduction

Currently, it is found that there are steadily increasing numbers of patients with high blood cholesterol across the world, especially in urban society with the Western lifestyle. In Thailand likewise, many facilities lead to a lack of appropriate exercise and changes in eating habits; snack food and fast food consumption contributes to increased blood cholesterol level, for example. There is the higher incidence of dyslipidemia in younger patients. Dyslipidemia is a disease that does not show any symptom to appear obviously. The patients will know at the time of blood drawing to check for blood lipid profile only. Failure to control and care properly will adversely affect the body. This is a risk factor that causes various diseases, especially Artherosclerotic cardiovascular disease considered to be another serious disease leading to the death of population in the top rank of Thailand. As a result, preventing and controlling the risk of hyperlipidemia is vital to the health and quality of life of this population.

Green tea and black tea drinks play a significant role in the beverage market of Thailand today and the consumption of which skyrockets. This demonstrates that green tea consumption is widely popular and clearly increases among consumers of every gender, age. Currently, there are numerous research reports on green tea and black tea, which show the benefits of green tea and black tea to help prevent **artery-clogging fats** and heart disease, control blood lipid profile, control blood pressure and blood sugar level.

The research into green tea and black tea concerning Antioxidant activity reveals that theaflavin in black tea exceeds catechin which is a major substance in green tea (1). Therefore, the aforesaid statement is the origin of this comparative study on the effectiveness of green tea and black tea in lowering blood lipid profile of humans. The researcher predicts that black tea will be more effective in lowering lipid profile than green tea and sincerely hopes that this research will be beneficial to consumers in the future.

Research Objectives

1. To study the effectiveness of green tea in lowering blood lipid profile of the volunteer group

2. To examine the effectiveness of black tea in lowering blood lipid profile of the volunteer group

3. To investigate comparatively the effectiveness of green tea and black tea in lowering blood lipid profile of the volunteer groups

Research Methodology and Procedure

Population of the Study

Male and female population aged between 35-60 years in Huay Yai Subdistrict, Chonburi Province, who were healthy, eligible in accordance with the terms and requirements, totaling 70 cases and 52 volunteers for participation in the research.

Tools used in Research
- Evaluation form, clinical characteristics, blood test results, side effects by the researcher and team
- Green tea leaves, infusion type Raming tea products: FDA No. 50-1-09225-2-0057
- Black tea leaves, infusion type Raming tea products: FDA No. 50-1-09225-2-0054
Quantity of green tea and black tea used in the research

Research Methodology

The method of conducting the research is based on making contact to find the volunteers in Huay Yai Subdistrict, Chonburi Province, who were healthy, eligible according to the terms and requirements, totaling 70 cases; preliminary check; enquiry about history of general health information, basic habits, career, eating habits of patients, including history of drug allergy and underlying disease, history of alcohol drinking and smoking ; calculating Body mass index in the range 25 +/- 4.8 kg / m^2 and blood test, namely FBS, ALT, AST, BUN, Creatinine ; selecting the cases that were not qualified or had abnormal blood, liver and kidney test results for removal; choosing at random a total of 52 volunteers; providing clarification of purposes, method of research implementation, details of each product type used in the research and expected benefits, side effects that may result from the research thoroughly. Then, the patients were asked to sign the consent form to participation in treatment. The research method also includes general physical examination, vital sign assessment, body weighing, blood test before conducting the research, namely Total Cholesterol Triglyceride LDL-cholesterol HDL-cholesterol; appointment to inform the blood results in another one week. Research participants were divided into two groups for random experiment. Next, the first group of research participants was requested to drink infusion black tea 2 g / serving with the required preparation of infusion in 200 ml of water at the same temperature every day (80-100^0 C) for 3 minutes without any flavoring. The pattern includes drinking 3 times daily in the morning, noon, evening, drinking during meals for the duration of 8 weeks by avoiding all kinds of caffeine-containing beverages and foods throughout the conduct of research. The research participants of the 2nd group drank infusion green tea 2 g / serving with the required preparation of infusion in 200 ml of water at the same temperature every day (80-100^0 C) for 3 minutes without any flavoring. The pattern includes drinking 3 times daily in the morning, noon, evening, drinking during meals for the duration of 8 weeks by avoiding caffeine-containing foods and beverages of all kinds throughout the conduct of research. There are monitoring of the symptoms after drinking black tea and green tea, general physical check results, vital sign, taking blood samples of patients after the 8th week, namely FBS, ALT, AST, BUN, Creatinine, Total Cholesterol, Triglyceride, LDL-cholesterol and HDL-cholesterol after beginning drinking black tea and green tea. In the 9th week after the start of conducting the research, the appointment was made to tell research participants about the results of blood taken after the experiment together with check on health, side effects, blood pressure.

Statistics Used in Data Analysis

Testing the effectiveness of green tea and black tea before (Basal Level) and after consumption by analyzing the data on levels of Total Cholesterol, Triglyceride, LDL-cholesterol and HDL-cholesterol of both representative groups. The data obtained is in quantitative terms. The statistical Paired Student t-test (Dependent Samples) is used.

Analysis of data on the levels of Total Cholesterol, Triglyceride, LDL-cholesterol and HDL-cholesterol which decrease of both representative groups (drinking green tea and black tea) for comparing the effectiveness in lowering Lipid Profiles between green tea and black tea. The data obtained is in quantitative terms. The statistical t-test (Independent Samples) is used.

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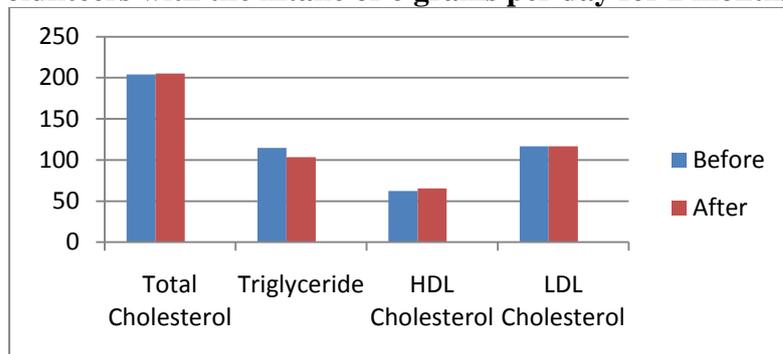
 Figure 1 shows the average of blood lipid before the experiment (Before) and after test (After) of the volunteer group that drank 6 grams of green tea per day for a period of 2 months.

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).
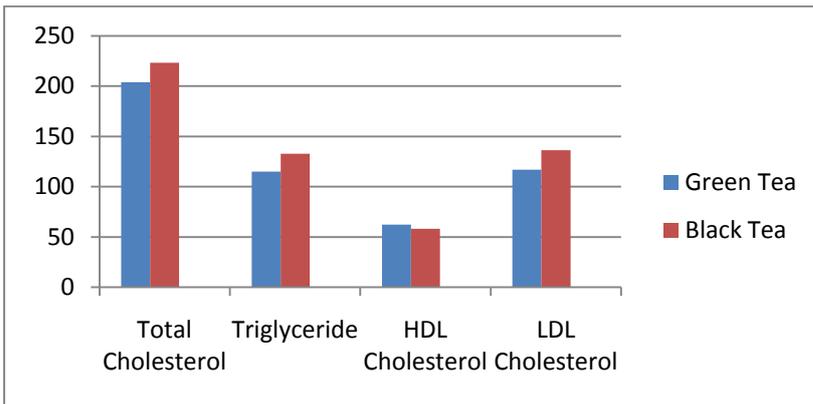
Analysis of differences between before and after the experiment of volunteers with the intake of 6- gram black tea per day for a period of 2 months
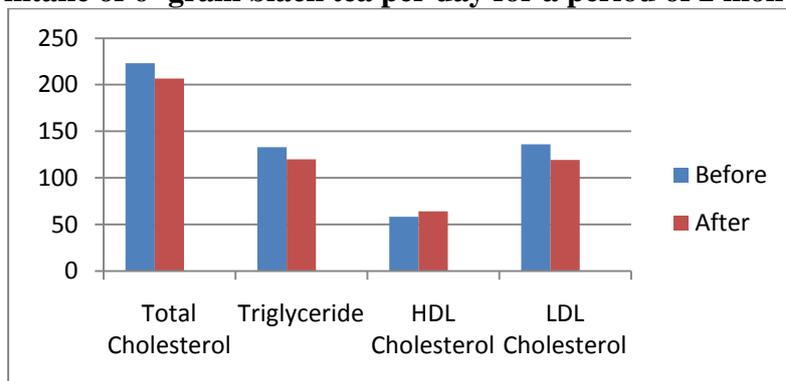
Figure 2 shows the average of blood lipid before and after the experiment of volunteers who drank 6 grams of black tea per day for a period of 2 months

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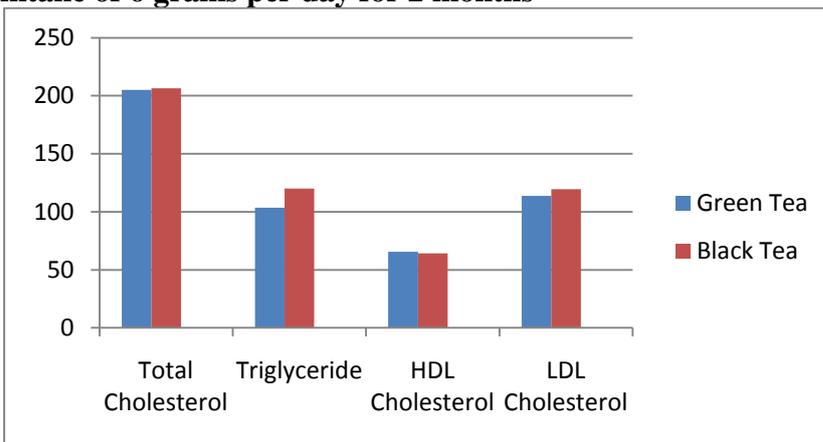
Analysis of differences before green tea and black tea – drinking experiment

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.

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

Figure 4 displays the average of blood lipid after the experiment between the group of volunteers that drank green tea and the group of volunteers that drank black tea with the quantity of 6 grams for a period of 2 months.

The result conclusion reveals that, after both groups of volunteers drank tea for two months, the levels of Total Cholesterol (sig. = 0.905), HDL-cholesterol (sig. = 0.791), LDL -cholesterol (sig. = 0.674) and Triglyceride (. sig. = 0.487) do not differ statistically. Because the sig value is greater than 0.05, thus there is no difference in the experiment after drinking 2 types of tea.

Discussion of Experiment Results

The findings of this comparative study on the effectiveness of green tea and black tea in lowering blood lipid profile suggest that drinking 6 grams of green tea per day for 8 weeks is not effective in reducing blood lipid profile. The reason is because the values of Total Cholesterol, HDL-cholesterol, LDL-cholesterol and Triglyceride have no statistical difference. Drinking 6 grams of black tea per day for 8 weeks is effective in lowering the level of Total Cholesterol significantly, increasing the level of HDL-cholesterol significantly,   lowering the level of

LDL-cholesterol significantly while Triglyceride has no difference. When comparing the effectiveness of green tea and black tea in lowering blood lipid profile of both experimental groups for 8 weeks, it is found that both types of tea do not differ statistically. Therefore, it is not feasible to indicate which kind of tea is more effective in lowering blood lipid profile. Moreover, this experiment excluded dietary control of volunteer groups. This is therefore the cause of conflict with many studies of which results reveal that green tea can lower blood lipid and can reduce blood lipid better than black tea. Furthermore, before taking the blood samples of both volunteer groups for the 2nd time after 2 months,

it was the period of Asalha Puja (the day before the Buddhist Lent) and Khao Phansa (Buddhist Lent) festival during which some volunteers took alcoholic drinks and quite highly fatty foods. These eating habits might affect the results of the research.

Conclusion of Results

In the group that drank 6 grams of black tea per day for a period of 8 weeks, it is possible to lower the levels of Total Cholesterol and LDL-cholesterol, increase the level of HDL-cholesterol. Nevertheless, there is no effect on Triglyceride level. In the group that drank 6 grams of green tea per day for 8 weeks, there is no effect on lowering blood lipid profile in all parameters. When these two groups were brought for comparing the results of blood lipid after drinking green tea and black tea for 8 weeks, it is not feasible to indicate which type of tea is more effective in lowering blood lipid profile.

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