THE DIFFERENCES IN RAT CHOLESTEROL LEVELS AFTER GIVING RED GUAVA JUICE

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ABSTRACT

Introduction: Cholesterol is a fat found in our body, it can be dangerous if cholesterol level is increasing. The way to lower cholesterol levels, such as by consuming high-fiber foods for example red guava.

Purpose: To determine the difference in total cholesterol levels in rats after giving red guava juice.

Method: The research was conducted using 30 Rattus Norvegicus. Rats were divided into three groups, each group consisted of 10 rats. Control group was given 594 chicken feed, first treatment group was given lard and second treatment group was given lard with red guava juice. Before being given treatment, five rats from each group were examined for their total cholesterol and the remaining five rats were given treatment for 14 days before total cholesterol were checked. Examination of total cholesterol by enzymatic colorimetry CHOD-PAP using blood from orbital vein of rats without fasting.

Result: There were significant differences in total cholesterol of rats before and after treatment (P<0.05) in each treatment group. In comparison of three groups that had given treatment, significant difference was found (P=0.005). Significant differences were also found in comparison of two groups, between first treatment group and second treatment group (P = 0.004), insignificant results were found in comparison of control group with first treatment group (P = 0.060), and comparison of control group with second treatment group. (P=0.299).

Conclusion: There are differences in total cholesterol of rats, total cholesterol of rats in high-fat diet group with guava juice were lower than the high-fat diet group.

Keyword: Red Guava, Total Cholesterol

INTRODUCTION

Increased cholesterol is very risky for heart disease, besides that hypercholesterolemia can worsen the function and structure of tissues or organs from time to time. (1) According to data from the World Health Organization (WHO) in 2008, the prevalence of hypercholesterolemia in adults in Europe was 53.7% while in the Mediterranean region, the prevalence in the adult population is 38.4%. (2) The percentage of high cholesterol recorded at the Pos Pembinaan Terpadu (Posbindu) and puskesmas by gender, 54.3% for women and 48% for men, which means that the percentage is higher for women than men.

However, the percentage according to general can be grouped into several age groups, at the age of 15-34 years obtained 39.4% and in the age group 35-59 obtained 52.9% while in the age group 60 years and over obtained 58.7%, from the data it can be seen that the age group 60 years and over has the most hypercholesterolemia. (3) Meanwhile in Bali itself, according to data

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from Posbindu and Health Centers in 2016 as many as 34 were examined, there were 3 with high cholesterol or about 8.8%, but this data cannot be concluded because it is only based on the number that is checked. (3)

The way to reduce the increase in cholesterol levels is to increase the consumption of foods that contain high fiber, WHO recommends about 25 grams per day. Fiber itself is very easy to find, found in vegetables, nuts, and fruit. Guava is one of the fruits that contain high fiber. In the research of Tijjani et al. regarding the effect of some fruit juices on lipid profiles in rats, some fruits used such as guava, paw paw, banana, apple, and pineapple, it was found that these fruits can lower blood cholesterol in experimental rats. (4)

Based on the explanation above, researchers are interested in conducting research by giving 5 cc of guava juice to mice given a high-fat diet with the aim of knowing whether there is a difference in the total cholesterol of the mice.

METHOD

In this study, 30 Rattus Norvegicus were used, the number of samples was calculated using the Federer formula. Thirty rats were adapted in advance for one week. Then, the rats were divided into three groups, in each group there were ten rats. Five rats from each group were examined for their total cholesterol levels before being given treatment.

Furthermore, the remaining rats in each group were given treatment according to their group. The first group is the control group which will be fed 594 chickens ad libitum. In the second group, 594 chickens were fed ad libitum and then 1 cc of pork fat was given by sonde method at 08.00 WITA. Meanwhile, in the third group, 594 chickens were fed ad libitum, 1 cc of pork fat was also given in the morning at 08.00 WITA, then the rats in this group were also given guava juice by means of sonde as much as 3 cc at 17.00 WITA. Chicken feed 594 contains 13.0% water content, 17.5-19.5% protein, 3.0% fat, 8.0% fiber, 7.0% ash,

0.90% calcium and 0.60% phosphorus. After being given treatment for 2 weeks, the total cholesterol level of the rats will be measured using CHOD-PAP enzymatic colorimetry. Blood samples taken were blood in the orbital veins of rats. After the research was conducted, all rats would be terminated using ketamine-zylaline 75-100 mg/kg body weight which was injected into the heart muscle. Then cremated and the ashes will be buried.

In this study, guava juice was made by peeling the guava fruit first then washing it. Before in the blender, the guava is cut into several parts to make it smoother faster. The guava fruit is blended without adding water and sugar. Next, the guava juice will be filtered using an iron filter so that it is separated from the rough seeds.

RESULTS

a. T-Test

In the research, hypothesis testing was carried out using Paired T-Test by comparing the results before and after being given treatment. Examinations on the total cholesterol levels of rats in each group and the following results were obtained:

Table 5.4 Hypothesis test with T-test

Paired samples test		
Group	Sig.	Interpretation
Control	0.038	Significant
P1	0	Significant
P2	0	Significant

Paired samples correlation		
Group	Sig.	Interpretation
control	0,004	Significant
P1	0,004	Significant
P2	0,026	Significant

In the paired samples correlation test, significant results were obtained ($P < 0.05$), which means that there is a correlation between the before and after being given treatment of each group. In addition, the

paired samples test also obtained significant results from each group so that it can be said that there was a significant difference between the results of the before and after being given treatment. In addition, the paired samples test also obtained significant results from each group so that it can be said that there is a significant difference in the results before and after being given treatment.

b. One Way Anova

Table 5.5 Hypothesis test with One Way Anova

Analysis test	Sig.	Interpretation
Anova	0,005	Significant

In the one way ANOVA test which compared the results of total cholesterol levels in mice after being given treatment with the control group with the first and second treatment groups, significant results were obtained with a P value <0.05, which means that there is a difference in cholesterol levels. Furthermore, a follow-up test will be carried out or it can be called a Post Hoc Test. By using the Tukey analysis test. From the Post Hoc test, the following results were obtained

Table 5.6 Post hoc test test with Tukey

Groups	Sig.	interpretation
Control : P1	0,060	Not significant
Control : P2	0,299	Not significant
P1 : P2	0,004	Significant

From table 5.6, the results show that the comparison of total cholesterol levels in the control group with the first treatment group (P1) is not significant or there is no significant difference, as well as the comparison of the control group with the second treatment group (P2), the results are not significant, but in comparison the group that was given lard (P1) and the treatment group that was given lard and red guava juice (P2), it was found that there was a

significant difference between the two groups.

DISCUSSION

Analysis of differences in total cholesterol levels of rats after given red guava juice. In this study, the results showed that there were differences in total cholesterol levels between after and before being given treatment, besides that there were also differences in total cholesterol levels between the treatment groups. This is in accordance with previous research conducted by Rahman et al. by comparing tomato juice and red guava juice in rats induced with egg yolk. In research conducted by Rahman et al. The mice were given red guava juice as much as 3 cc every day for 2 weeks. In this study, it was found that guava juice can reduce total cholesterol levels in rats.[5]

Red guava fruit has a high fiber content, especially pectin, which is about 5.60 grams per 100 grams. This makes guava can lower cholesterol levels. Pectin can lower cholesterol levels by delaying gastric emptying so that calorie intake can be limited. Dietary fiber in guava can increase the excretion of cholesterol and bile acids. Low cholesterol absorption can reduce cholesterol levels in the liver. In addition, the fiber that we consume can bind fat in the intestine. Fiber forms gelatin and in the digestive process binds bile acids and cholesterol which will then be excreted through the feces. [6] Primary bile acids (cholic acid and chenodeoxylic acid) in the gallbladder combine with glycine and taurine to form bile salts. Under normal conditions, the primary bile acids excreted by the bile into the intestine will be reabsorbed back into the liver via the enterohepatic pathway. Primary bile acids that do not enter the enterohepatic circulation are passed into the colon. Primary bile acids are partially converted by bacteria into secondary bile acids (deoxylic acid and litholic acid). Then, the primary and secondary bile acids become one in the lower intestine, precisely in the

colon, into sterols or fecal cholesterol called cosprotanol. By dietary fiber, bile is bound in the intestine and then excreted continuously through the feces, as well as the liver which continuously takes and metabolizes blood cholesterol then excretes it into the gallbladder so that cholesterol in the blood is reduced.(7)

In addition, guava fruit also contains vitamin C and beta carotene which can increase endurance, but it is also useful as an antioxidant. (8) In the research of Ardian et al. involving housewives who are hypercholesterolemic, red guava juice is given as much as 200 grams per day for 24 days. This is in accordance with the theory according to Srimonasark which says that consuming at least 6 grams of pectin per day can reduce blood cholesterol levels by up to 13% within 14 days. It is known that pectin is a soluble fiber that is effective in lowering total or LDL cholesterol levels.(8)

Furthermore, in the study of Maryanto et al. on the effect of guava on lipid profiles in hypercholesterolemic rats, the rats were divided into 4 treatment groups and the results showed that there were significant differences in the total cholesterol levels of each group. Red guava can improve lipid profile because the dominant content is fiber (pectin).(9)

Analysis increases of total cholesterol levels after given lard. In a study by Fatimatuzzahro et al. on the effect of robusta coffee on blood lipid profiles and body weight of rats induced by a high-fat diet. In this study, rats were used as samples which were divided into three groups, namely the control group which was given standard feed, the coffee group which was given Robusta coffee brewing and the last is the hyperlipid group which was given lard. Pork fat was given as much as 3 grams per 200 grams of body weight rats per day, after being given treatment for 4 weeks there was a significant difference in total cholesterol levels between the hyperlipid group and the control group and the coffee group. (10) This could be because lard contains saturated fatty acids. tall one. (11)

Apart from lard, saturated fat is also contained in cheese, butter, coconut oil, chocolate and animal fat. (12) Saturated fatty acids are fatty acids that do not have double bonds at carbon atoms. A diet high in saturated fat can increase cholesterol levels by about 15-25%. Fa deposits in the liver. (13) High consumption of saturated fat causes LDL cholesterol to be produced in large quantities by the liver. (14) High LDL can accumulate in the walls of blood vessels so that saturated fat is also at risk of atherosclerosis and cardiovascular disease. Consumption of saturated fat is a maximum of 10% of the total energy consumed a day. (9)

CONCLUSIONS

There is a difference in total cholesterol levels between the high-fat diet group and the high-fat diet group with red guava juice. The total cholesterol levels of rats in the group given lard and guava juice were lower than the group given lard.

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