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The Effects of Temulawak extract and Yoghurt on HDL-LDL mice blood exposed waste cooking oil

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Abstract. Using cooking oil repeatedly in processing the fried foods can cause health problems, especially cholesterol metabolism that affect levels of HDL, LDL, triglycerides and total cholesterol blood that can cause blockage of blood vessels leading to coronary heart disease. This study aimed to determine the effect of temulawak extracts and yoghurt in lowering levels of LDL-HDL mice after given used cooking oil. The Treatments were temulawak extract at a dose of 280 mg/kg bw mice and 560 mg/kg bw mice and yoghurt concentration of 4% of the body weight of mice. Parameters measured were the levels of HDL (High Density Lipoprotein) and LDL (Low Density Lipoprotein). The results showed that temulawak extract 560 mg/kg bw and yoghurt 4 % bw effective in increasing HDL levels and decreasing LDL levels mice blood.

Keywords: temulawak extract, yoghurt, cooking oil, HDL-LDL, mice.

Introduction

Vegetable cooking oil is generally containing saturated fatty acids, which could increase blood cholesterol levels, whereas unsaturated fatty acids can lower blood cholesterol levels and monounsaturated fatty acids more effective in lowering blood cholesterol levels [1].

Cooking oil used repeatedly will change the physical structure and chemical, with high temperatures result in the hydrolysis of fats in the oil into free fatty acids are easily oxidized to form peroxides are compounds that can cause toxicity in the body and various diseases such as diarrhoea, fat deposition in vessels blood, cancer [2].

Free fatty acids are formed due to oxidation and hydrolysis enzymes during processing and storage which in turn form trans fatty acids and free radicals, when present in food consumed can lead to increased levels of LDL (Low Density Lipoprotein) and reduce levels of HDL (High Density Lipoprotein). Consumption of trans fatty acids 5 g/day may raise the risk of heart disease by 25% in just a few years. While free radicals in the body can cause liver disease, coronary heart disease, and cholesterol [3].

Potential temulawak and yoghurt are known to have fairly high antioxidant content. Temulawak (Curcuma xanthorrhiza Roxb) is a medicinal plant native to Indonesia containing starch, curcumin and essential oil. Curcumin is the yellow colour that can lower blood cholesterol, increase the secretion of bile, anti-cancer and anti-hepatotoxic, but it also acts as an anti-oxidant curcumin [4, 5].

While yogurt is a drink that has been known since long ago because of the benefits and nutritional value is high enough. Yoghurt is produced from the fermentation of milk with lactic acid bacteria is Lactobacillus bulgaricus and Streptococcus thermophillus [6]. Lactic acid bacteria can be consumed by people who are allergic to milk (lactose intolerance) and lower blood cholesterol levels, through its ability to change cholesterol into cosprostanol and discharged with faeces, so the cholesterol absorbed by the body will be reduced [7].

Antioxidants are compounds that are able to stop, inhibit and repair the attack or damage caused by free radicals. This capability is obtained by giving the electron, binding and terminate the chain reaction of free radicals. Antioxidants are believed to reduce cholesterol and prevent coronary heart disease and stroke [8, 9]

Methods

Materials used in this study are: 28 mice (Mus musculus L.) Swiss Webster males aged 3 months, weighing 25-30 grams, distilled, extract of temulawak (Curcuma xanthorrhiza Roxb) and yoghurt, cooking oil, feed mice, PGA (Powder Arab GoM). Mice were kept in a closed room with temperature between 25-280C, 78-85% air humidity and irradiation time of 12 hours of light and 12 hours dark. Replacement chaff carried out regularly twice a week. During the treatment the mice were given drinking water and feed ad libitum. Further research was conducted by the method of experimental using completely randomized design (CRD) with seven treatments, namely: negative control, positive control, treatment extract of temulawak at a dose of 280 mg / kg bw, 560 mg / kg bw, yoghurt 4% weight, and a combination of extracts of temulawak and yoghurt. Parameters measured were the levels of HDL (high-density lipoprotein), LDL (Low Density Lipoprotein). Data were analyzed with Analysis of Variance (ANOVA) with significance level of 5%, if significantly different Ganda Located continued with Duncan test.

Result

Results for HDL showed that there was a significant change in HDL levels thus continued with Duncan Multiple Range Test. Treatment P3 (31.82) showed the worst effect increase HDL levels than the other treatments, close to the value KP (35.12), while the P5 (15.07) shows the influence of the most well compared with other treatments, approaching the value of KN (1,375).

Results for LDL showed that was significantly so that continued with Duncan Multiple Range Test. P5 treatment (36.47) showed the most good effect decrease LDL levels compared with other treatments, while P3 (47.85) shows the effect of the worst with a value approaching KP (56.72).

The results showed P3 treatment is treatment which gives bad influence on HDL and LDL levels. While the P5 treatment is the best treatment in raising HDL levels and lower LDL levels. This reflects a combination of temulawak extracts given in high doses and yoghurt could increase HDL levels and decrease LDL levels. Curcumin is able to increase the secretion of bile thereby affecting the metabolism of cholesterol and lowering blood cholesterol level [10]. Yogurt containing lactic acid bacteria can degrade cholesterol to coprostanol that cannot be absorbed by the intestine. Coprostanol and cholesterol in bile will be removed from the body with feaces [11].

Table 1. Average levels of HDL-LDL

Treatments	HDL		LDL		Levels changes	
	Before	After	Before	After	HDL	LDL
KP	47,32	12,20	83,42	140,1	35,12e	56,72e
KN	45,50	45,20	86,17	91,85	1,375a	5,67a
P1	46,15	18,60	83,07	130,0	27,55d	46,92d
P2	48,62	21,87	82,70	124,8	26,75d	42,10c
P3	48,37	16,55	84,00	131,8	31,82e	47,85d
P4	45,22	24,62	82,77	124,2	21,60c	41,42c
P5	47,02	27,77	85,77	122,2	15,07b	36,47b

Note: Different letters indicate significantly different values based on the results of Duncan's Multiple Test ($p < 0.05$). KP: The treatment of waste cooking oil 6 ml / kg bw, KN: Treatment PGA 2%, P1: Treatment of temulawak extract 280 mg / kg bw, P2: Treatment of temulawak extract 560 mg / kg bw, P3: Treatment yoghurt 4% bw, P4: Treatment of temulawak extract 280 mg / kg bw and yoghurt 4% bw, P5: Treatment of

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temulawak extract 560 mg / kg bw and yoghurt 4% bw.

Conclusion

Extracts of temulawak (Curcuma xanthorrhiza Roxb) and yoghurt influence the levels of HDL-LDL the most effective treatment was P5 (temulawak extract 560 mg / kg bw and yoghurt 4% bw) increasing HDL levels and decreasing LDL levels.

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