EFFECT OF ETHANOL EXTRACT OF PICRIA FELTERRAE LOUR. LEAVES ON TRIGLYCERIDE AND CHOLESTEROL LEVELS OF WHITE RATS

by Marianne Anne5
EFFECT OF ETHANOL EXTRACT OF PICRIA FEL-TERRAE LOUR. LEAVES ON TRIGLYCERIDE AND CHOLESTEROL LEVELS OF WHITE RATS

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Received: 07 March 2018, Revised and Accepted: 25 March 2018

ABSTRACT

Objective: The objective of the study was to evaluate the effect of Picria fel-terrae on triglyceride and cholesterol levels in long-term duration.

Method: The effect of ethanol extract of P. fel-terrae leaves was performed using white rats divided into several groups, which include control group, extract at doses of 125, 250, 500, and 1000 mg/kg body weight. The extract at different doses was orally administered to the test animal for 90 days. Then, the triglyceride and cholesterol levels were measured.

Results: The ethanol extract of P. fel-terrae in long-term use did not affect the cholesterol level of male and female white rats. However, there was a significant increased in triglyceride level as compared to normal control (p<0.05).

Conclusion: The ethanol extract of P. fel-terrae increased triglyceride level only without increasing the level of cholesterol.

Keywords: Picria fel-terrae, Triglyceride, Cholesterol.

INTRODUCTION

Cholesterol and triglycerides are the major lipids in the body. They are transported as lipoproteins which contain lipid and proteins. Plasma lipoproteins consist of phospholipid, cholesterol, triglyceride, and protein. Low-density lipoproteins (LDLs), very-LDLs, and high-density lipoproteins are three major classes of lipoproteins [1]. Abnormalities of plasma lipoproteins can result in hyperlipidemia includes hypercholesterolemia and hypertriglyceridemia. It is a predisposition to coronary disease and constitutes one of the major risk factors for coronary heart disease. Atherosclerosis may lead to the manifestations of ischemic heart disease [2].

Picria fel-terrae has been studied to have pharmacological activity as hepatoprotective, antioblastic, and diuretic effects [3-5]. The previous study showed that this plant contains flavonoids, saponins, tannins, glycosides, and steroids/triterpenoids [6].

However; the effect of P. fel-terrae on cholesterol and triglycerides was seldom reported. Therefore, this study aimed to evaluate the effect of ethanol extract of P. fel-terrae on cholesterol and triglycerides levels of male and female white rats.

METHODS

Materials

The chemicals reagents used in this study were acaridol, ethanol, Na-CMC (Sodium-Carboxy Methyl Cellulose) (Sigma, USA). The tools used in this research were blender (Philips, Netherlands), rotary evaporator (Heidolph VV-500, Germany), animal balance (P Beckman Citi, 1500, Indonesia), and digital balance (Vibra, Japan).

Plant material, extraction, and characterization

The leaf of pangan tanah (P. fel-terrae Lour.) was collected from Pancur Batu, Deli Serdang, Sumatera Utara. The plant identification was confirmed by Herbarium Medanese (MEDA) Universitas Sumatera Utara.

Extraction procedure

Fresh samples were washed, dried, and powdered in a grinder and stores in an airtight jar. An amount of 1000 g the dried leaf of pangan tanah was extracted with maceration method using 10 L ethanol until decolorization. Then, the ethanol macerato was evaporated at 60°C in a rotary vacuum evaporator and thickened by heating in a water bath at 40°C. The yield of ethanol extract of pangan tanah leaf was 66.0 g (11.31%).

Animals

All treatments to the animal and procedure were evaluated by Animal Research Ethics Committee Faculty of Mathematics and Natural Science, Biological Department, University of Sumatera Utara.

Analysis of triglyceride and cholesterol levels

Animals were divided into five groups of females and males, each consisting of five rats:
1. Control of Na-CMC 0.5% w/v
2. Dose 125 mg/kg body weight (BW)
3. Dose 250 mg/kg BW
4. Dose 500 mg/kg BW
5. Dose 1000 mg/kg BW

The treatment was administered orally at a single dose to the test animal for 90 days. At the end of the study, the blood was collected and inserted into microcentrifuge tubes and immediately centrifuged for 10 min at 3000 rpm. The serum was separated and stored in a freezer. The blood and serum samples were examined at Balai Laboratorium Kesehatan, Dinas Kesehatan Propinsi Sumatera Utara [7] OECD.

Statistical analysis

Data were analyzed using SPSS 17.0 with Kolmogorov-Smirnov normality test, two-way ANOVA, and Kruskal (Kruskall-Wallis) tests to see differences between test groups with significance (p<0.05).

RESULTS

Based on statistical analysis using two-way ANOVA (Table 1) it can be concluded that there is no significant difference (p>0.05) and post-hoc
Table 1: Triglyceride and cholesterol levels of white rats

| Group | Gender | Biochemical parameters (mg/dL) | Triglyceride | Cholesterol |
|-------|--------|--------------------------------|--------------|-------------|
| I     | Female | 67.40±14.13                    | 65.60±19.68  |
|       | Male   | 65.60±14.99                    | 58.40±12.79  |
| II    | Female | 117.20±20.46*                  | 55.80±12.43  |
|       | Male   | 118.40±60.21*                  | 53.00±14.64  |
| III   | Female | 118.40±21.24*                  | 43.60±18.76  |
|       | Male   | 118.00±33.42*                  | 73.49±23.38  |
| IV    | Female | 117.40±56.71*                  | 43.09±21.08  |
|       | Male   | 116.75±28.25*                  | 48.09±5.88   |
| V     | Female | 116.80±12.45*                  | 57.20±23.85  |
|       | Male   | 118.40±11.14*                  | 50.40±14.97  |

*Significantly different with the control group (p<0.05)

Tukey test showed that there was a significant difference of cholesterol levels between normal control group and extract group. However, there was no increase of triglyceride level in the treatment group.

**DISCUSSION**

The biochemical examination showed no effect on cholesterol level but significant effect on triglyceride level. The ethanol extract of *P. fal-teuue* at all doses increased the triglyceride level (116.75-118.40 mg/dL) as compared to normal group (65.60-67.40 mg/dL) in both male and female rats. As shown in Table 1, the effect of the extract on triglyceride level was not in a dose-dependent manner. Duration and intensity of exposure to toxic substances also can affect the form and the toxicity of a particular material [8]. These biochemical responses that may be adaptive, if sustained, lead to change of pathological and biochemical disorder [9]. Based on the screening, pegan tanoh leaf has glycoside compounds, terpenoids, saponins, tannins, and flavonoids. Flavonoids are polyphenol compounds that act as antioxidants [10]. On this study, treatment was orally administrated for 90 days so that it could increase the concentration of flavonoids in the blood and organ targets. Increased of high concentration antioxidant can change antioxidants be free radicals (pro). High concentration of antioxidant may affect the rate of oxidation that causes oxidative stress in cells because there was an unbalance amount of oxidant and pro-oxidant [11]. Oxidative stress may impair the metabolism of triglyceride. Collectively, these data show that ethanol extract of *P. fal-teuue* induced a significant effect on triglyceride level.

**CONCLUSION**

Ethanolic extract of pegan tanoh leaf increased the level of triglyceride. Hence, may increase the risk of hypertriglyceridemia in long-term use.

**ACKNOWLEDGEMENT**

This work was supported by Ministry of Research, Technology and Higher Education of the Republic of Indonesia through DIPA research grant scheme with grant number 0/BN2.3.1/FPMIPA-DRPM/2017.

**REFERENCES**

1. Niroha KK, Divya M, Vani S, Sadiq M. A review on hyperlipidemia. J Novel Trends Pharm Sci 2014;4:81-92.
2. Shuttat GF. A review article on hyperlipidemia: Types, treatments and new drug targets. J Biomed Res 2014;7:399-409.
3. Marianne, Christella J, Ginting MA, Dilmunthi A, Nasution R. Hepatoprotective activity combination of Curcuma longa L. and Zingiber officinalis L. on liver induced by a combination of rifampicin and isoniazid. Int J Pharm Sci Res 2017;9:23-8.
4. Candani D, Supriadi A, Zaini U, Saragih A. The effect of dichloroacetic Acid (DCA) on liver function using the high-cholesterol diet rat model. Int J Pharm Sci Res 2016;7:1125-8.
5. Dilmunthi A, Harahap U, Rosidah, Naiton M. Evaluation of diuretic activity of Feruta fal-teuue leaves extract. Asian J Pharm 2015;8:204-5.
6. Jiwina NA, Harahap U, Dilmunthi A. Relaxation effect of ethanol extract of Pueraria fal-teuue (Pegan tanoh) leaves on constriction of isolated rat’s ileum contracted by serotonin. J Iran Pharm Biotech 2016;5:359-41.
7. OECD: Repeated Dose 90-Day Oral Toxicity Study in Rats (TG 408). 2008.
8. Prata D, Bharadwaj S. Study of acute, subacute and chronic toxicity of Ayurvedic Medicine. Int J Adv Res Pharm Bio Sci 2012;1:103-14.
9. Witty PK. How do elevated triglycerides and low HDL-cholesterol affect inflammation and atherosclerosis?Curr Cardio Rep 2013;15:960.
10. Jiwina NA, Harahap U, Dilmunthi A. Relaxation effect of ethanol extract of Pueraria fal-teuue leaves on constriction of isolated rat’s ileum contracted by serotonin. J Iran Pharm Biotech 2016;5:359-41.
11. Prodromou I, Beolciu I, Wiidsoowa S. Antioxidant and prooxidant properties of flavonoids. Fioterapia, 2011; 82(4):513-22.
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4. José L. Peñalvo, Anu Hopia, Herman Adlercreutz. "Effect of sesamin on serum cholesterol and triglycerides levels in LDL receptor-deficient mice", European Journal of Nutrition, 2006
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Yuandani, Ibrahim Jantan, Khairana Husain. "Phyltetralin, 1,7,8-trihydroxy 2-naphtaldehyde, ethyl 8-hydroxy-8-methyl-tridecanoate and 1-triacontanol from Schumach. & Thonn. inhibit phagocytic activity of human leucocytes", Journal of Pharmacy and Pharmacology, 2019

Rosidah, Mun Fei Yam, Amirin Sadikun, Mariam Ahmad, Gabriel Akyirem Akowuah, Mohd. Zaini Asmawi. "Toxicology evaluation of standardized methanol extract of Gynura procumbens", Journal of Ethnopharmacology, 2009