

**EFFECT OF ETHANOL EXTRACT OF *PICRIA FEL-TERRAE* LOUR. LEAVES ON TRIGLYCERIDE AND CHOLESTEROL LEVELS OF WHITE RATS****URIP HARAHAP\*, MARIANNE, YUANDANI, HAFIZA MITHA AGUSTYA, DIRA UMMUL AZIZAH, SYARI WIDIA ALFIAH**

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**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.**Methods:** 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.© 2018 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>) DOI: <http://dx.doi.org/10.22159/ajpcr.2018.v11s1.26618>**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, antidiabetic, and diuretic effects [3-5]. The previous study showed that this plant contains flavonoids, saponins, tannins, glycosides, and steroids/triterpenoid [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 aquadest, ethanol, Na-CMC (Sodium-Carboxy Methyl Cellulose) (Sigma, USA). The tools used in this research were blender (Philips, Netherlands), rotary evaporator (Heidolph VV-300, Germany), animal balance (Presica Geniweigher GW-1500, Indonesia), and digital balance (Vibra, Japan).

**Plant material, extraction, and characterization**

The leaf of pugun tanoh (*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 pugun tanoh was extracted with maceration method using 10 L ethanol until discoloration. Then, the ethanol macerate was evaporated at  $\pm 40^\circ\text{C}$  in a rotary vacuum evaporator and thickened by heating in a water bath at  $\pm 40^\circ\text{C}$ . The yield of ethanol extract of pugun tanoh leaf was 680 g (11.31%).

**Animals**

All treatments to the animal and procedure were evaluated by Animal Research Ethics Committees 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 (Kruskal) Wallis 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±48.21*	53.00±14.64
III	Female	118.40±21.24*	43.60±8.76
	Male	118.00±33.42*	73.40±23.38
IV	Female	117.40±56.71*	43.00±8.80
	Male	116.75±28.25*	48.00±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 an 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. fel-terrae* 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 or pathological and biochemical disorder [9]. Based on the screening, pugun 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. fel-terrae* induced a significant effect on triglyceride level.

## CONCLUSION

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

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