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Methoxy Bergenin's Effect on Total Protein, Albumin and Globulin Levels of Wistar Rats' Blood

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ABSTRACT

This paper describes the effect of methoxy bergenin isolated from the raru's stem bark ethanol extract (Vatica pauciflora blume) on the total protein, albumin and globulin levels. The 4 × 4 ccompletely randomized design is done by envolving 16 Wistar rats of ± 3 mon age, ± 100 g weight. Group 1 was treated by only feed as a control, and each of the other groups i.e., Group 2, Group 3, and Group 4 by doses of 65 mg/200 g body weight/2 ml, 130 mg/200 g body weight/2 ml and 195 mg/200 g body weight/2 ml respectively, which provided during 21 days. The Wistar rats' total protein, albumin and globulin level was measured on the 21st day by Folin's phenol method. Data was analized by ANOVA, and showed that administration of methoxy bergenin of the raru stemb bark's ethanol extract (V. pauciflora blume) effect the total protein, albumin and globulin levels of Wistar rats' blood significantly.

Keywords: Methoxy Bergenin, Herbal medicine, Total protein, Albumin, Globulin

INTRODUCTION

Levels of total protein, albumin, and globulin is the important parts of blood plasma, which serve to maintain osmotic pressure and carry steroid hormones, lipids and fibrinogen in the blood clotting. Fluids move from blood vessels into tissues is an indication of edema, caused by decreased levels of albumin. Albumin Globulin Ratio (AGR) which is lower than the normal range also indicates the disorders of the kidneys and liver. Things like this can be caused by the use of chemical drugs [1]. Therefore, herbal medicine has become an alternative to drug use chemicals with security considerations [2]. However, it must be ensured an herbal medicine is completely safe to use [3].

In general, herbal medicines are derived from plants that have green flavonoid compounds [4]. The existence of the levels of total protein, albumin and globulin produced in the liver, can be a basis for determining the level of the safe use of herbal medicines consumed. When liver function is abnormal or damaged, it will disrupt the metabolic secretion of albumin and globulin. This can be remedied with increasing protein intake [5] and powers of endurance [6-8].

Some experiments have explained the impact of the plant extracts against the levels of total protein, albumin and globulin. Extract onion *Allium cepa* Linn has been informed not significant [9]. However diverse the fraction of *Vernonia amygdalina* resulted in a significant increase compared with the group given paracetamol. This summed potential as hepatoprotective [10]. Likewise, the ethanol extract of *Annona muricata* given to mice can be used for treatment of liver damage [11].

Effect posed by an extract of the plant should be considered when used as a drug [12], because the uses of herbal medicines are closely connected with the functioning of the heart though the liver has a great capacity to synthesize detoxification. For this reason it is necessary to test to make sure an herbal remedy does not impair liver function [13]. Guidelines for testing can be used in the normal range for the concentration of total protein, albumin, and globulin male mice, respectively are 5.6-7.6 g/dl, 3.0-5.1 g/dl, dan 1.5-2.5 g/dl, and AGR is 1.58-2.67 [14].

Plant as a potential antidiabetic drugs are those containing flavonoids [15]. Methoxy bergenin is a pure flavonoid compound, which is obtained from the ethanol extract of the stem bark raru (*Vatica pauciflora* Blume) [16]. The test results showed that the extract has a toxicity value of Ic 5.76 and potentially as a medicinal ingredient [17]. But still needs to be studied to ensure that their use does not impair liver function [18]. In connection with this, in this paper is described the impact of the provision methoxy bergenin on levels of total protein, albumin and globulin from Wistar rats.

MATERIALS AND METHODS

Materials

To obtain bergenin methoxy, *Vatica pauciflora* Blume obtained from the forest in the district of Central Tapanuli, North Sumatra, Indonesia, is processed through the extracts by ethanol [16,17]. Healthy male Wistar rats were obtained from the Laboratory of Pharmacy, University of North Sumatra, Indonesia as many as 16 tails, which was adapted for 3 days before being given treatment.
Method.

A level of total protein, albumin and globulin from across the Wistar rats was measured by the method of Folin's phenol [19] before treatment. This is done to check the health of all Wistar rats. As a rule of comparison is the normal range for the concentration of total protein, albumin, and globulin from healthy male rats, which respectively are 5.6-7.6 g/dl, 3.0-5.1 g/dl, dan 1.5-2.5 g/dl and AGR is 1.58-2.67. The experimental group made with variations replay 4 × 4, which consists of control G_0 (without being given methoxy bergenin or only feed); G_1 (methoxy bergenin given at a dose of 65 mg/200 g body weight/2 ml); G_2 (methoxy bergenin given at a dose of 130 mg/200 g body weight/2 ml); G_3 (methoxy bergenin given at a dose of 195 mg/200 g body weight/2 ml) each for 21 days. Levels of total protein, albumin, and globulin of the Wistar rats were measured again at day 21. The measurement results were analyzed by ANOVA using SPSS.

RESULTS AND DISCUSSION

The results of the levels of total protein, albumin, and globulin measurements of the Wistar rats of the each group (Table 1) showed that administration of bergenin methoxy is likely to increase the 3 parameters on average. The higher levels dose of methoxy bergenin is tend to the result in the higher of the 3 parameters relatively, but they were still at a normal range. This allows as a result of the immune system of mice is increased after the extract [8].

Table 1: Total protein, albumin and globulin level of Wistar rats' blood after 21 days (n=4)

Group	Albumin (M ± SD)	Globulin (M ± SD)	A/G Ratio	Protein total
G_0=Untreatment	4.1451 ± 0.2668	1.9992 ± 0.0556	2.0733	6.144
G_1=Dose of 65 mg/200 g body weight/2 ml	4.1967 ± 0.0056	2.1266 ± 0.0483	1.9734	6.323
G_2=Dose of 130 mg/200 mg body weight/2 ml	4.208750 ± 0.0096	2.199750 ± 0.0143	1.913286	6.409
G_3=Dose of 195 mg/200 g body weight/2 ml	4.226425 ± 0.0415	2.288125 ± 0.0265	1.847113	6.515

The Wistar rats' total protein, albumin and globulins levels after the administration of Methoxy Bergenin with a variety of different doses looks like Figures 1-3 graphically.

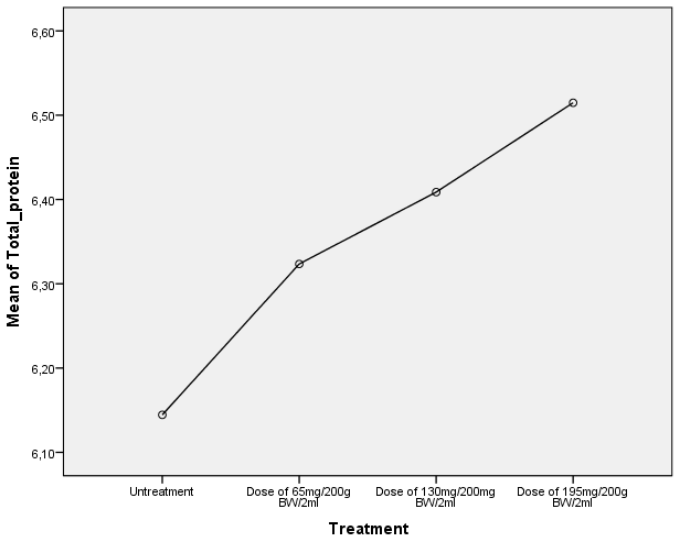

Figure 1: Graphic of Wistar rats' total protein level

In the graph it appears that administration of methoxy bergenin tend to raise levels of total protein, wherein a dose of 195 mg/200 mg body weight/2 ml provide a higher total protein. However, this increase needs to be taken in order not to cause danger because healthy categorized total protein is 5.6-7.6 g/dl [14]. With this show the use of methoxy bergenin for 21 days is still safe.

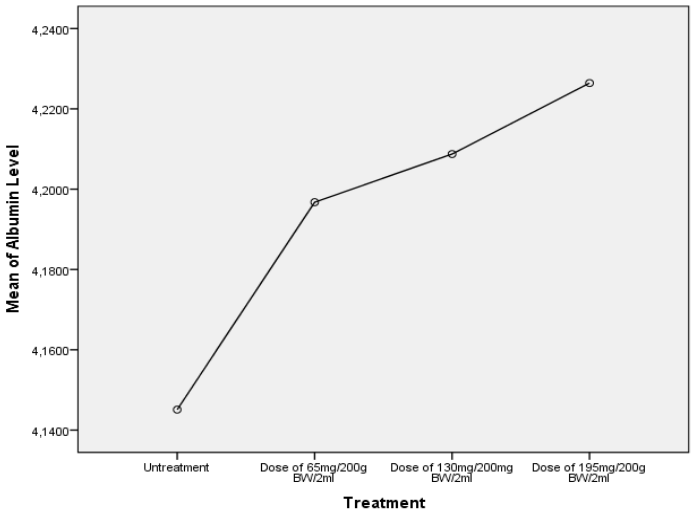

Figure 2: Graphic of Wistar rats' albumin level

In Figure 2 also appears that the albumin level is increasing with increasing doses given. It is possible that a methoxy bergenin administration can strengthen the body of Wistar rats.

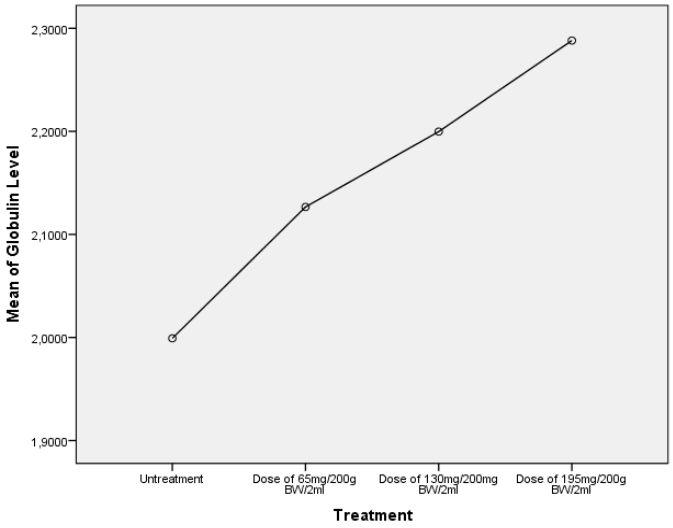

Figure 3: Graphic of Wistar rats' globulin level

Likewise globulin shown in Figure 3 is also increasing with increasing doses given. AGR value of the group given methoxy bergenin (Figure 4) is located in the normal range 1.58-2.67. On this basis it can be stated that the methoxy bergenin not interfere with liver function.

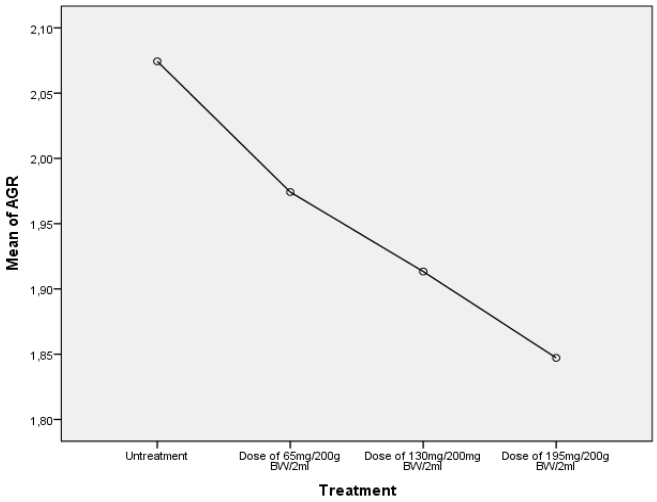

Figure 4: Graphic of Wistar rats' albumin/globulin ratio

ANOVA results (Table 2) shows the administration methoxy bergenin with different dose levels resulted in total protein, albumin, and globulin group of Wistar rats was significantly different at α=0.05 level. This indicates that the provision allowing bergenin methoxy affect the level of integrity of different liver in groups of mice [8].

Table 2: ANOVA of total protein, albumin, and globulin of Wistar rats' blood (n=4)

		Sum of Squares	Df	Mean Square	F	Sig.
Total protein	Between Groups	0.294	3	0.098	31.586	0.000
	Within Groups	0.037	12	0.003		
	Total	0.331	15			
Albumin level	Between Groups	0.015	3	0.005	7.618	0.004
	Within Groups	0.008	12	0.001		
	Total	0.022	15			
Globulin level	Between Groups	0.179	3	0.060	37.666	0.000
	Within Groups	0.019	12	0.002		
	Total	0.198	15			

The result of the average difference (Table 3) showed that administration of methoxy bergenin with a dose of 195 mg/200 mg body weight/ 2 ml lead to three parameter levels higher than other dosing. This situation allows that can be just as methoxy bergenin protein intake. Table 3. Multi comparison of Wistar rats' total protein, albumin and globulin level.

Table 3: Difference mean examine of wistar rats' total protein, albumin and globulin level

Dependent variable	(I) Treatment	(J) Treatment	Mean Difference (I-J)	Std. Error	Sig.
Total protein	G_o	G_1	-0.17900*	0.03939	0.001
		G_2	-0.26425*	0.03939	0.000
		G_3	-0.37025*	0.03939	0.000
	G_1	G_o	0.17900*	0.03939	0.001
		G_2	-0.08525	0.03939	0.051
		G_3	-0.19125*	0.03939	0.000
	G_2	G_o	0.26425*	0.03939	0.000
		G_1	0.08525	0.03939	0.051
		G_3	-0.10600*	0.03939	0.020
	G_3	G_0	0.37025*	0.03939	0.000
		G_1	0.19125*	0.03939	0.000
		G_2	0.10600*	0.03939	0.020
Albumin level	G_o	G_1	-0.0516500*	0.0179154	0.014
		G_2	-0.0636500*	0.0179154	0.004
		G_3	-0.0813250*	0.0179154	0.001
	G_1	G_o	0.0516500*	0.0179154	0.014
		G_2	-0.0120000	0.0179154	0.516
		G_3	-0.0296750	0.0179154	0.124
	G_2	G_o	0.0636500*	0.0179154	0.004
		G_1	0.0120000	0.0179154	0.516
		G_3	-0.0176750	0.0179154	0.343
	G_3	G_0	0.0813250*	0.0179154	0.001
		G_1	0.0296750	0.0179154	0.124
		G_2	0.0176750	0.0179154	0.343
Globulin level	G_o	G_1	-0.1274250*	0.0281569	0.001
		G_2	-0.2005500*	0.0281569	0.000
		G_3	-0.2889250*	0.0281569	0.000
	G_1	G_o	0.1274250*	0.0281569	0.001
		G_2	-0.0731250*	0.0281569	0.023
		G_3	-0.1615000*	0.0281569	0.000
	G_2	G_o	0.2005500*	0.0281569	0.000
		G_1	0.0731250*	0.0281569	0.023
		G_3	-0.0883750*	0.0281569	0.009
	G_3	G_0	0.2889250*	0.0281569	0.000
		G_1	0.1615000*	0.0281569	0.000
		G_2	0.0883750*	0.0281569	0.009

*The mean differences significant at the 0.05 level. Description: G_o=Untreatment (feed); G_1=Dose of 65 mg/200 g body weight/2 ml; G_2=Dose of 130 mg/200 mg body weight/2 ml; G_3=Dose of 195 mg/200 g body weight/2 ml

Based on the mean difference examine, the wistar rats' total protein, albumin, and globulin level within dose of 195 mg/200 g body weight /2 ml is highest among of them. Its increasing can be caused by accretion of protein intake [6], or also caused by the absorption power is increased [7]. This is made possible occurs therefore can act as protein intake and have a high toxicity values [13] like as hepatoprotective [5,10].

CONCLUSION

Utilization metohoxy bergenin based on the study of the state of total protein, albumin and globulin can be inferred that this could be useful as an herbal remedy that does not give effect to the deterioration of liver function, because it is hepatoprotective. It appears from the significance of the increase in total protein, albumin, and globulin were still within normal range.

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