



Effervescent Powder Activity of the God's Crown Fruit Extract (*Phaleria macrocarpa*) (Scheff) Boerl) in Rats Model of Alloxan-Induced Balb/C Diabetes Mellitus

Khrisna Agung Cendekiawan^{1*}, Lia Fitriyaningrum²

¹Pharmacy Study Program, Universitas dr. Soebandi, Jember, Indonesia

²Academy of Pharmacy, Jember, Indonesia

ARTICLE INFO

Keywords:

Antidiabetic
Effervescent
God's crown
In vivo

*Corresponding author:

Khrisna Agung Cendekiawan

E-mail address:

khrisnaagunqfarmasi@uds.ac.id

All authors have reviewed and approved the final version of the manuscript.

<https://doi.org/10.37275/ehi.v4i2.69>

ABSTRACT

God's crown fruit (*Phaleria macrocarpa* (Scheff) Boerl) is one of the ingredients that can be used as a natural anti-diabetic because of the presence of flavonoids which have activity as antioxidants. This study aimed to determine the anti-diabetic activity of the powder-effervescent God's crown fruit extract in various doses in test animals and to determine the effective dose of the powder-effervescent God's crown fruit extract as an anti-diabetic. This study is an in vivo experimental study. This study used 25 rats (*Mus musculus*) Balb/c, which were grouped into 5 groups (negative control, positive, and 3 treatment groups). Rats were induced diabetes mellitus with alloxan, then blood glucose levels were assessed. Data analysis was carried out using SPSS software version 25 in univariate and bivariate. There was no significant effect on reducing blood glucose levels in mice treated with effervescent powder of God's crown fruit extract.

1. Introduction

Diabetes mellitus (DM) is a degenerative disease whose number of sufferers is increasing from year to year. The increase in DM sufferers for the next 20 to 30 years is due to increased affluence, changes in diet, demography, and urbanization. In addition, there are risk factors that cannot be controlled, such as age, gender, and genetic factors, that are quite influential in increasing the incidence. In 2015, Indonesia was ranked seventh in the world for the highest prevalence of diabetes in the world, along with China, India, the United States, Brazil, Russia, and Mexico, with an estimated number of diabetics of 10 million. Diabetes with complications is the third

highest cause of death in Indonesia. DM is a chronic disease that cannot be cured. Therefore the use of drugs is the main option in dealing with it. Drugs that are often used to treat DM are sulfonylureas, biguanides, and acarbose.¹⁻⁵

The crown of the god plant is a plant that is very useful and contains minerals, vitamins, alkaloids, flavonoids, and polyphenols which are highly efficacious as cancer drugs, diabetes drugs, kidney stones and anti-diarrhea and anti-vomiting, and so on. God's crown fruit peel contains minerals, vitamins, alkaloids, flavonoids, and polyphenols which are useful as antioxidants and are able to overcome one of the degenerative diseases, namely

diabetes mellitus. The ability of alkaloids, flavonoids, and polyphenols as antioxidants can ward off radical hydroxyl and superoxide and then neutralize free radicals, thereby protecting cells and maintaining the integrity of the cell structure, and regenerating the pancreas against unwanted reactions. A study showed that the crown of the god produced an anti-diabetic effect at a dose of 241.35 mg/kg BW. Another study showed a formula of the crown of Gods extract formula (1.192 g) with concentrations of citric acid (1.58 g), tatric acid (0.79), sodium bicarbonate (2.78 g), lactose (3.458), and PVP (0. 2 g) to produce powder preparation effervescent God's crown fruit fulfills the organoleptic physical properties test, water content, flow rate, soluble time and pH but the activity test has not been carried out.⁶⁻¹⁰ This study aimed to assess the efficacy of the powder-effervescent God's crown fruit extract as a blood sugar-lowering agent in a diabetes model using alloxan-induced balb/c rats.

2. Methods

This study is an in vivo experimental study with a post-test design with a control group design. Subject The research in this study was rats (*Mus musculus*) balb/c. A total of 25 rats were included in this study, which were grouped into 5 groups (group control positive, negative control, and 3 treatment groups). In experimental animals, diabetes mellitus was induced by intraperitoneal injection of alloxan 175 mg/kgBW. Then three days after induction, blood glucose levels were assessed. If blood glucose levels are > 200 mg/dL, the mice are declared to have diabetes mellitus. In experimental animals in groups, the control positive was given glibenclamide 10 mg/kgBW. Experimental animals in groups control negative only given aquadest. Meanwhile, in the treatment group, each group received 0.04 mg/20 gram BW of effervescent powder, 0.08 mg/20 gram BW and 0.16 mg/20 gram BW.

The crown fruit of the god types *Phaleria macrocarpa* (Scheff.) Boerl obtained and determined by the Materia Medika Batu to ensure that the fruit of the god's crown used is really of the same type. *Phaleria*

macrocarpa (Scheff.) Boerl. Extraction was carried out using 96% ethanol solvent for 3 days using the maceration method, and the results obtained were: immersion fruit crown god (*Phaleria macrocarpa* (Scheff) Boerl) obtained an extract weight of 87.606 grams and a yield of 21.9% which is used as an active ingredient for making powder preparation effervescent.

Data analysis was performed with SPSS software version 25. Kolmogorov Smirnov test is done to see the normality of the data distribution. If the p-value > 0.05, then the distribution is normal, then the test is carried out One Way ANOVA to see differences, in general, to find out which groups are different will be continued with the Post Hoc test (LSD). If the p-value < 0.05, then the distribution is not normal. Then, the Kruskal-Wallis test is carried out to see a general difference. To see the difference between groups, the test is carried out by Mann-Whitney.

3. Results and Discussion

Based on Table 1, it can be seen that the biggest drop in blood sugar levels was in the powder treatment group effervescent God's crown fruit extract at a dose of 0.08 g/20g, which is 85.4 mg/dL, while the smallest decrease in blood sugar levels was in treatment group 3 which was given the powder treatment. Effervescent God's crown fruit extract at a dose of 0.16 g/20g, which is 50.4 mg/dL. This is due to the high sugar content in the powder effervescent can affect the effectiveness of the God's crown fruit extract contained in the powder effervescent. The positive control group using glibenclamide at a dose of 10 mg/kg showed an average decrease in blood sugar levels in experimental animals of 64.6 mg/dL, this decrease in blood sugar levels being the second largest after powder. Effervescent crown of gods fruit extract dosage 0.08 g/20g. while the powder treatment group effervescent of God's crown fruit extract dose of 0.04 g/20g has an average reduction in blood sugar levels of 53.2 mg/dL, and the negative control group without treatment has an average decrease in blood sugar levels of 44.5 mg/dL. This decrease in blood sugar levels is due to

the fruit of the God's crown having flavonoid compounds that have activity as antioxidants so that they can inhibit oxidative stress, which can damage pancreatic β cells caused by free radicals.¹¹⁻¹⁵

Treatment using powder-effervescent God's crown fruit extract at a dose of 0.08 g/20g has the greatest blood sugar-lowering activity compared to other treatments.

Table 1. Comparison of blood glucose levels before and after treatment.

Group	Pre-test blood glucose level (mg/dL) \pm SD	Post-test blood glucose level (mg/dL) \pm SD	p-value post-test*
Positive control	142,8 \pm 14,75	78,2 \pm 16,3	0,073
Negative control	159,75 \pm 18,18	115,25 \pm 3,77	
Treatment 0,04 mg/20gr BW	194,8 \pm 12,43	141,6 \pm 23,3	
Treatment 0,08 mg/20gr BW	187,6 \pm 44,32	102,2 \pm 50,72	
Treatment 0,16 mg/20gr BW	185,4 \pm 50,85	135 \pm 24,96	

*One-way ANOVA test.

From the normality test obtained significant, Kolmogorov Smirnov is 0.200. This result is greater than ($p > 0.05$), which means that all groups in this study have a normal distribution. Meanwhile, the homogeneity test shows a significance of 0.609. This value is greater than 0.05, which indicates a homogeneous variation. Therefore, the test conditions One Way ANOVA have been fulfilled. Based on the analysis results, in One Way ANOVA value is obtained with a significance of 0.073 ($p > 0.05$). This shows that there is no significant difference between each treatment group, which means that there is no significant difference in each group. However, the results of the research data obtained showed that treatment 2 could reduce blood sugar levels in balb/c rats with diabetes. In the negative control group experiment, there was a decrease in blood sugar levels because it could be caused by several factors, both internal and external factors. Internal factors come from the level of stress that occurs in each mouse, and the level of health, while external factors are very influential when viewed from food intake/disputes between rats. Another factor that can have an effect is when force-feeding/oral administration of mice refuses and even vomits. It affects the large amount of preparations absorbed by the rats' bodies.¹⁶⁻¹⁸

4. Conclusion

Administration of effervescent powder of God's crown fruit extract (*Phaleria macrocarpa* (Scheff) Boerl) in alloxan-induced balb/c diabetic rats did not have anti-diabetic activity.

5. References

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