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TONICUM ACTIVITY TEST OF BIDARA LEAF EXTRACT ON SWIMMING RESISTANCE OF WHITE MALE MICE

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ABSTRACT

The bidara plant (*Ziziphus mauritiana* L.) is one of the medicinal plants used and trusted by the wider community for treatment. Traditionally this plant was used as a tonic. Objective : The purpose of this study was to prove the tonic activity of bidara leaf extract against white male mice (Mus musculus) and to determine the effective concentration of bidara leaf extract which has tonic activity against swimming resistance white male mice (*Mus musculus*). Method :This research was conducted in February - August 2019 at the Pharmacy Laboratory of the Kendal College of Health Sciences. The tools and materials used are mice, bidara leaves, ethanol, glassware, sonde and glass ponds.Leaf extraction of bidara was carried out by maceration method using 70% ethanol solvent. The design of this study was an experimental study (pre-experimental desings) in the form of statistical group comparisons. The tonic effect test was carried out using the mice swimming endurance method. Twenty five white malemice were divided into five groups. Group I mice were given 0.5% CMC Na (negative control), group II were given Fatigon (positive control) and groups III, IV, V were given bidara leaf extract concentrations of 50, 100 and 200 mg / kgBW orally. Data analysis was performed by comparing swimming times using the Kruskal-Wallis test and the Mann-Whitney test with a confidence level of 95%. Result : The results showed that there were group differences between treatments.Conclusions : The leaf extract of bidara (*Ziziphus mauritiana* L.) had tonic activity against white male mice (Mus musculus) with an effective concentration of 100 mg / kgBW.

Keyword: *Ziziphus mauritiana* L; tonic; swimming mice

INTRODUCTION

Indonesia has thousands of types of plants scattered in various regions. The existing biodiversity can be used as raw material for modern and traditional medicine. Many types of medicinal plants in Indonesia have been used as medicinal raw materials, some of these plant species have even been clinically tested for their phytochemical content, properties and safety (Akhyar, 2010). The bidara plant (*Ziziphus mauritiana* L.) is one of the medicinal plants used and trusted by the public for treatment. In everyday life, bidara can be used as a tree of herbal medicines which is believed, one of its functions is as a canker sore (candidiasis), urinary tract infections, diarrhea, etc. Traditionally this plant was used as a tonic. It is also used to stop nausea, vomiting and to relieve pain in pregnancy and for wound healing (Taradipta, 2015).

According to Najafi *Ziziphus mauritiana* L. contains several groups of compounds including glycosides, saponins, tannins and flavonoids (Najafi, 2013). Based on research conducted by Ashraf, et al the largest chemical components contained in the extract of methanol, chloroform and n-hexane of bidara leaves are methyl stearic, palmitic acid and α-linolenic acid and several

other components in small amounts (Ashraf, et al., 2015). While the fruit bidara contains flavonoids, glycosides, saponins, phenols, lignins, sterols and tannins (Rathore, et al., 2012). Research conducted by Gupta and Singh and Lado states that the methanol and ethanol extracts of bidara leaves have antioxidant activity (Gupta adnd Singh, 2013 ; Lado, 2016).

The use of tonic or stamina-enhancing drugs is now becoming more widespread. Along with the increasing lifestyle and community activities. Increased activity also causes excessive physical fatigue, so that the need for stamina-enhancing drugs also increases.Tonic is a drug that can increase energy or energy in the body. The tonic effect is classified into the psychostimulant class. These psychostimulant compounds can relieve fatigue (Mutschler, 1991). The purpose of this study was to determine the tonic activity test of bidara leaf extract (*Ziziphus mauritiana* L.) on the swimming resistance of white male mice (*Mus musculus*) and what is the most effective extract concentration as a tonic.

METHOD

The tools and materials used are glass tools, analytical scales, porcelain plates, flannelette, sonde, stopwatch, a set of swimming tools for testing, male mice aged 2-3 months, leaves of bidara (*Ziziphus mauritiana* L.), 70% ethanol. , aquadest, CMC Na and Fatigon tablets. The research procedure was divided into two stages, namely making bidara leaf extract and testing the tonic activity of bidara leaf extract. The leaves of bidara are plucked, cleaned with running water, dried with a dryer, mashed and sieved with a sieve number 60. Then macerated with 70% ethanol solvent for 5 days, stirring every day. The maserate is filtered and evaporated until it becomes thick extract and the yield is calculated. A total of 25 male mice were divided into 5 groups, namely group 1 (negative control), group 2 (positive control of fatigon suspension), group 3 (leaf bidara extract dose of 50 mg/kgBW), group 4 (leaf bidara extract dose of 100 mg/kgBW) and group 5 (leaf bidara extract dose 200 mg/kgBW). Before the treatment, the mice were fasted for 8 hours. Then the mice were given a test preparation, let stand for 30 minutes and tested their swimming activity. The swimming duration of the mice was assessed in seconds / minute using a stopwatch and when testing the mice's head submerged for 4-5 seconds was observed. The glass pool used is 50cmx30cmx25cm in size. The test was carried out using *Kruskal-Wallis* because it was not a pair and the group was more than two groups, followed by *Mann-Whitney*.

RESULTS AND DISCUSSION

The yield of bidara leaf extract obtained was calculated on the dry matter. The results of the extract yield can be seen in table 1, the swimming time of the mice can be seen in table 2 and the results of the bivariate test (*Mann-Whitney*) can be seen in table 3.

Table1.
The yield of bidara leaf extract

Sample	Simplicia Weight (g)	Extract Weight (g)	Yield %
Bidara Leaves	200,092 g	33,578 g	16,7%

Table 2.
Mice Swim Time (seconds)

			Bidara Leaf Extract		
Replication	CMC Na	Fatigon	50 mg/kgBW	100 mg/kgBW	200 mg/kgBW
1	07.50	13.13	04.54	10.23	13.21
2	05.05	12.17	05.10	11.01	10.51
3	06.40	13.15	09.18	10.50	05.50
4	04.30	17.52	03.46	08.28	06.46
5	06.50	12.07	07.24	10.26	08.35
Median	06.40	13.13	05.10	10.26	08.04

Table 3.
Bivariate Test Results (Mann-Whitney)

	Group	P value	Information
Swimming Time	CMC Na Fatigon	0,009	There is a difference
	CMC Na Bidara leaf extract 100 mg/kgBW	0,009	There is a difference
	Fatigon Bidara leaf extract 50 mg/kgBW	0,009	There is a difference
	Fatigon Bidara leaf extract 100 mg/kgBW	0,009	There is a difference
	Bidara leaf extract 50 mg/kgBW Bidara leaf extract 100 mg/kgBW	0,016	There is a difference
	CMC Na Bidara leaf extract 50 mg/kgBW	0,917	There is no difference
	CMC Na Bidara leaf extract 200 mg/kgBW	0,117	There is no difference
	Fatigon Bidara leaf extract 200 mg/kgBW	0,076	There is no difference
	Bidara leaf extract 50 mg/kgBW Bidara leaf extract 200 mg/kgBW	0,117	There is no difference
	Bidara leaf extract 100 mg/kgBW Bidara leaf extract 200 mg/kgBW	0,602	There is no difference

The first processing of bidara leaves is washing which functions to separate the simplicia material from impurities, then the drying process is carried out, with the aim of obtaining simplicia that is not easily damaged in storage and reducing water content and stopping enzymatic reactions that can reduce the quality of simplicia. with a size of 60 with the aim of increasing the surface area so as to speed up the extraction process because it increases the contact between the powder and the solvent (Sa'adah and Nurhasnawati, 2015). After being pollinated, the maceration process is carried out. Maceration is the process of extracting simplicia by using a solvent with several shaking or stirring at room temperature, namely 20 ºC - 25 ºC. The maceration process is left to stand for 5 days, stirring every day and extracted with 70% ethanol solvent (Marjoni, 2016).

The results of the normality test show that the data are not normally distributed, so it is necessary to do the Kruskal-Wallis test followed by Mann-Whitney. The results of the Kruskal-Wallis analysis obtained p value = 0.003. This means that there are differences between treatment groups. The next step is post hoc analysis to determine which groups have differences. The post hoc analysis for the Kruskal-Wallis test is the Mann-Whitney test. The results of the Mann-Whitney analysis showed varied results. Bidara leaf extract has tonic activity and a dose of 100 mg / kgBW has a difference with positive control CMC Na and fatigon and is not different from the dose of 50 or 200 mg / KgBB. The dose of 100 mg / kg BW had the highest mean swimming time compared to other doses.

The ethanol extract of bidara leaves contains flavonoids which are thought to have a tonic effect in male mice. This is supported by several similar studies. There is a research similar to the research above, namely the study entitled the test of the tonic effect of the ethanol extract of sambiloto leaves (*Andrographis paniculata*, Nees.) On male mice (*Mus musculus*) Swiss strain. Research that has been conducted by Warditiani, shows that the purified ethanol extract of the herb sambiloto (*Andrographis paniculata*, Nees.) positively contains flavonoids and terpenoids, where these compounds are thought to have a tonic effect in male mice test animals (Warditiani, et al., 2015). Another study conducted by Prastiwi et al. showed that triterpenoid compounds in gotu kola are asiaticoside, centelloside, madekasoside and asiatic acid (Prastiwi, et al., 2015 ; Randriamampionona, et al., 2007). Flavonoids in gotu kola leaves are minor compounds such as 3-glycosylkuercetin, 3- glucosylkaempferol and 7-glycosylkaempferol and gotu kola herbal extract (*Centella asiatica* (L). Urb) at a dose of 50 mg, a dose of 100 mg, and a dose of 150 mg has potential as a tonic (Jamil, et al., 2007).

Flavonoids which are antioxidant compounds are thought to be able to contribute to adaptogenic activity by preventing damage to functional proteins and increasing ATP production by inhibiting free radicals that are formed during stressful conditions (Panossian and Wikman, 2010). Adaptogens are compounds that help the body adapt to stress by helping restore balance to the body (Samirana, et al., 2015). Adaptogenic activity is similar to tonic activity which can provide energy lost due to fatigue.

CONCLUSION

The conclusion of this study is that the leaf extract of bidara (*Ziziphus mauritiana* L.) has tonic activity against swimming resistance of white male mice (*Mus musculus*). The effective concentration of bidara leaf extract (*Ziziphus mauritiana* L.) which has tonic activity against

swimming resistance of white male mice (*Mus musculus*) is bidara leaf extract at a dose of 100 mg/ kgBW.

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