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Phytochemical Screening And Aphrodisiac Activity Of Luvunga Sarmentosa (Bi.) Kurz Ethanol Extract In Male Wistar Albino Rats.

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ABSTRACT

The aim of this study was to evaluate the aphrodisiac activity of the ethanol extract of Luvunga sarmentosa in male Wistar albino rats. The phytochemical screening was carried out for flavonoids, streroids, quinones, tannins, saponins and alkaloids. The effect of the plant extract on sexual behavioral aspects of the rats were determined. Twenty-five male Wistar albino rats were divided into 5 groups; P1 groups was the normal control administered with aquadest, P2 groups as positive control received Eurycoma longifolia ethanol extract 200 mg/kg body weight, P3-P5 groups were the treatment groups which received L. sarmentosa ethanol extract at 225, 450, 900 mg/kg body weight, respectively. Each groups was administered orally once a day for seven days. The aphrodisiac activity of the rats were observed for various parameters involving mounting Frequency (MF), mounting latency (ML), intromission frequency (IF), intromission latency (IL). The data were analyzed using Kruskal Wallis Test. The results of this study showed that P3, P4, and P5 groups have aphrodisiac activity and significant effect of sexual behavior compared to P1 groups ($p<0,05$). The phytochemical screening revealed the presence of flavonoids, steroids, and tannins. The results of the present study suggest that L. sarmentosa ethanol extract exhibited aphrodisiac activity in male Wistar albino rats.

Keywords: aphrodisiac activity, Luvunga sarmentosa , phytochemical screening, sexual behavior.

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INTRODUCTION

Male sexual dysfunction is defined as repetitive inability to achieve normal sexual intercourse [1,2] which includes erectile dysfunction. To overcome the erectile dysfunction, medications such as sildenafil citrate (Viagra ®), Vardenafil (Levitra ®) and tadalafil (Cialis ®) are used for improving the erection. But in fact some of these drugs have serious side effects.[3,4,5] Therefore, there is a current interest to develop herbal supplements as aphrodisiac because of the abundant availability of the natural resources, minimal side effects, and the prices are relatively affordable.[6] Aphrodisiac is a substance that increases sexual activity and improve sexual performance.[7]

Borneo is one of the largest Islands in Indonesia that has a large area of tropical forest. One of the endemic plants from Borneo that has been used by local people as traditional medicines to cure lumbago, kidney and vitality enhancer is Saluang Belum (Luvunga sarmentosa (Blume) Kurz.). [8] This study was carried out to evaluate the aphrodisiac activity of Luvunga sarmentosa ethanol extract on male Wistar albino rats. The phytochemical screening was performed to determine the presence of flavonoids, streroids, quinones, tannins, saponins and alkaloids in the extract of L. sarmentosa.

MATERIALS AND METHODS

Plant materials

Fresh plants were collected from Palangkaraya, Central Kalimantan, Indonesia in February 2017. The roots of the plants were washed, shredded, then dried. 300 grams sample extracted using maceration method using ethanol 96%. Extraction was done for 3x24 hours. After 3x24 hours, the filtrate obtained was filtered, and then concentrated using a rotary evaporator. Condensed L. sarmentosa ethanol ready to used for the research.

Phytochemical Screening

Phytochemical screening was carried out to test for the presence of flavonoids, streroids, quinones, tannins, saponins and alkaloids in accordance with some methods [9-13] with little modification.

Animal Selection and Drug Administration

Twenty-five male Wistar rats of 8 weeks old weighing about 200-300 gram were procured and kept in cages. The rats were fed with standard pellets and fresh water ad libitum. The study was approved by Institutional Animal Ethical Committee of Faculty of Medicine, Universitas Islam Indonesia (approval number : 14/Ka.Kom.Et/70/Ke/IV/2017). The rats were selected randomly with 5 rats in each group: P1 served as normal control were given aquabides (1ml/ 200g body weight), P2 as positive control rats were administered pasak bumi (Eurycoma longifolia Jack.) (200 mg/Kg body weight), P3-P5 served as experimental rats were administrered Luvunga Sarmentosa (Blume) Kurz ethanol extract at doses of 225, 450 and 900 mg/Kg body weight,respectively. The drug was administered orally to the experimental group regularly every day for 7 days. At day 8 the animals sexual behavior were observed by various parameters such as mount frequency (MF), mount latency (ML, intromission frequency (IF), intromission latency (IL).

Preparation of Female Rats

Adult healthy 8- 12 week old weighing about 200-300 gram were selected and have estrous phase using this experiment.

Copulatory Study Of The Rats

The experiment was using a specially designed box measuring 50 x 30 x 30. [14] One male rat was placed in the box and then one the female rats met each other for observed sexual behavior. The observed doing for 30 minutes, and the parameters were sexual behavior such as mount frequency, mount latency, intromission frequency, intromission latency.

Collected The Data

The observed for 30 minutes after that value the mount latency and intromission latency was categorized as the Table 1.[15]

Table 1: Table category of value the mount latency and intromission latency after observed for 30 minutes [15].

Category	Range of time (minutes)	Score
1	>0-3	1
2	>3-6	2
3	>6-9	3
4	>9-12	4
5	>12-15	5
6	>15-18	6
7	>18-21	7
8	>21-24	8
9	>24-27	9
10	>27-30	10
11	>30	11

Data analysis

Data were presents as mean ± SEM and median of five replicates. The data's were analyzed using Kruskal-Wallis test and then compared the differences between groups with the Mann Whitney test. Differences at $P < 0.05$ wa considered statistically significant.

RESULTS

Phytochemical Screening

Results of phytochemical screening showed the compound contained flavonoids, steroids, and tanins (Table 2). This is consistent with several studies that showed steroids and tannins have aphrodisiac activity. [16, 17]

Table 2 : Results of phytochemical screening of the *Luvunga Sarmentosa* (Blume) Kurz

Compound	Results
Flavonoids	+
Steroids	+
Quinones	-
Tannins	+
Saponins	-
Alkaloids	-

Aphrodisiac Test

The data's of sexual behavior was given in Table 3. The statistically analyzed using Kruskal Wallis test were P2, P3, P4, and P5 significant for MF, ML, IF, IL than P1 (Figure 1 & Figure 2). Comparison between the groups was analyzed using the Mann Whitney test and given in Table 4.

Table 3: Sexual behavior results of : Mount frequency (MF), Intromission frequency (IF), Mount latency (ML), Intromission latency (IL) parameters

No	Parameters	Group P1	Group P2	Group P3	Group P4	Group P5
1	MF(Mean±SEM)	0.3±0.2	6.2±0.4	4.8±0.9	6.8±1.2	6.8±1.4

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2	IF (Mean±SEM)	0.2±0.2	1.6±0.4	2.6±1.1	2.6±0.6	0 ±0
3	ML(median)	10	2	3	2	2
4	IL (median)	11	2.75	7	3	11

Note: Mount frequency (MF), Intromission frequency (IF), Mount latency (ML), Intromission latency (IL), med-Median, : P1- normal control rats given aqubides, P2 positive control rats administered pasak bumi 200mg/Kg body weight; P3 experimental rats administered *L. sarmentosa* (Blume) Kurz ethanol extract (225 mg/Kg body weight); P4 experimental rats administered *L. Sarmentosa* (Blume) Kurz ethanol extract (450 mg/Kg body weight), P5 experimental rats administered *Luvunga Sarmentosa* (Blume) Kurz ethanol extract (900 mg/Kg body weight).

Table 4 : Statistic analysis using Mann Whitney test compares the differences between groups

Pair wise comparison	MF	ML	IF	IL
P1 vs P2	S	S	S	S
P1 vs P3	S	S	N/S	N/S
P1 vs P4	S	S	S	N/S
P1 vs P5	S	S	NS	N/S
P2 vs P3	N/S	N/S	N/S	N/S
P2 vs P4	N/S	N/S	N/S	N/S
P2 vs P5	N/S	N/S	S	N/S

Note: P1- normal control rats given aqubides, P2 positif control rats administeredpasakbumi 200mg/Kg body weight; P3 experimental rats administered *L. sarmentosa* (Blume) Kurz ethanol extract (225 mg/Kg body weight); P4 experimental rats administered *L. sarmentosa* (Blume) Kurz ethanol extract (450 mg/Kg body weight), P5 experimental rats administered *L. sarmentosa* (Blume) Kurz ethanol extract (900 mg/Kg body weight); S- Statistically significant (p<0,05). N/S- statistically not significant (p> 0,05).

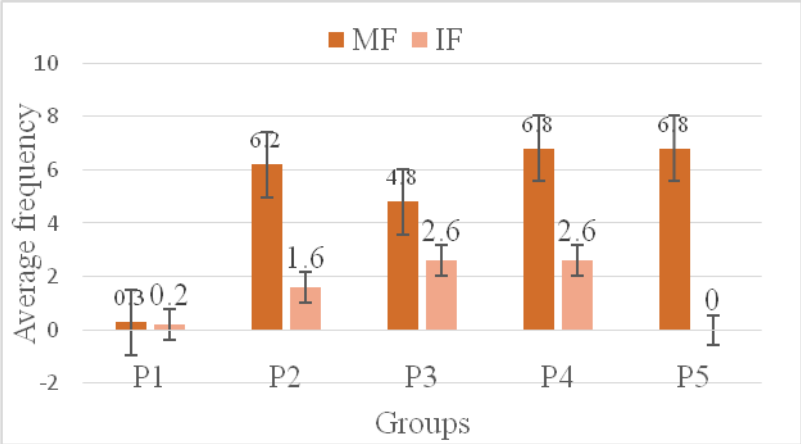

Figure 1 : Mount frequency (MF), Intromission frequency (IF), P1- normal control rats given aqubides, P2 positive control rats administered pasak bumi 200mg/Kg body weight; P3 experimental rats administered *L. sarmentosa* (Blume) Kurz ethanol extract (225 mg/Kg body weight); P4 experimental rats administered *L. Sarmentosa* (Blume) Kurz ethanol extract (450 mg/Kg body weight), P5 experimental rats administered *Luvunga Sarmentosa* (Blume) Kurz ethanol extract (900 mg/Kg body weight). All values are expressed as mean ± SEM, n=5.

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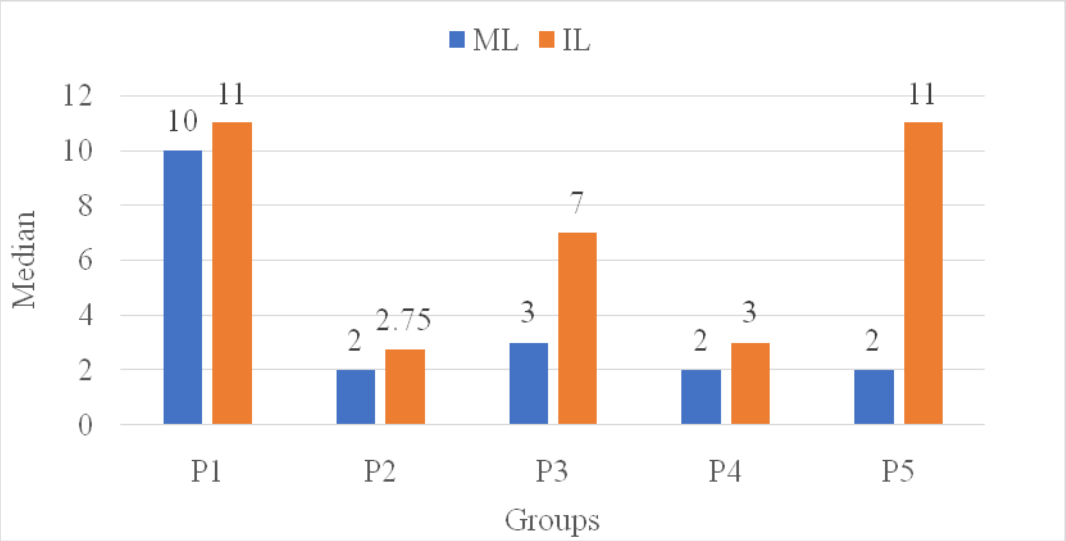

Figure 2 : Mount latency (ML), Intromission latency (IL), P1- normal control rats given aquabides, P2 positive control rats administered pasak bumi 200mg/Kg body weight; P3 experimental rats administered *L. sarmentosa* (Blume) Kurz ethanol extract (225 mg/Kg body weight); P4 experimental rats administered *L. Sarmentosa* (Blume) Kurz ethanol extract (450 mg/Kg body weight), P5 experimental rats administered *Luvunga Sarmentosa* (Blume) Kurz ethanol extract (900 mg/Kg body weight). All values are expressed as median, n=5.

DISCUSSIONS

The phytochemical screening revealed the presence of flavonoids, steroids, and tannins. These compounds are closely related to the aphrodisiac activity possessed by L. sarmentosa. [16,17] Flavonoids are compounds that can improve the quality of sperm to affect aphrodisiac activity. [1] Steroids are a hormone increase dehydroepiandrosterone and can affect sexual behavior. [18] Flavonoids can work as a Phosphodiesterase 5 inhibitor. So it can affect the sexual behavior activity of male rats given L. Sarmentosa. [19]

MF is therefore defined as the number of mounts without intromission from the time of introduction of the female until ejaculation. Intromission is the introduction of one organ or parts into another. For example, the penis into the vagina. IF is therefore defined as the intromissions from the time of introduction of the female until ejaculation. ML is defined as the time interval between the introduction of the female and the first mount by the male. IL is the time interval from the time of introduction of the female to the first intromission by the male. This is usually characterized by pelvic thrusting and springing dismounts. [20]

Based on the result of SPSS analysis using Kruskal Wallis test showed that mounting frequency (MF) between groups there was a significant difference (p <0,05). Then proceed by using Mann whitney test to see the differences between groups. The result of SPSS analysis showed that there was significant difference between P1 and P2, P3, P4, P5 (p <0,05). This showed that there are aphrodisiac activity in P2, P3, P4, and P5 groups in the form of increasing mounting of rats against female rats compared to P1 group. In addition, the differences between the groups of P2 with P3, P4, P5 showed no significant difference (p> 0.05) indicating that the L. sarmentosa had the same activity with Eurycoma longifolia ethanol extract. L. sarmentosa ethanol extract increased spermatosid cell count and spermatid cells.[21] In addition, aqueous extract of L. sarmentosa roots showed improved the sexual behavior of Wistar albino rats. [6]

Based on the result of SPSS analysis using Kruskal wallis test showed that mounting latency (ML) between group P1 with group P2, P3, P4, and P5 there was significant differensce (p <0.05). This suggests that groups P2, P3, P4, and P5 speed up mounting times in male rats. In addition, if compared between groups P2 with P3, P4, and P5 showed no significant difference (p> 0.05).

Based on the result of SPSS analysis using Kruskal Wallis test showed that Intromission Frequency (IF) between male rats group there is significant difference (p <0,05). Then proceed by using Mann whitney test to see the differences between groups. The result of SPSS analysis shows that there is a significant difference between the number of intromission between group P1 and group P2, P3 (p<0,05). This shows that there is aphrodisiac activity in group P2, P3 in the form of increasing intromission of male rat to female rats when compared with group P1. In addition, when compared between groups of P2 with P3, SPSS results showed no significant difference (p>0.05).

Based on SPSS analysis using Kruskal Wallis test showed that average of Intromission Latency (IL) between male rats group there was a significant difference (p <0,05). Then proceed by using Mann Whitney test to see the differences between groups. The result of SPSS analysis showed that there was a significant difference of intromission latency between group P1 and group P2 (p <0,05). But it did not show any significant difference with P1, P2, and P3. This showed that L. sarmentosa ethanol extract influenced intromission time against male rats.

CONCLUSIONS

L. sarmentosa ethanol extract has aphrodisiac activity in male Wistar Albino rats.

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