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Aphrodisiac Activity and Sub Chronic Toxicity of *Polyscias scutellaria*.

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ABSTRACT

Polyscias scutellaria is an ornamental plant that is often growing as a hedge plant. This plant part has been tested its pharmacological activity and their role in inflammatory response, hair loss and growth and as an anti-oxidant activity had been published. This study aim is to investigate the aphrodisiac effect of leaf extract and its safety through sub-chronic toxicity test. Aphrodisiac activity of leaf extract was tested in Wistar rat. Leaves extracted by maceration using ethanol as solvent. Three doses of extract were tested i.e., 500, 1000, and 1500 mg/Kg body weight and sildenafil used as a standard. All are given orally, once a day for 7 consecutive days. For sub chronic toxicity test, the extracts are administered orally once a day for 28 days. Observation of the sexual behavior on test animals was performed on the 8th day. The influence of the extract on blood SGPT and creatinine were measured on day 7, 14, 21 and 28. Data obtained were analyzed statistically with Duncan method. Result showed that the extract at dose 1000 and 1500mg/ kg BW had shown the significant effect to stimulate sexual activity compare to the sildenafil effect. In sub-chronic toxicity test, the blood SGPT level of animal received 1500 mg/kg BW increased significantly on day 7. Based on the result, it can be concluded that *P. scutellaria* extract have aphrodisiac activity, however the used of the extract should be concerned primarily on the high dose because it could influence liver function.

Keywords: *Polyscias scutellaria*, aphrodisiac activity, sub chronic toxicity test, ALT and creatinine level

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INTRODUCTION

The growing progress of time to make the increasing guidance and work activities create consequences that must be received by each individual. One consequence of the many activities and pressure one receives from a job or profession that they do may also affect the activity of their sexuality. Busyness is also reported as one of the things that affect sexual function in men (1),(2). Other factors are also affecting among other things the lack of knowledge of each individual against things that are useful in treating sexual dysfunction and the feelings of shame of ordinary people to discuss the problems that may be causing the deterioration of an incident of sexual dysfunction. In addition both physical and psychological stress is also believed as one factor contributing to sexual dysfunction.(3)

However, the use of synthetic drugs such as sildenafil as the drug is used in aiding the sexual dysfunction is also know could cause to adverse health effects (Ozgun et al., 2014), (Jarrar and Almansour, 2014), (5).

Therefore, much research was done on the use of plants in useful as an aphrodisiac (6), (7), (8) etc. One of the plants that are believed Indonesia with the activity as an aphrodisiac is *Polysciascutellaria* leaves. *P. scutellaria* an ornamental plant which is commonly found growing in the yard of houses in Indonesia. Besides as an ornamental plant, *P. scutellaria* also has many functions that is as an antioxidant (9), anti-inflammation and diuretic effect, (11) and can also be used as the repellent. Therefore, in this study tested aphrodisiac activity and its sub-chronic toxicity

METHODS

Animal

Male and female white rat (Wistar) 2–3 month old are using in this experiment. Weight 180-200 g. all animal experiment was housed separately in clean cage and had free access to pellet and drinking water for 24 hour. Animal were acclimatized to reverse 12 h/12 h light and dark cycle. Behavior study was perform between 10.00–17.00 WIB

Extraction

2 kg *P.scutellaria* leaves cutting into small pieces (chopped) and maceration in 70% ethanol for 5 days at all times while stirring. Ethanol filtered to obtain filtrate and pulp macerated back with the same treatment as much as two times. The filtrate obtained pooled and concentrated using a rotary vacuum evaporator to a constant weight.

Treatment Group and Giving Extract

Behavioral Test

For aphrodisiac activity Groups of animals were divide into five and each group consisted of 5 rats female taken at random, which consists of the control group (negative and sildenafil group) and the test group (group II, III, and IV), extract were induce by oral administration for 7 day and behavioral test were measuring at day 8th.

Group I: control group were given a solution of 0.5% Na-CMC

Group II: Rats were given the leaf extract at a dose *Polysciascutellaria* 500 mg / kg orally.

Group III: Rats were given the leaf extract at a dose *Polysciascutellaria* 1000 mg / kg orally.

Group IV: Rats were given the leaf extract at a dose *Polysciascutellaria* 1500 mg / kg orally.

Group V: Mice were given sildenafil at a dose 50 mg/kg BW orally.

Measurement of levels of creatinine and alanine aminotransferase

For measurements blood concentration of creatinine and alanine aminotransferase (SGPT) inducing of extract were continuing for 28 day. Blood examination was taken at days 7, 14, 21 and 28 Day. Serum

creatinine and SGPT levels of rat blood by performing the following procedures: Taken rat blood by cutting the tails of rat, the blood collected in Eppendorf tubes left in place for 15 minutes and then centrifuged for 15 minutes at a speed of 3000 rpm. Clear section (serum) in check the levels of creatinine and alanine aminotransferase:

1. Measurement of creatinine levels. Serum 50 mL pipette inserted into the cuvette, mixed with creatinine kit of 1 ml then homogenized. Measurements were performed by spectrophotometer to obtain diagnostic creatinine levels.
2. Measurement SGPT. One of the liver function tests is to measure the levels of blood serum SGPT of mice by performing the following procedures: Serum pipette of 100 mL in the mix with a measurement kit SGPT ratio reagent A: reagent B = 4: 1 then homogenized. Measurements were performed using diagnostic spectrophotometer to obtain SGPT levels.
3. Data were statistically analyzed using Kruskal Wallis test and Duncan test

RESULTS

Sexual behavior

Sexual behavior tests observed in this experiment included intermission latency, mounting frequency, vaginal kissing frequency, vaginal kissing latency and mounting duration observed from the five test groups. Behavior test results show that leaf extract gave a positive effect on increasing sexual behavior of white rat.

Intermission latency: Eachdose of leave extract gave the positive effectat intermission stage of latency group showed decreasing time of IL and the highest decrease was indicated by test group with dose 1500 mg/kg BW where the IL decrease time to 10 times compared with the control group.

Mounting frequency: Each dose of leaf extract provides an increase in the frequency of the mounting and increases almost closer to the increased effect on the sildenafil group at a dose of 50 mg / kg BW

Vaginal kissing latency: In vaginal kissing latency, each leaf extract test group had a dramatic decrease in time effect compared to the control group; wherein the decrease occurred almost 50 times lowest than the control group. And this decrease approaches the decreasing effect as shown by the sildenafil group at a dose of 50 mg/kg BW

Table1. Behavioral observation

| Treatment (mg/kg BW) | IL (s) | MF | VKL (s) | VKF | MD (s) |
|----------------------|--------------|------------|------------|------------|------------|
| Control | 4450 ± 117,9 | 1,7 ± 0,3 | 80,3 ± 1,2 | 10,7 ± 0,7 | 4,3 ± 0,7 |
| 500 | 818 ± 60,5 | 6,3 ± 0,3 | 25,7 ± 0,3 | 24,7 ± 0,9 | 31 ± 4,3 |
| 1000 | 564 ± 41 | 6,7 ± 0,3 | 12,7 ± 1,2 | 39,3 ± 1,3 | 52,7 ± 4,4 |
| 1500 | 311,7 ± 27,9 | 11,3 ± 0,3 | 6,7 ± 1,2 | 54,3 ± 1,5 | 64 ± 4,4 |
| Sildenafil 50 | 288,7 ± 40,9 | 12 ± 0 | 7,3 ± 1,2 | 62,7 ± 0,7 | 64,3 ± 2,9 |

All value are mean ± standard error (n=5) Statistical analysis by Kruskal Wallis Test followed by Duncan test *P <0, 05 compare with control and sildenafil. IL = Intromission latency; MF = Mounting frequency; VKL = Vaginal kissing latency; VKF = Vaginal kissing frequency; MD = Mounting duration

Vaginal kissing frequency: In vaginal kissing frequencies, each leaf extract test group had a dramatic increase in time effect compared to the control group, where the increase was almost 5 times higher than the control group. And this increase is close to an increased effect as shown by the sildenafil group at a dose of 50 mg / kg BW

Mounting duration: The effect of increasing the sexual behavior of the test animals appears very prominent especially in the duration of mounting. Each group of extracts showed an increase in the duration of the mounting when compared to the control group. And a markedly close increase of nearly 50-fold, this increase

approximates the effect of sexual behavior enhancement as in the comparison group with sildenafil a dose of 50 mg / kg BW

Sub chronic toxicity

The effect of sexual enhancement shown by each group of test animals leaves little question of whether this gift is safe enough during its use. Because it is a further test of sexual activity is to look at the safety of its use by looking at the liver and kidney activity of the test animals by measuring the levels of creatinine and serum alanine transferase in the blood. The results of measurement of blood creatinine levels over a period of 28 days showed that each group of test animals did not give rise to blood creatinine levels and this was similar to that of creatinine measurements in the control group. This may indicate that the use of leaf extract is quite safe to use.

Table 2. Blood level of creatinine

| Treatment (mg/kg BW) | Day 7 | Day 14 | Day 21 | Day 28 |
|----------------------|-----------------|-----------------|-----------------|-----------------|
| Control | 0,5033 ± 0,0112 | 0,51 ± 0,0044 | 0,5133 ± 0,0068 | 0,52 ± 0,0089 |
| 500 | 0,5067 ± 0,0112 | 0,5167 ± 0,0068 | 0,52 ± 0,0044 | 0,5233 ± 0,0093 |
| 1000 | 0,5133 ± 0,0068 | 0,5167 ± 0,0025 | 0,5233 ± 0,0025 | 0,5267 ± 0,0025 |
| 1500 | 0,5167 ± 0,0068 | 0,52 ± 0,0044 | 0,5233 ± 0,0093 | 0,5267 ± 0,0025 |

All value are mean ± standard error (n=5) Statistical analysis by Kruskal Wallis Test followed by Duncan test *P <0, 05 compare with control

In line with the results of the blood creatinine measurements, the levels of blood alanine transferase serum in each dose group of extracts did not show a significant increase compared with the control group. Although the dose group of 1500 mg / kg BW showed an increase in ALT compared to the control group, but this increase was still within safe limits.

Table 3. Blood level of SGPT

| Treatment (mg/kg BW) | Day 7 | Day 14 | Day 21 | Day 28 |
|----------------------|------------|------------|------------|------------|
| Control | 55 ± 0,4 | 55,3 ± 0,3 | 56,3 ± 0,3 | 57,3 ± 0,3 |
| 500 | 55,3 ± 0,5 | 56,7 ± 0,3 | 57 ± 0,4 | 58 ± 0,4 |
| 1000 | 56,3 ± 0,3 | 57,3 ± 0,3 | 58,3 ± 0,3 | 59,7 ± 0,3 |
| 1500 | 62,7 ± 0,5 | 64,3 ± 0,7 | 66 ± 0,8 | 67,7 ± 0,9 |

All value are mean ± standard error (n=5) Statistical analysis by Kruskal Wallis Test followed by Duncan test *P <0, 05 compare with control

DISCUSSION

Behavioral test had shown that Polysciasscutellaria extract increasing sexual activity compare to negative control group. Polysciasscutellaria extract at dose 1500 mg/Kg BB shown the effect almost nearly similar to the sildenafil effect. Increased sexual activity of test animals suspected because *polysciasapoin* compounds contained in extracts of ScutellariaPolyscias.(12) Where in compounds containing saponins and glycosides believe to be linked to the activities of the artery vasodilatation. as a result of vasodilatation occurs increased sexual activity due to a stimulus directly or indirectly to increased levels of nitro oxidase in the blood that affects the source of neural signals are most important for starting sexual activity men are on the penis gland, where the penis gland is an organ system late sensory highly sensitive. This can be seen from the increasing number of sexual activity in the test group dose of 1500 mg / kgBW compared with sildenafil (Table 1)

Sub-chronic toxicity test results of the use of extracts of ScutellariaPolyscias show that the use is sub chronic dose of 1500 mg /Kg Bb causes an increase in alanine aminotransferase levels significantly. Whereas in

blood creatinine levels at the same dose no significant impacted. Result of the measurement alanine aminotransferase levels during chronic administration of the extracts showed that the levels of alanine aminotransferase extract increase when compared with the normal group of test animals. But the increase is still within the range of normal for ALT values on the rat test animals 52-224 IU / L.(13)

Where alanine aminotransferase an enzymatic compound that is found in the liver and can also be used as a compound sign of an increase in the liver or damage and diseases that affect the liver. Other things that can increase the levels of alanine aminotransferase in addition to damage in the liver, among others, is a state of intoxication, tumors, exposure to CCl₄ compound or compounds can induce liver.(14)(15)

While the results of measurements of blood creatinine levels indicate that all doses of the extract provided does not affect the performance of the kidney as an elimination compound in the body. Creatinine is a compound indicator of kidney function. where the normal value of blood creatinine in test animals in this experiment were within normal range, which is 0.4 to 1.4 mg / dl.(13). Limitation of the study is the compound being tested is an extract of the plant, for further research will be conducted to determine the fractionation of the most significant activity against the increase in sexual activity. Especially if the increase in sexual activity in line with the increase in spermatogenesis.

CONCLUSION

Based on the result, it can be concluded that *P.scutellaria* extract have aphrodisiac activity, however the used of the extract should be concerned primarily on the high dose because it could influence liver function.

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