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ENHANCEMENT OF SEXUAL MOTIVATION IN SEXUALLY NAIVE MALE MICE BY *EURYCOMA LONGIFOLIA*

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ABSTRACT

Eurycoma longifolia was preliminary investigated for aphrodisiac property on sexually naive male mice using both the modified runway-choice and open field methods. The animals were conditioned to seek, either an estrous female, a measure of right choice for sexual motivation or a male mouse, a measure of wrong choice, within two minutes. However, male mice which failed to respond within the stipulated period were considered as having no choice. Oral administration of 0.5 g/kg daily of different fractions of *E. longifolia* viz., chloroform, methanol, water and butanol resulted in an enhancement of the sexual motivation of the animals after three days post-treatment and the effect was more prominent after eight days post-treatment.

INTRODUCTION

Eurycoma longifolia, identified by its local name as Tongkat Ali, is a tall, slender shrub-tree from the Simaroubaceae family and is commonly found along the hilly jungle slopes of Malaysia. The roots are used in traditional medicine as a cure for persistent fevers and malaria (Gimlette and Thomson, 1977; Perry, 1980).

In Malaysia, *E. longifolia* has gained notoriety as a male aphrodisiac since it is reputed to increase male prowess (Gimlette and Thomson, 1977) and it is usually taken as a decoction of the roots in water. Pharmacological evaluations on the various compounds

isolated from this plant showed that it possessed anti malarial (Chan *et al.*, 1986, 1989; Kardono *et al.*, 1991; Ang *et al.*, 1995a, b), cytotoxic (Morita *et al.*, 1990, 1993; Kardono *et al.*, 1991; Itokawa *et al.*, 1992, 1993), antiulcer (Tada *et al.*, 1991) and antipyretic (Chan *et al.*, 1995) properties. However, no study has been carried out on the aphrodisiac property of this plant.

In this paper, we investigated the effects of chronic oral administration of various fractions from *E. longifolia* on the sexual motivation of mice using both the modified runway-choice and open field methods (Meyerson *et al.*, 1973).

MATERIALS AND METHODS

Test Animals

Four hundred male albino mice (35–40 g), naive to heterosexual behaviour and drugs, were adapted to the test apparatus and training protocol daily for 10 consecutive days. The amount of visible light in the environment was just enough to see the animals. Training period was carried out between midnight and 0700 h after the beginning of the dark phase of the light–dark cycle. Two hundred and forty responsive mice were selected on the 11th day and then divided randomly into 12 groups of 20 animals per group. The mice were then caged singly, with food and water available *ad libitum*.

The female mice were induced into the estrous stage with intramuscular injection of 0.3 mg/kg of estradiol benzoate (Sigma Chemical, USA) three days before testing and followed by 3 mg/kg of progesterone (Sigma Chemical, USA) approximately 3 h before testing. Only receptive females were chosen in the study and this was shown by the lordotic reflex in response to

Keywords: *Eurycoma longifolia*, modified open field method, modified runway-choice method, sexual motivation, yohimbine.

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manual stimulation of the vaginal region and also confirmed by the vaginal smear.

Test Compounds

The milled roots of *E. longifolia* were extracted to yield the chloroform, methanol, water and n-butanol fractions following the method as previously described (Chan *et al.*, 1986).

The test compounds were given daily to the male mice using an appropriate oral needle. Each mouse in the respective groups received 0.5 g/kg on one of the following fractions: chloroform, methanol, water or butanol. The mice in the yohimbine (Sigma Chemical, USA) group were given 0.03 g/kg, and the mice in the control group received 3 ml/kg of normal saline. These six groups of male mice were evaluated using the modified runway-choice method (Meyerson *et al.*, 1973). Another six groups of male mice subjected to the similar test samples were tested using the modified open field method (Meyerson *et al.*, 1973). The two tests were repeated daily for 10 consecutive days.

Modified Runway-Choice Method

Male mice were deposited into a runway which led to a choice chamber with two doors at the far end. Each door led into a separate goal cage. The male mice had to pass through a maze to reach the goal cage which housed either a sexually vigorous male or an estrous female mouse. Sexual contact was restricted by a wire

mesh running straight across the goal cage separating the experimental male mice from the caged animals.

Modified Open Field Method

Animals were observed in an arena where the sexually vigorous male and the estrous female mice were placed in alternate mesh cages at the circumference. The male mice were placed in the centre of the field and were free to move around the caged animals.

Choice Selection of the Male Mice

For both methods, each male mouse was given 15 min to establish and maintain contact for at least two minutes with a caged estrous—right choice, or with a caged male—wrong choice. Male mice failing to respond within the stipulated period were considered as having no choice.

RESULTS AND DISCUSSION

Tables 1 and 2 show the percentage of male mice responding to the right choice, wrong choice and no choice, respectively, using both the modified runway-choice and open field methods. Results showed that there was a transient increase in the percentage of male mice responding to the right choice after chronic consumption of 0.5 g/kg chloroform, methanol, water and butanol extracts of *E. longifolia*, 0.03 g/kg of yohimbine

Table 1. Effect of different fractions of *E. longifolia*, yohimbine and normal saline on male mice ($n_{\text{each group}} = 20$) until 10 days post-treatment using the modified runway-choice method.

Day	Percentage of male mice responding to right choice, {wrong choice} and [no choice]					
	Chloroform*	Methanol	Water	Butanol*	Yohimbine	Normal Saline
1	40{25}[35]	45{15}[40]	40{30}[30]	40{10}[150]	45{15}[40]	40{20}[40]
3	45{25}[30]	55{15}[30]	50{30}[20]	45{05}[50]	65{15}[20]	45{20}[35]
5	55{20}[25]	60{25}[15]	65{20}[15]	60{10}[30]	75{10}[15]	40{20}[40]
8	65{10}[25]	75{15}[10]	70{10}[20]	65{15}[20]	85{10}[05]	50{15}[35]
10	65{05}[30]	65{25}[10]	70{20}[10]	70{20}[10]	85{05}[10]	50{10}[40]

*Fractions obtained from *E. longifolia*.

Table 2. Effect of different fractions of *E. longifolia*, yohimbine and normal saline on male mice ($n_{\text{each group}} = 20$) until 10 days post-treatment using the modified open field method.

Day	Percentage of male mice responding to right choice, {wrong choice} and [no choice]					
	Chloroform*	Methanol	Water	Butanol*	Yohimbine	Normal Saline
1	45{20}[35]	45{15}[40]	45{25}[30]	45{10}[45]	45{20}[35]	45{15}[40]
3	45{25}[30]	55{15}[30]	50{20}[30]	45{10}[45]	65{10}[25]	40{20}[40]
5	50{20}[30]	60{15}[25]	65{15}[20]	65{05}[30]	75{10}[15]	50{20}[30]
8	65{10}[25]	75{10}[15]	70{10}[20]	65{25}[10]	85{05}[10]	50{20}[30]
10	75{10}[15]	70{15}[15]	75{10}[15]	70{20}[10]	85{10}[05]	50{20}[30]

and 3 ml/kg of normal saline using both methods. In general, yohimbine and the *E. longifolia* extracts began to enhance the sexual motivation of the male mice after 3 days post-treatment respectively.

Further results indicated that more than 50% and 75% of the male mice after given *E. longifolia* and yohimbine respectively, scored right choice after 5 days post-treatment. The effect was more prominent with more than 65% and 85% of the male mice which consumed *E. longifolia* and yohimbine respectively, scored right choice after 8 days post-treatment. However, there was no enhancement of sexual motivation for the male mice which consumed normal saline (control) as only 40–50% of the male mice responded to right choice throughout the period of investigation. This study showed that *E. longifolia* has aphrodisiac qualities in mice; but however, further studies should be conducted to determine if *E. longifolia* has aphrodisiac qualities in humans.

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