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Effects of *Microdesmis keayana* roots on sexual behavior of male rats

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Abstract

In the present study, the aphrodisiac properties of *Microdesmis keayana* J. Léonard root extract and major isolated alkaloids were evaluated by observing the sexual behavior of male rats.

Aqueous extract (150 mg/kg body weight) and pure alkaloids (3 mg/kg body weight) were administered orally by gavage to male rats. Latent times of observation, intromission and ejaculation, mounting behavior, number of intromissions and mating performances were evaluated and compared to those obtained with untreated rats in the presence of receptive and non-receptive females. The results have shown that aqueous extract and alkaloids of *M. keayana* stimulate sexual parameters in rats' sexual behavior.

A short-term toxicity study undertaken to establish the therapeutic index of aqueous extract, showed that a high dose of the extract (2 g/kg body weight) caused no mortality or changes in rats' behavior.

Keywords: *Microdesmis keayana*; Pandaceae; Alkaloids; Aphrodisiac; Male sexual behavior

Introduction

Aphrodisiacs are substances that stimulate or increase sexual desire and sexual performance. Sexual desire is controlled and regulated by the central nervous system which integrates tactile, olfactory, auditory, and mental stimuli. Sexual performance, which is quite different and not always dependent on sexual desire, is also called erectile performance or capacity. But erectile dysfunction can occur even if sexual desire remains strong, in which case sexual performance depends on a neurovascular event *via* the hemodynamic mechanisms of penile erection (Anderson, 2001; Anderson and Wagner, 1995; Chandler, 1988).

Microdesmis keayana J. Léonard is a West African tropical plant widely used in traditional medicine for many purposes. Its roots are especially used to cure erectile dysfunction and are reputed to be a strong aphrodisiac.

We showed in a preliminary pharmacological study (Zamblé et al., 2006a) that *M. keayana* aqueous root extract had significant hypotensive and vasorelaxing properties and could stimulate erection by both antioxidant activities and stimulation of eNOS mRNA expression. Also in our more recent works (Zamblé et al., 2006b, 2007), one quinoline and four tris(4-hydroxycinnamoyl)spermidine and spermine alkaloids were isolated and these included two quantitatively major compounds, keayanidine B and keayanine. The present study was therefore undertaken to investigate sexual behavior effects of the aqueous extract and two major alkaloids of *M. keayana* in male rats.

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Materials and methods

Plant material

Microdesmis keayana J. Léonard (Pandaceae) was identified by Prof. Aké ASSI, Department of Botany, Director of the National Floristic Centre at the University of Abidjan, Côte d'Ivoire. A voucher specimen (Mk5901) has been deposited in the herbarium of the Department of Pharmacognosy and Botany (herbarium code: LIP), University of Lille 2, France.

Extract preparation

The collected roots (250 g) were washed with distilled water and stored at 37 °C for several weeks until dried. They were then ground and boiled with distilled water (2×500 ml) and filtered. The filtrate was lyophilized yielding 2.83 g of aqueous extract of *M. keayana* (= AEMK) as a yellowish powder.

Pure alkaloids

Keayanidine B and keayanine were isolated as previously described (Zamblé et al., 2006b, 2007). Their structures (Fig. 1) were confirmed by spectroscopic and chemical analyses (ESI-MS and NMR).

Chemicals

Progesterone and oestradiol benzoate were purchased from Sigma Chemical Co. (St. Louis, MO, USA).

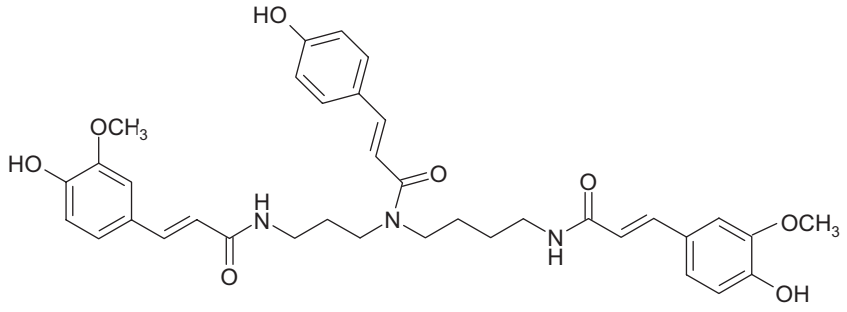
Animals

Healthy, sexually mature Wistar male rats (280–386 g) and female rats (200–231 g) were purchased from Charles River Laboratories (L'arbresles, France). The animals were housed under standard laboratory conditions (temperature: 23 ± 2 °C; photoperiod: 12 h natural light and 12 h dark). They were fed with complete composed foods (Safe®, ref A04) and tap water.

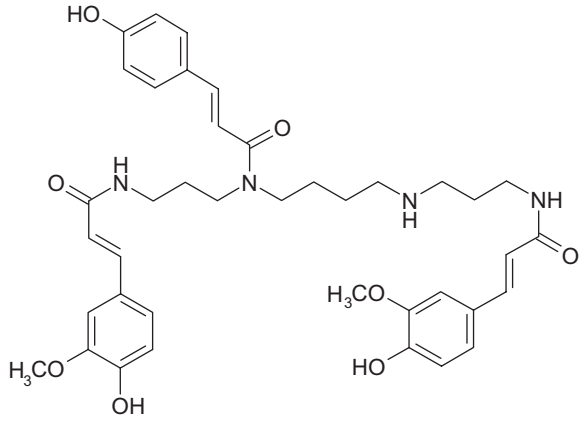
The study was carried out according to the guidelines laid down by the Nara Medical University Animal Welfare Committee, and also under the terms of the Declaration of Helsinki.

Experimental protocol

To test the sexual behavior effects of AEMK, two groups with five sexually mature rats in each, were used. Rats in the first group (= control group) received 1 ml of tap water, while AEMK (150 mg/kg body weight) was administered orally by gavage to those in the second group (= test group). Lyophilized AEMK powder was



Keayanidine B



Keayanine

Fig. 1. Structures of keayanidine B and keayanine.