Science Press

Journal homepage:
www.jcimjournal.com/jim
www.elsevier.com/locate/issn/20954964
Available also online at www.sciencedirect.com.

• Research Article

Aphrodisiac activity of aqueous extract of *Anthonotha macrophylla* P. Beauv. leaves in female Wistar rats

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ABSTRACT

OBJECTIVE: This study investigated the aphrodisiac activity of aqueous extract of *Anthonotha macrophylla* leaves (AEAML) in female Wistar rats.

METHODS: Thirty female rats were assigned into five groups of six animals each, such that rats in groups A, B, C, D and E received orally 1 mL of distilled water only, 5.7 mg/kg body weight (BW) of Exus Ginseng (a polyherbal formulation), 25, 50 and 100 mg/kg BW of AEAML, respectively. After 1 h of treatment, female sexual behaviour parameters were monitored for 30 min. Luteinizing hormone (LH), follicle stimulating hormone (FSH), estradiol (E) and testosterone were also determined using standard methods.

RESULTS: Six secondary metabolites were detected in AEAML with alkaloids (13.00 mg/L) being the highest. AEAML at 25 and 50 mg/kg BW significantly (P<0.05) increased the darting frequency, hopping frequency, lordosis frequency, anogenital grooming, genital grooming and licking behaviour, whereas the darting latency, hopping latency and lordosis latency decreased (P<0.05) in a manner comparable with Exus Ginseng. The 25 and 50 mg/kg BW of AEAML increased (P<0.05) the serum concentrations of FSH, LH and E, like Exus Ginseng, whereas testosterone content was not altered (P>0.05). The 100 mg/kg BW of AEAML did not alter (P>0.05) the sexual behaviour parameters, serum FSH, LH and E contents, whereas testosterone content increased significantly. The ovarian histology of the animals treated with Exus Ginseng, AEAML at 25 and 50 mg/kg BW revealed developing and ruptured follicles with numerous corpora lutea in the stroma, whereas the 100 mg/kg BW of AEAML produced fewer follicles and corpora lutea.

CONCLUSION: The enhanced proceptive, receptive and orientation components of the female sexual behaviour by the 25 and 50 mg/kg BW of AEAML confers sexual invigorating potential on the plant. This study thus justifies the folkloric claim of the plant as a female aphrodisiac.

Keywords: plant extracts; *Anthonotha macrophylla*; leguminosae; aphrodisiacs; estradiol; sexual behaviour

Citation: Yakubu MT, Olutoye AF. Aphrodisiac activity of aqueous extract of *Anthonotha macrophylla* P. Beauv. leaves in female Wistar rats. *J Integr Med*. 2016; 14(5): 400–408.

http://dx.doi.org/10.1016/S2095-4964(16)60271-6
Received April 28, 2016; **accepted** May 30, 2016.
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1 Introduction

Normal sexual function is an important aspect of well being and quality of life for human beings[1]. In some instances, sexual function in females may be hindered and sexual performance unsatisfactory due to sub-optimal or inadequate functioning of the reproductive organs. The inability to have satisfactory sexual performance in females is referred to as female sexual dysfunction (FSD). FSD is expressed as chronic (3 months or more) lack of interest in sexual activity, persistent or recurrent phobic avoidance of sexual contact with a partner, persistent or recurrent inability to attain or maintain sexual excitement, chronic difficulty in attaining orgasm following sufficient arousal, involuntary vagina spasm that interferes with penetration, pain during intercourse and genital pain following stimulation during foreplay, during the reproductive age of 21–45 years[2,3]. FSD is a social and psychological problem that results in significant personal distress, adversely impacting on quality of life and interpersonal relationships[4].

Available information shows that FSD is common, with a worldwide prevalence of 22%–43%[5]. It was found to affect 63% of 384 Nigerian women of reproductive age (21–45 years) that attended the outpatient clinic of a teaching hospital setting in Ile-Ife, a town in Osun State, Nigeria[4].

The etiology of FSD includes psychological (anger, depression, anxiety, ignorance and conflicts), interpersonal (conflicts with partner or inability to establish interpersonal relationships or divorce) and physical causes such as illness (breast cancer, infertility) and injury or drug (sedatives, antidepressants, anti-hypertensives)[4,6]. Management options include both pharmacological and non-pharmacological. The majority of the available management options are either too expensive or pose serious side effects, including increased risk of breast cancer and stroke. Thus, there is a need for complementary and alternative options, including the use of medicinal plants. One medicinal plant that was claimed to excite sexual behaviour in females, identified during our ethnobotanical survey of some areas of Western Nigeria, is *Anthonotha macrophylla* (Family: leguminosae).

A. macrophylla, otherwise known as Abara (Yoruba, Western Nigeria), Ububa-ikpa (Igbo, Eastern Nigeria), African rosewood (English), Furmu (Guinea, West Africa) or Furugudu (Sierra Leone), is found growing in Guinea westward, central African republic, Congo, Democratic Republic of Congo, Gabon, Cabinda (Angola) and Nigeria. It is typically a shrub but sometimes a small-to medium-sized tree of about 20 m, anchored by several branches. It bears green leaves, which are about 2 mm long. The plant has been used in local medicine to treat a number of diseases that include gonorrhea, pain, diarrhoea, dysentery, yellow fever, malaria fever and jaundice[7–10]. In some parts of Western Nigeria, the leaves are believed to excite sexual behaviour in females. Studies reported on *A. macrophylla* in the open scientific literature are limited to chemical constituents of the seeds[11], analysis and identification of the oils from the seed[12] and nutritional properties[13]. The absence of empirical evidence supporting the pharmacological uses of the plant, especially the aphrodisiac claim, necessitated the present study. Therefore, here we investigated the aphrodisiac activity of aqueous extract of *A. macrophylla* leaves (AEAML) in female rats in order to provide a complementary and alternative medicine approach to the important public health problem, FSD.

2 Materials and methods

2.1 Materials

2.1.1 Plant material and authentication

Fresh leaves of *A. macrophylla* were obtained in July, 2013, from a riverside plantation at Obaagun, Osun State, Nigeria. The plant was authenticated at the herbarium unit of the Department of Plant Biology, University of Ilorin, Ilorin, Nigeria, and a voucher specimen was deposited under UIH 001/1138.

2.1.2 Experimental animals

Thirty healthy female rats (*Rattus norvegicus*) with an average weight of (142.40 ± 1.16) g, and the thirty male rats with average weight of (191.41 ± 3.28) g were obtained from the animal house of the Department of Biochemistry, University of Ilorin, Ilorin, Nigeria. The animals were housed in clean plastic cages, placed in well-ventilated house conditions (temperature: (22 ± 3) ℃; photoperiod: 12 h natural light and 12 h dark; humidity: 45%–50%). They were allowed unrestricted access to rat pellets (Premier Feeds, Ibadan, Nigeria) and tap water.

2.1.3 Drug and assay kits

Exus Ginseng (a polyherbal formulation for the management of female sexual dysfunction) was a product of Exus Pharmaceutical (Nigeria) Limited, Lagos, Nigeria. The luteinizing hormone (LH), follicle stimulating hormone (FSH), estradiol (E) and testosterone assay kits were products of Monobind Inc., Lake Forest, California, USA. All other chemicals used were products of Sigma Aldrich Company, Mannheim, Germany.

2.2 Methods

2.2.1 Preparation of plant extract

The leaves were separated from the stem, washed under running tap water and oven-dried at 40 ℃ for 24 h using Uniscope SM 9053 Laboratory Oven (Surgifriend Medicals, England). The dried materials were pulverized with an electric blender (Master Chef, Model MC-BL