
Proceedings

In vitro uterine activity of extract and fractions of *Manniophyton fulvum* Mull. Arg (Euphorbiaceae) in mice

Proceedings of the University of Benin, Faculty of Pharmacy Research Day. February, 2018

Josephine O Ofeimun^{1*}, Chidi U Okafor¹, Enitome E Bafor², Fabian C Ameachina², Buniyamin A Ayinde¹

Departments of ¹Pharmacognosy, ²Pharmacology, Faculty of Pharmacy, University of Benin, PMB 1154, Benin City, 300001, Nigeria.

* For correspondence: Email: jofeimun@uniben.edu. Tel: +2348064942568

Abstract

Purpose: *Manniophyton fulvum* is a plant in the Euphorbiaceae family that is used to manage dysmenorrhea amongst other conditions. It was investigated for its effect on the isolated mice uterus.

Methods: Methanol extract (ME) of the leaves was partitioned into chloroform (CF) and aqueous fractions (AF) and their effects on amplitude and frequency of uterine contractions were evaluated.

Results: The methanol extract and aqueous fraction were observed to significantly ($p < 0.05$ and 0.01) increase the frequency and amplitude of contraction of the smooth muscle of the uterus in a concentration-dependent manner in the presence and absence of an

agonist, while the chloroform fraction decreased the frequency and amplitude of contraction ($p < 0.05$) in a concentration-dependent manner. The presence of saponins, alkaloids, tannins, flavonoids and anthraquinones were detected in the plant material.

Conclusion: This work provides scientific evidence for the use of the plant to manage dysmenorrhea and similar conditions in ethnomedicine and this may form the basis for further investigation of the plant.

Keywords: *Manniophyton fulvum*, *in vitro*, uterine, Euphorbiaceae, dysmenorrhea

Indexing: Index Copernicus, African Index Medicus

Background

Preterm birth has been factored as a major determinant of neonatal mortality and morbidity with grave consequences for health in the long term [1]. It is defined as any child birth that occurs at less than 37 completed weeks or 259 days of pregnancy [2]. Drugs used to suppress premature labour are known as tocolytics, while those used to argument labour during childbirth and to stop bleeding after childbirth are known as oxytocics. Although drugs currently exist that serve these purposes, the search for new drugs with the promise of improved safety and better indices of survival for mother and child remains an ongoing process. Against this backdrop *Manniophyton fulvum*, a dioecious shrub or climber belonging to the family of plants known

as Euphorbiaceae with diverse biological activities and wide use in traditional medicine is being investigated for its effect on the uterus. It is claimed to be useful in the management of pain, cough, bronchitis insanity, diarrhoea and dysmenorrhea in folkloric medicine [3].

Aim/Objectives

The aim of this work was to determine the activity of the methanol extract, chloroform and aqueous fractions of the leaves of the plant on the uterus of female mice using the isolated tissue model and also determine constituents present in the plant.

Materials and Methods

Plant was collected in Iwu village Edo state, identified and authenticated with voucher

number FHI-109931 issued at the Forestry Research Institute of Nigeria (FRIN), Ibadan. Leaves were separated from the stalk dried, powdered and extracted with methanol with the aid of a Soxhlet apparatus to yield the methanol extract (ME). The methanol extract was partitioned into chloroform and water to obtain the chloroform fraction (CF) and aqueous fraction (AF). Twenty four hours prior to ex vivo experiment, female mice were treated with 1.0 mg/kg of diethylstilbestrol to induced oestrous. Uterine tissue from animals in oestrous was mounted in De Jalon's physiological solution and the effects of ME, CF and AF at a concentration range of 7×10^{-5} – 7×10^{-1} µg/ml were evaluated on the amplitude and frequency of spontaneous uterine contraction. The effects of extract and fractions on amplitude and frequency of oxytocin and potassium chloride induced uterine contractions at a concentration range of 3.43×10^{-2} – 3.43×10^1 were equally evaluated. Phytochemical tests using standard procedures [4] were carried out on the plant material.

Results

The methanol extract and the aqueous fraction were observed to increase the frequency and amplitude of spontaneous contraction in the smooth muscle of the uterus in a concentration-dependent manner. Whereas the effect produced by the aqueous fraction was significant ($P < 0.01$ and 0.05), that produced by the methanol extract was not. The chloroform fraction produced significant ($P < 0.01$ and 0.05) concentration dependent decrease in the amplitude and frequency of uterine smooth muscle contraction. In the presence of an agonist (oxytocin and potassium chloride), the methanol extract and aqueous fraction increased the amplitude and frequency of contraction in a concentration dependent manner significantly, suggesting that constituents that are responsible for effecting contraction of the smooth muscle may be present in the polar fraction of the extract. Also the

chloroform fraction was observed to decrease the amplitude and frequency of contraction in a concentration dependent manner. This equally suggests that constituents responsible for tocolytic effect on the uterus may be present in the non-polar fraction of the extract. Phytochemical investigation revealed the presence of alkaloids, saponins, tannins, flavonoids, cardiac glycosides and anthraquinones in the leaves of the plant.

Conclusion

This study shows that the methanol extract and fractions of the leaves of *Manniophyton fulvum* have ability to modulate the contraction and relaxation of the smooth muscle of the uterus in female mice. It also provides scientific evidence for the use of the plant in ethnomedicine in the management of dysmenorrhea. This is worthy of further investigation to identify exact mechanism(s) of action and identify and isolate constituent(s) from it which are responsible for the observed activities.

References

1. Beck S, Wojdyla D, Say L, Betran AP, Merialdi M, Requejo JH, Rubens C, Menon R, FaVan Look P. The worldwide incidence of preterm birth: a systematic review of maternal mortality and morbidity. *Bulletin of the World Health Organization* 2010; 88:31-38.
2. World Health Organization. *International classification of diseases and related health problems (10th Ed)* Geneva, World Health Organization, 1992. p 114.
3. Burkill HM. *The useful plants of West Tropical Africa (2nd Ed), Vol 2, Families E – I.* Royal Botanic Gardens, Kew Richmond, United Kingdom; 1994. p 636.
4. Harborne JB. *Textbook of phytochemical methods and guide to modern techniques of plant analysis (5th Ed).* Chapman and Hall Ltd, London, 1998. pp 21-72.