

## Effect of Aqueous Extract of Root Bark of *Rauvolfia Obscura K Schum* (Apocynaceae) on Sexual Parameters in Castrated Rats

Ondele Radard\*, Peneme Max Bonaventure Lazard, Wossolo Lingono Bertrand Stephane, Olingou Ilengué Bondzele Adris, Kombo Koutia Mireche Darocha and Etou Ossibi Arnaud Wilfrid

\*Laboratory of Life and Earth Sciences, ENS UMNG, Republic of Congo.

Received June 28, 2024; Revised July 12, 2024; Accepted July 15, 2024

### ABSTRACT

Infertility affects all societies in the world and concerns all human age groups, from puberty to old age. The aim of this study was to investigate the effect of the aqueous extract of the root bark of *Rauvolfia Obscura K Schum* (apocynaceae) on sexual parameters in castrated rats, castrated using the slightly modified Roubinian technique. Aqueous extracts of *Rauvolfia obscura* root bark (100, 250 and 500 mg/kg P.O.), testosterone enanthate and yohimbine (10 mg/kg) were administered for 7 days to castrated animals in 6 batches of 5 rats each. After mating with the females, the effect of the plant on sexual parameters was observed for one hour. In another study, still involving castrated animals, the aqueous extract of *Rauvolfia obscura* (100, 250 and 500 mg/kg P.O.) was administered in animals pre-treated with testosterone enanthate (0.2 ml), and sexual parameters were also observed as before. This study showed that the aqueous extract reduced the weight of castrated animals. Aqueous extract of *Rauvolfia obscura* (100, 250 and 500 mg/kg P.O.) alone had no effect on the sexual parameters studied. However, when administered to animals pre-treated with testosterone enanthate, it activated sexual parameters, with a reduction in latency time. This result suggests that the plant extract acts synergistically with natural testosterone to stimulate libido in castrated rats. It is therefore a good remedy to activate the rise in testosterone and thus to resolve cases of infertility.

**Keywords:** *Rauvolfia obscura*, Sexual parameters, Castrated

### INTRODUCTION

Plants in nature hold the keys to life, in the sense that they nourish, heal, maintain and keep man alive. To speak of life is to pay particular attention to the means by which it is accessed. By this we mean sexuality and reproduction. Some men are or become unable to access sexual pleasure or even procreation. They are said to be infertile. Infertility is understood as the inability of a couple to achieve a full pregnancy after 12 months of unprotected sexual intercourse [1-4]. The number of infertile couples worldwide is estimated at between 50 and 130 million [5-7]. One of the main causes of this condition is hormonal deficiency. Prevalence of infertility due to hypogonadism. Hypogonadotropic hypogonadism is found in 30% of micro penises observed at birth [8] and 12% of investigations for delayed puberty in both sexes [9]. In view of these epidemiological data, this study was initiated in laboratory rats. In the latter, ablation is performed using conventional methods, with the aim of creating a deficiency in androgens, in particular the male sex hormone testosterone, synthesized in the testicles. Because of their therapeutic power, plant extracts continue to be used by many traditional health practitioners and laboratories for pharmacological studies. The case of the aqueous extract of the roots of *Rauvolfia*

*Obscura K Schum* (apocynaceae) used in this study. The roots of this plant have already been the subject of pharmacological studies such as: acute toxicity, aphrodisiac [10], diuretic and hypertensive [11], abortive [12], hypoglycemic [13] and many others. Thus, the primary characteristic of castration is the loss of sexual performance and libido in male species. In order to demonstrate the efficacy of the aqueous extract of *Rauvolfia obscura* root bark, its effect on certain sexual parameters (sexual mounts, number of erections, number of ejaculations and latency time) was demonstrated in normal rats [10]. In the present study, sexual parameters are evaluated in castrated rats. The aim of this study is to investigate the effect of the aqueous

**Corresponding author:** Ondélé Radard, Laboratory of Life and Earth Sciences, ENS UMNG, Republic of Congo, Tel: +242066993028 / +242055310232; E-mail: ondelradard@gmail.com

**Citation:** Radard O, Lazard PMB, Stephane WLB, Adris OIB, Darocha KKM, et al. (2024) Effect of Aqueous Extract of Root Bark of *Rauvolfia Obscura K Schum* (Apocynaceae) on Sexual Parameters in Castrated Rats. *BioMed Res J*, 8(2): 748-752.

**Copyright:** ©2024 Radard O, Lazard PMB, Stephane WLB, Adris OIB, Darocha KKM, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

extract of the root bark of *Rauvolfia Obscura K Schum* (apocynaceae) on sexual parameters in castrated rats.

## MATERIAL AND METHODS

### Material

#### Plant material

*Rauvolfia obscura* root bark powder was used as plant material in various pharmacological tests.

The bark was cut into small pieces and air-dried in the laboratory at an ambient temperature of 25°C for 15 days.

For *Rauvolfia Obscura K Schum* (Apocynaceae), root barks were collected in Gamboma (365 km north of Brazzaville, Congo) in April 2023. Identification was carried out by systematist botanists and completed at the IRSN botanical laboratory in Brazzaville, where a sample was compared with a reference sample deposited under number: IEC001856 dated 9/12/96.

#### Animal material

Male rats of wistar strain aged 5 to 6 months and weighing between 130 and 150g were used. These animals were bred at the animal house of the Ecole Normale Supérieure (ENS) of the Université Marien NGOUABI. They were regularly fed with free access to tap water.

### Methodology

#### Preparation of aqueous extracts

50g of *Rauvolfia obscura* root bark was macerated in 500ml of distilled water for 48 hours. After filtration using hydrophilic cotton and "Wattman" filter paper, the macerates obtained were concentrated on a water bath thermostated at 55°C, yielding a yellow solid of *Rauvolfia Obscura K Schum*. The solid obtained was stored in a flask.

#### Animal preparation

Rats were castrated using the technique described by Roubinian [13] slightly modified [14, 15] for albino wistar rats.

#### Evaluation and monitoring of castration effects in rats after castration

The study parameter in this experiment was weight. Thus, after removal of the testes, the weight of castrated animals was measured using a balance. KERN brand, FCB 30K1. was used every day for two weeks.

#### Study of the effects of aqueous extracts of *Rauvolfia Obscura K Schum* on sexual parameters in castrated rats

15 days after castration, 30 male rats were divided into 06 batches each containing five 05 animals and treated as follows:

Batch 1: animals received distilled water (0.5ml/100g.P. O)

Batch 2: animals received testosterone enanthate (0.2ml/kg subcutaneously)

Lot 3: animals received yohimbine (10mg/kg)

Lots 4, 5 and 6 received aqueous extracts of *Rauvolfia obscura* (100, 250, 500 and 500mg/kg. P.O).

Extracts were administered for seven 7 days prior to mating. Females were treated subcutaneously with estradiol (600ug/animal/d) [16], to make them receptive to males. 6 h after the last administration, animals were paired with females to observe the following sexual parameters (number of mounts, number of erections, number of ejaculations and latency time) for one hour.

#### Study of the effects of aqueous extracts of *Rauvolfia obscura* roots in castrated rats pre-treated with testosterone enanthate.

30 castrated male rats were divided into 6 batches each containing five (05) animals and treated as follows:

Batch 1: animals received distilled water (0.5ml/100g.P. O);

Batch 2: animals received testosterone enanthate (0.2ml/kg subcutaneously)

Lot 3: animals received testosterone enanthate (0.2ml/kg) + yohimbine (10mg/kg)

Lots 4, 5 and 6 received testosterone enanthate (0.2ml/kg) + aqueous extract of *Rauvolfia obscura* root bark (100, 250 and 500mg/ kg. P.O).

The same parameters were observed for one hour as in the previous study.

## RESULTS

#### Effects of aqueous extracts of *Rauvolfia Obscura* root bark on sexual parameters in castrated rats

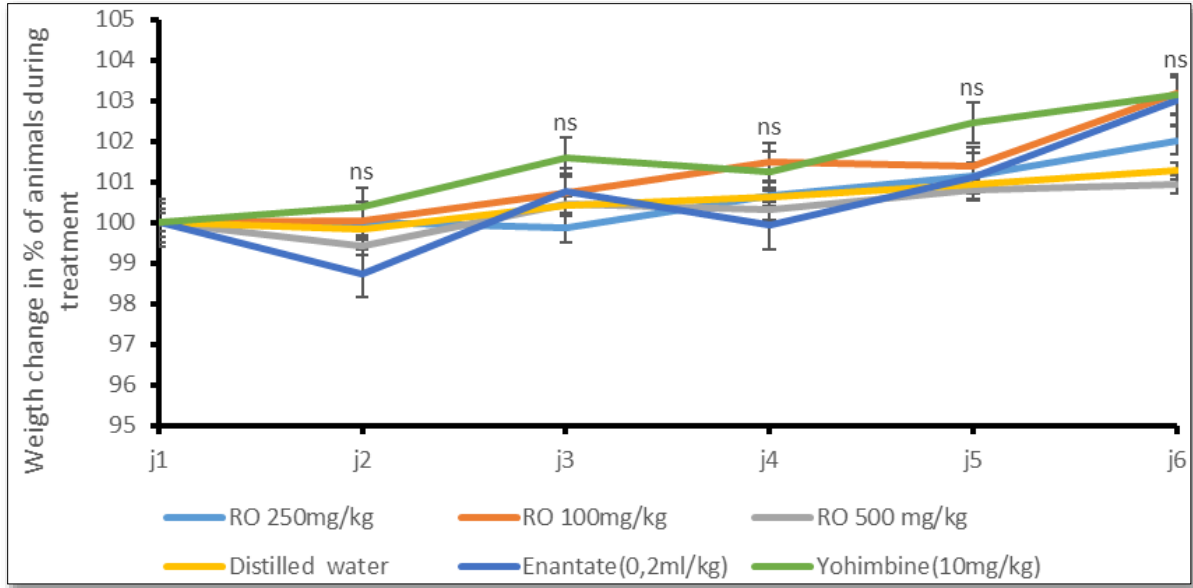
Changes in rat body weight during treatment with *Rauvolfia Obscura K Schum* (Figure 1).

#### Effect of aqueous extract of *Rauvolfia obscura* root barks alone in castrated rats

Effects of aqueous extracts of *Rauvolfia obscura* root bark on sexual parameters in castrated rats pretreated with testosterone enanthate (Table 1).

#### Effects of aqueous extracts of *Rauvolfia obscura* root barks on sexual parameters in castrated rats pretreated with testosterone enanthate (Table 2).

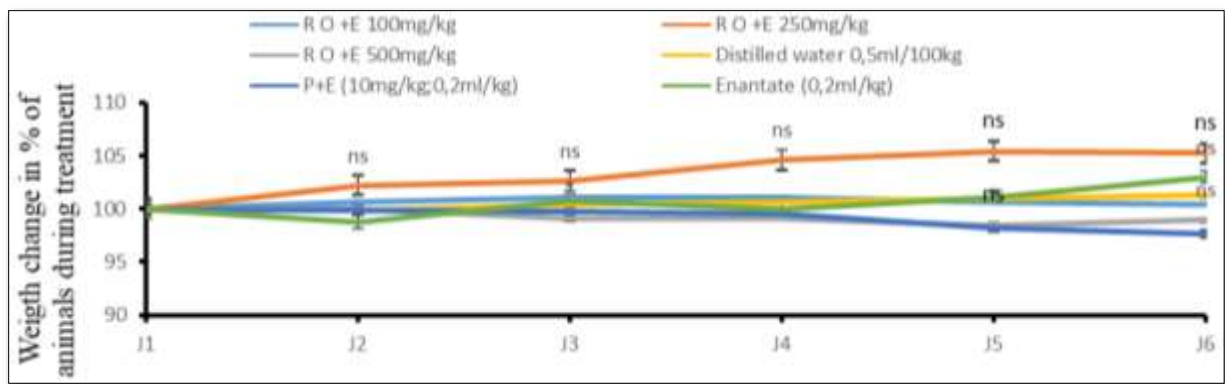
Weight development of testosterone enanthate-pretreated animals (Figure 2)



**Figure 1.** Effect of aqueous extract of *Rauvolfia Obscura* K Schum root barks. Values are means ± MSE; n=5; ns p<0.05 difference not significant

**Table 1.** Effect of aqueous extract of *Rauvolfia obscura* root bark alone in castrated rats.

Sexual parameters	Distilled water (0,5ml/100g)	Yohimbine (0,2ml/kg)	Enanthate (0,2ml/kg)	R. Obscura (100mg/kg)	R. Obscura (250mg/kg)	R. Obscura (500mg/kg)
Sexual mounts	0,00±0	6,8 ± 4,865ns	1,4 ± 0,393*	0,00 ± 00	0,00 ± 00	0, 00±00
Erection	0,00 ± 0	4,6±3,291ns	1,6± 0,858ns	0,00 ± 00	0,00 ± 00	0,00 ± 00
Ejaculation	0,00 ± 0	0,00 ± 00	0,00 ± 00	0,00 ± 00	0,00 ± 00	0,00 ± 00
Latency time (second)	3600 ±00	18,664 ± 13,355ns	46 ± 8,228**	3600 ± 00	3600 ±00	3600 ±00



**Figure 2.** Effect of aqueous extract from the trunk bark of Lire *Rauvolfia obscura* et non *Rauvolfia obscura* K Schum. Values are means ± MSE with n=5, ns p<0.05 non-significant difference from day 1

**Table 2.** Effect of aqueous extract of *Rauvolfia Obscura K Schum* roots in castrated rats pretreated with testosterone enanthate.

Sexual parameters	Distilled water (0,5ml/100g)	Enanthate (0,2ml)	Yohimbine + Enanthate (0,2ml)	<i>R. obscura</i> + Enanthate (100mg/kg)	<i>R. obscura</i> + Enanthate (250mg/kg)	<i>R. obscura</i> + Enanthate (500mg/kg)
Sexual mounts	0,00±0	1,4±0,39*	55±8,765**	50,2 ±9,946ns	38,8 ±5,044ns	38,4 ±4,937ns
Erection	0,00±0	1,6±0,88*	46,4±3,00***	44,2 ±4,937**	38,8±4,579ns	45 ±4,114*
Ejaculation	0,00 ±0	0,00±0	1,6±0,679*	1,6 ±0,858ns	0,8±0,286ns	2,2 ±0,286*
Latency time (second)	0,00 ±0	46±8,228**	60,029 ±8,12ns	79,9894 ±7,986*	70,5758 ±8,474*	78,4748±10,5*

Values are means ± MSE with n=5, \*p<0.05; \*\*p<0.01 and \*\*\*p<0.001 significant difference

## DISCUSSION

The aim of the present study was to investigate the effect of aqueous extract of the root bark of *Rauvolfia Obscura K Schum* (apocynaceae) on sexual parameters in castrated rats. Analysis of the results on changes in body weight of animals treated with aqueous extract of the root bark of *Rauvolfia obscura* (100, 250 and 500mg/kg) showed a decrease in body weight in castrated animals treated with aqueous extract of the root bark of *R. obscura schum* roots (apocynaceae), as well as in castrated animals pretreated with testosterone enanthate (0.2 ml), compared with untreated castrated animals. This reduction, observed in both cases, shows that the extract acts like natural testosterone. It has been shown that testosterone blocks lipolysis. Its absence promotes the entry of fatty acids into adipocytes, resulting in obesity [17,18]. Furthermore, the reduction in animal body weight in these experiments following administration of *Rauvolfia obscura* aqueous extract (250, 500 mg/kg), seems to be explained by the toxic effects of the plant, whose previous studies had shown a lethal dose of 3300 mg/kg in mice [10]. The aqueous extract of *Rauvolfia Obscura K Schum* root bark (100, 250 and 500mg/kg) administered to castrated rats had no effect on any of the sexual parameters (number of mounts, number of erections and number of ejaculations) examined in this study. This result suggests that the aphrodisiac power of *Rauvolfia Obscura K Schum* root bark in normal rats is probably due to the stimulation of blood release of androgens, notably testosterone. Indeed, testosterone released by the testicles is reputed to stimulate the nerve structures at the origin of any sexual act [19]. However, previous studies with aqueous extracts alone in rats have shown the opposite result. Examples include aqueous extracts of *pausinyntalia yohimbe* [15] and *Buchholzia coriacea* [14]. In this study, sexual parameters were also assessed using the aqueous extract of *Rauvolfia obscura* root bark in castrated rats pre-treated with testosterone enanthate. The results obtained show that the aqueous extract of *Rauvolfia obscura* root bark (100, 250

and 500mg/kg) administered to castrated rats pretreated with testosterone enanthate, increases sexual parameters with a decrease in latency time in castrated rats pretreated with testosterone enanthate. This result shows that the aqueous extract of *Rauvolfia obscura* root bark acts synergistically with testosterone to stimulate the nervous system to perform sexual acts. Aqueous extracts of the roots of *Rauvolfia Obscura K Schum* are a good remedy for treating impotence linked to androgen deficiency in men.

## CONCLUSION

At the end of the study of the effects of aqueous extracts of the bark of the roots of *Rauvolfia Obscura K Schum* (Apocynaceae) on sexual parameters in castrated rats, it should be noted that the aqueous extract of *Rauvolfia obscura* (250 ,500 mg/kg) alone reduced the weight of rats, as did the reference molecules yohimbine (10 ml) and testosterone enanthate (0.2 ml). Compared with pods from animals after castration. The aqueous extract of *Rauvolfia obscura* root bark alone had no effect on sexual parameters in the study. However, in the presence of testosterone enanthate (0.2 ml), plant extracts such as yohimbine (10 mg/kg) activated sexual parameters with a reduction in latency time. The aqueous extract of *Rauvolfia obscura* (100, 250, 500 mg/kg) acts synergistically with testosterone to stimulate natural testosterone. It is therefore a good remedy for the treatment of sexual impotence due to a drop in androgen levels in men.

## REFERENCES

1. World Health Organization (1999) WHO laboratory manual for the examination of human semen and sperm-cervical mucus interaction. Cambridge: Cambridge University Press pp: 138.
2. Leridon H, Mandelbaum J, De La Rochebrochard E, Troude P, Jaoul M (2011) De l'infertilité à l'assistance médicale à la procréation. Actualité et dossier en santé publique (75): 11-27.

3. Sim KA, Dezarnaulds GM, Denyer GS, Skilton MR, Caterson ID (2014) Weight loss improves reproductive outcomes in obese women undergoing fertility treatment: A randomized controlled trial. *Clin Obesity* 4(2): 61-68.
4. Amadou CF, Georges Armel MA, Brahim K, Witabouna KM (2022) Effet œstrogénique de l'extrait aqueux des feuilles de *Cissus aralioides* chez la ratte Wistar, *Rattus norvegicus*. *J Animal Plant Sci* 53 (1): 9657-9667.
5. Mascarenhas MN, Flaxman SR, Boerma T, Vanderpoel S, Stevens GA (2012) National, regional, and global. *PLoS Med* 9(12): e1001356.
6. Agarwal A, Mulgund A, Hamada A, Chyatte MR (2015) A unique view on male infertility around the globe. *Reprod Biol Endocrinol* 13: 37.
7. Jacques Young (2016) Infertilité masculine: Mécanismes, causes et exploration. *MCED* 80: 29-36.
8. Lee PA, Mazur T, Danish R, Amrhein J, Blizzard RM, et al. (1980) Micropenis. I. Criteria, etiologies and classification. *Johns Hopkins Med J* 146: 156-163.
9. Sedlmeyer IL, Palmert MR (2002) Delayed puberty: Analysis of a large case series from an academic center. *J Clin Endocrinol Metab* 87: 1613-1620.
10. Ondele R, Ossibi AWE, Bassoueka DJ, Peneme MB, Itou RDE, et al. (2015) Acute toxicity and aphrodisiac effect of the aqueous extract of *Rauvolfia Obscura K Schum* (apocynaceae). *Afr Sci* 11(3): 172-180.
11. Radard O, Elva N, Cadosh MB, Wilfrid EOA, Antoine AA (2024) Hypotensive and diuretic activities of aqueous extract of *Rauvolfia Obscura K Schum* root bark in normotensive rats. *J Med Plant Stud* 12(2): 68-72.
12. Radard O, PENEME MBL, Stephane WLB, Jesusciel K, De Garde Elion IR, et al. (2023) Abortive effect of the aqueous extract of the root bark of *Rauvolfia Obscura K Schum* (apocynaceae) in female Wistar rats. Conference - UAC EVENTS (Indico) pp: 11.
13. Alphonsine NB (2023) Evaluation of the anti-hypoglycemic and hypoglyceminant activity of the aqueous extract of the root bark of *Rauvolfia Obscura K Schum* (Apocynaceae) in rats Master's thesis, Marien Nguabi University, Brazzaville, Republic of Congo pp: 37.
14. Radard O (2016) Effets Aphrodisiaques Et Cardiovasculaires De L'extrait Aqueux Des Ecorces De Tronc De *Buchholzia Coriacea Engl.* (Capparidaceae) Chez Rat Male Wistar; Thèse de doctorat unique, Université Marien ngouabi, Brazzaville république du Congo pp: 126.
15. Adrisse OIB (2023) Etude des effets de deux plantes aphrodisiaques sur l'impuissance sexuelle induite par la castration chez rat male wistar; Mémoire de master enseignement Université marien Nguabi Brazzaville République du Congo pp: 36.
16. Watcho P, Wankeu Nya M, Nguelefack TB (2007) Prosexual effects of *Dracaena arborea* (Wild) Link (Dracaenaceae) in sexually experienced male rats. *Pharmacologyonline* 1: 400-419.
17. Chaabouni K, Lahyani A, Turki M, Messedi M, Louati D, et al. (2014) Profils métabolique et inflammatoire dans le syndrome des ovaires polykystiques associé à l'excès pondéral. *Ann Biol Clin* 72(4): 500-502.
18. Chatard JC (2003 Éd.) *Biomechanics and Medicine in Swimming IX*. Publications de l'Université de St-Étienne.
19. Tostain J, Rossi D, Martin PM (2004) Physiologie des androgènes chez l'homme adulte, progrès en urologie 14: 639-660.