

Effect of aqueous extracts of *pausinystalia yohimbe* trunk bark on castration-induced sexual impotence in male rats

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Abstract

Medicinal plants have occupied since ancestral times a place of choice in the treatment of many pathologies that affect man, following the example of sexual impotence. The aim of the present study was to investigate the effect of an aqueous extract of *P. yohimbe* trunk bark on castration-induced sexual impotence in male rats. The animals were castrated using the slightly modified Roubinian technique. Fifteen days after castration the animals were divided and treated as follows: one batch distilled water control (0.5ml/100g W.O.), one batch testosterone enanthate (0.2ml/kg subcutaneously), one batch yohimbine (10mg/kg) and three batches aqueous extract of *P. yohimbe* (100, 250 and 500 mg/kg W.O.). The animals were dosed for seven days. On the last day, each animal was mated with a female previously treated with 600 µg of 17 β-Oestradiol. The study parameters were sexual mounts, number of erections, number of ejaculations and latency time between two consecutive mounts. In other castrated animals, previously treated with testosterone enanthate (0.2 ml/kg subcutaneously), the aqueous extract of *P. yohimbe* (100, 250 and 500 mg/kg) was administered and the study parameters were observed as before. Analysis of the results shows that the aqueous extract of *P. yohimbe* bark (100, 250 and 500 mg/kg) alone and the two reference molecules activate the sexual parameters compared with distilled water (0.5 ml/100g). The same result was observed when the administration of the extract was followed by that of the reference molecules. *P. yohimbe* trunk bark contains phytoandrogens and acts by potentiating the action of natural testosterone. The extract is an important remedy for the treatment of sexual impotence.

Keywords: Pausinystalia yohimbe; Castration; Sexual impotence; Aqueous extracts; Androgen

1. Introduction

Sexual impotence is a benign, non-fatal, guilt-ridden condition that affects men's sexual lives at some point. It is a man's inability to initiate and maintain a sufficient erection during one or more sessions of sexual intercourse (Delavière 2002, Lue 2004). There are various causes of this condition, including hormonal factors, psychological factors, state of health, climatic factors and age-related factors. The prevalence of sexual impotence in Europe is estimated at 20-45% and its incidence in the West at 25-30 new cases per 1000 inhabitants per year (Droupy 2005; Cailleau 2009). In Brazzaville, 40 out of 273 patients, i.e. 14.7% of patients aged between 20 and 80 seen at the Centre Hospitalier Universitaire as urology-andrology outpatients for various pathologies were concerned with erectile dysfunction. Pausinystalia yohimbe is one of a number of plants known to treat erectile dysfunction. The literature shows that it has been the subject of various pharmacological studies, including : Acute and subacute toxicity (Akassa ; 2022), Aphrodisiac activity - mechanism of action (Akassa 2019), Anxiolytic activity of the aqueous extract of trunk bark (Ondélé ; 2024). Sexual impotence remains a permanent concern in all societies around the world, and treating it is essential to relieve the suffering of those affected. It involves, among other things, the use of plants such as the aqueous extract of the trunk of

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pausinystalia yohimbe, reputed to be an aphrodisiac (Akassa, 2019). Castration was used in this study as a technique to induce sexual impotence in rats. No study is yet highlighted, the efficacy of the extract of this plant on sexual parameters in castrated rats. The scope of this work. The aim of this study was to investigate the effects of the aqueous extract of *P. yohimbe* trunk bark on castration-induced sexual impotence in rats.

2. Materials and methods

2.1. Plant material

The trunk bark of *Pausinystalia yohimbe* K. Schum (Apocynaceae) were used. They were dried and pulverised in the Life Sciences laboratory of the Ecole Normale Supérieure (ENS).

2.2. Animal material

Wistar rats weighing between 200 and 250 g and aged 4 months were used. These rats were supplied by the animal house of the Ecole Normale Supérieure (ENS) of the Université Marien Ngouabi. The animals were given a balanced diet plus tap water at all times. The animals were acclimatised for 72 hours and fasted for 24 hours before each experiment.

2.3. Methods

2.3.1. Preparation of the aqueous extract

50g of *Pausinystalia yohimbe* trunk bark powder was macerated in 500ml of distilled water for 48 hours. After filtration using hydrophilic cotton and 'Wattman' filter paper, the macerate obtained was concentrated on a water bath thermostated at 55 °C, to obtain a yellow solid of *Pausinystalia yohimbe* K. Schum. The solid obtained was stored in a flask.

2.3.2. Study of the effect of aqueous extract of *p. yohimbe* alone on sexual parameters in male rats

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

- Batch 1: the animals received distilled water (0.5 ml/100g.P.O);
- Lot 2: the animals received testosterone enanthate (0.2ml/kg subcutaneously)
- Lot 3: the animals received yohimbine (10mg/kg)
- Lots 4, 5 and 6 received aqueous extracts of the trunk of *P. yohimbe* (100, 250 and 500 mg/kg.P.O).

The extracts were administered orally for seven (07) days. Before mating, the females were treated subcutaneously with oestradiol (600 ug/animal/d) (Watcho *et al.*, 2007) to make them receptive to males. Six (6) hours after the last administration, the animals were mated to observe the sexual parameters (sexual mounts, number of erections, number of ejaculations and latency time) for one hour.

2.4. Study of the effect of aqueous extracts from the trunk of *P. yohimbe* in castrated rats pre-treated with testosterone enanthate

30 male rats were divided into nine (09) batches each containing five (05) animals and treated as follows:

- Batch 1: the animals received distilled water (0.5ml/100 g.P.O);
- Lot 2: the animals received testosterone enanthate (0.2ml/kg subcutaneously);
- Lot 3: the animals received testosterone enanthate (0.2ml/kg) + yohimbine (10mg/kg);
- Batch 4, 5 and 6 received testosterone enanthate (0.2ml/kg) + aqueous extract of *P. yohimbe* trunk bark (100, 250, and 500mg/kg. P.O).

3. Results

3.1. Changes in rat weight during treatment with *Pausinystalia yohimbe*

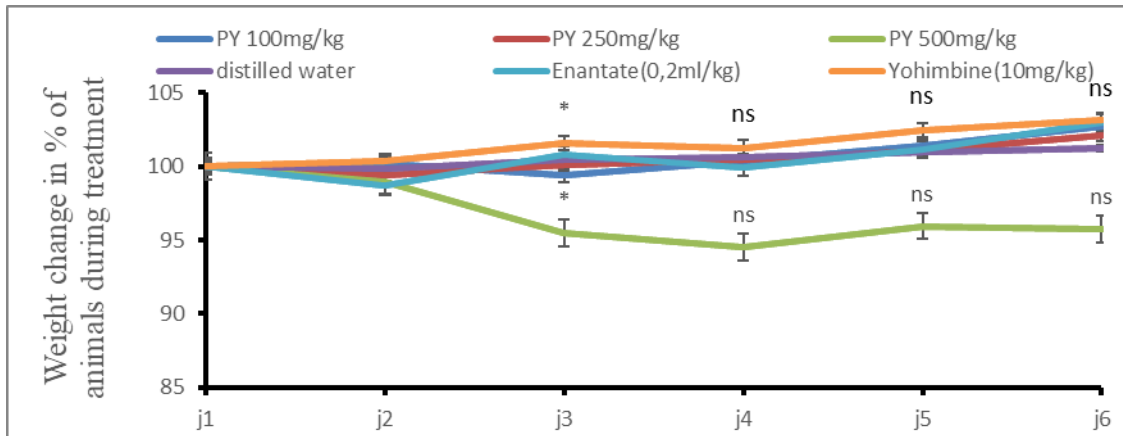


Figure 1 Effect of aqueous extract of the trunk bark of *Pausinystalia yohimbe* K. Schum on weight development

Values are means ± SEM; n=5 and *p<0.05.

3.2. Effect of aqueous extract of *Pausinystalia yohimbe* trunk bark in castrated rats

Table 1 Effect of aqueous extract of the trunk bark of *Pausinystalia yohimbe* K. Schum in castrated rats

Sexual parameters	Distilled water (0,5ml/100g)	Yohimbine (0,2ml/kg)	Enantate (0,2ml/kg)	<i>P. Yohimbe</i> (100mg/kg)	<i>P. Yohimbe</i> (250mg/kg)	<i>P. Yohimbe</i> (500mg/kg)
Sexual mounts	0,00±0	6,8±4,865 ns	1,4±0,393 *	12,4±8,872 ns	19,8±7,083 ns	0,00 ±00
Erection	0,00±0	4,6 ±3,291 ns	1,6±0,851 ***	9,8 ±7,0123 ns	12,6 ±4,507 ***	0, ±00
Ejaculation	0,00 ± 00	0,00 ± 00	0,00±00	0,00 ±00	0,4 ± 0,286 ns	0,00 ±00
Latency time (seconds)	3600±0	18,664 ± 13,355ns	46±8,228 ns	7,2±5,151 ns	49,126±17,576 ns	3600 ±00

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

3.3. Effect of the aqueous extract of *P.yohimbe* on sexual parameters in castrated rats pre-treated with testosterone enanthate

Table 2 Effect of the aqueous extract of the roots of *Rauvolfia obscura* K. Schum on castrated rats pretreated with testosterone enanthate

Sexual parameters	Distilled water (0,5ml/100g)	Enanthate (0,2ml)	Yohimbine + Enanthate (0,2ml)	<i>P. yohimbe</i> + Enanthate (100mg/kg)	<i>P. yohimbe</i> + Enanthate (250mg/kg)	<i>P. yohimbe</i> + Enanthate (500mg/kg)
Sexual mounts	0, ±00	1,4±0,393	55±8,765 ***	37,8 ±9,552 ns	34,4 ±9,087 ns	24,8 ±6,547 ns
Erection	0, ±00	1,6 ±0,88 *	46,4±3,005 ***	40,4 ±11,842 *	29,6±7,727 ns	25,2 ±6,726 ns
Ejaculation	0, ±00	0, ±00	1,6±0,679	1,4 ±0,572	3 ±0,715	1,4 ±0,572

			*	ns	ns	ns
Latency time (seconds)	3600 ±00	46 ±8,228	60,029±8,126 ns	45,814 ±7,829 ns	49,79 ± 9,359 ns	57,056 ±11,69 ns

Values are means ± MSE with n=5, *p<0.05; **p<0.01 and ***p<0.001 significantly different.

4. Discussion

The aim of the present study was to investigate the effects of aqueous extract of *P. yohimbe* trunk bark on castration-induced sexual impotence in rats. Administration of the aqueous extract of *P. yohimbe* K. Schum (100 and 250; 500 mg/kg) caused a reduction in weight in castrated animals. This result is in contrast to that observed in the same animals before any treatment with the plant extract. The reduction observed is therefore attributed to the effects of the plant, which appears to mimic the action of testosterone. In fact, hormonal physiology shows that in the absence of testosterone, lipolysis is inhibited and the entry of fatty acids into adipocytes is no longer curbed, thereby encouraging the onset of obesity (Chatard, 2004). Weight reduction was also observed in castrated animals after administration of the aqueous extract of the bark of the roots of *Rauvolfia obscura* (100, 250 and 500 mg/kg) (Ondélé 2024). Aqueous extract of *P. yohimbe* (100, 250 and 500 mg/kg) activates sexual parameters in castrated rats. This result suggests that the aqueous extract of this plant acts by substituting natural testosterone. Motivation of sexual parameters with the aqueous extract of the trunk of *Buchholzia coriacea* had also been observed in castrated rats (Ondélé; 2019). *P. yohimbe* trunk bark therefore appears to possess phytoandrogens with affinities to natural testosterone. The androgenic properties of *P. yohimbe* trunk bark were demonstrated in a previous study by (Akassa *et al* 2019). In addition, the effect of the plant extract was compared with that of castrated animals treated with enanthate (0.2ml/kg) and yohimbine (10mg/kg). The results showed that sexual parameters were maintained, with the exception of ejaculations. Testosterone enanthate has been used to assess testicular growth; testicular and epididymal sperm concentration in normal rats and rats with testicular insufficiency due to administration of anti-androgens (Ngom, 2010). The sympathetic α -blocking properties of yohimbine allow an increase in the production of catecholamines (norepinephrine and adrenaline) which induce vasodilatation of peripheral vascular territories and in particular that of genital tissues: In this study, sexual parameters were also assessed using aqueous extracts of *P. yohimbe* trunk bark in castrated rats pre-treated with testosterone enanthate (Ngom 2010). The results obtained with the aqueous extract of the trunk of *P. yohimbe* in castrated rats pre-treated with testosterone enanthate show an activation of sexual parameters in castrated rats. This result once again confirms the aphrodisiac effect (Akassa *et al.*, 2019) of the aqueous extract of the trunk of *P. yohimbe*. They do this by potentiating natural testosterone. Aqueous extracts of the bark of the trunk of *P. yohimbe* K. schum are a good remedy in the treatment of impotence linked to androgen deficiency in men.

5. Conclusion

The aqueous extract of the trunk bark of *P. yohimbe* (100, 250 mg/kg body weight) alone administered to castrated rats causes a reduction in the weight of the animals. However, at the same doses, it activated the sexual parameters (sexual mounts, erections and reduced the latency time between two consecutive mounts). The same result was obtained when this extract was administered to castrated rats pre-treated with testosterone enanthate (0.2 ml) used as the reference molecule in this study. The aqueous extract of *P. yohimbe* trunk bark therefore acts like natural testosterone. This study justifies its use in the treatment of sexual impotence in traditional medicine.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

These rats were supplied by the animal house of the Ecole Normale Supérieure (ENS) of the Université Marien Nguabi..

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