

Imperata Rhizome Extracts Cylindrica in Male Mice

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ABSTRACT

Male sexual dysfunction is a major public health problem in the Democratic Republic of Congo, impacting quality of life and the stability of couples. This study evaluates the aphrodisiac potential of *Imperata* rhizome extracts. *Cylindrica*, a plant used in the traditional pharmacopoeia of Haut-Katanga. The study was conducted at the UNILU Pharmacognosy Laboratory on male mice. Extracts were obtained using a mixture of dichloromethane and ethyl acetate (DCM/AE). The parameters evaluated included general behavior, priming time, latency to mating, and ejaculatory latency. The results show a significant improvement in alertness and mobility, as well as a marked reduction in the time to sexual initiation compared to the negative control. The DCM/AE (50/50) fraction at 50 mg/kg exhibits comparable, and even superior, activity to sildenafil on certain parameters. These data scientifically validate the empirical use of this species.

Keywords: *Imperata Cylindrica*, Aphrodisiac, Sexual Behavior, Lubumbashi, Pharmacognosy

Introduction

Human sexuality is a complex physiological and psychological process, essential for emotional and social well-being. The sexual response cycle is classically divided into phases of desire, arousal, plateau, orgasm, and resolution [1]. However, numerous pathologies or environmental factors can disrupt this cycle, leading to sexual dysfunctions such as erectile dysfunction or premature ejaculation [2,3].

In the Democratic Republic of Congo, sexual dysfunctions are common but often remain underdiagnosed for cultural reasons [1]. Limited access to phosphodiesterase-5 inhibitors and their high cost lead the population to resort to natural aphrodisiacs [4,1]. In the Haut-Katanga province, surveys reveal the intensive use of medicinal plants to stimulate libido (François et al., 2024; Valentin et al., 2020).

The *Imperata* **Imperata cylindrica**, known by various local names, is a perennial grass whose rhizomes are renowned for

their tonic and pro-erectile properties (François et al., 2024) [5]. Previous studies have highlighted the plant's richness in secondary metabolites, particularly flavonoids, saponins, and polyphenols [6-8]. While some studies suggest effects on testosterone levels (*The Effect of *Imperata**), *Cylindrica* Root Aqueous Extracts on Serum Testosterone Levels of Hyperglycemic Rats, 2020), experimental data on in vivo sexual behavior still need further investigation. This study aims to evaluate the activity of rhizome extracts in a murine model to confirm these traditional claims.

Materials and Methods

Study Framework

All experiments, such as selective extraction and fractionation, were conducted at the chemistry laboratory of the Higher Pedagogical Institute of Lubumbashi, located at No. 2 Avenue de la Révolution, Baudouin district, while biological tests were carried out at the animal laboratory of the Faculty of Pharmaceutical Sciences, located at the intersection of Kato and Usoke Avenues, in the industrial district. These two sites provided a suitable technical environment for conducting the chemical and biological experiments.

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Plant Material and Extraction

The rhizomes of *Imperata cylindrica* were collected in the peri-urban area of Lubumbashi. The botanical identification was confirmed in the faculty herbarium. Extraction was carried out by selective maceration to obtain fractions of different polarity, using a mixture of Dichloromethane and Ethyl Acetate (DCM/AE) in proportions of 50/50 and 40/60 [9,10].

Animal Material

Twenty-three male albino mice (average weight 220-230g) were used. They were kept under standard animal facility conditions. The females used for testing were sexually immature to ensure

that the observed sexual interest was induced by the extracts and not by a natural cycle [3].

Experimental Protocol

The animals were divided into four groups:

- Negative witness.
- Positive control (Sildenafil 5 mg/kg).
- Test Group 1 (DCM/AE 50/50 extracts at 25 and 50 mg/kg).
- Test Group 2 (DCM/AE 40/60 extracts at 25 and 50 mg/kg).

Sexual behavior was observed after 30 minutes of administration by gavage, including priming time, rise latency and ejaculatory latency [2,11].

General behavior	Abbreviation	Specific sexual behavior	Abbreviation
Mobility	M	Sexual mounts	Mo
Assault	HAS	Intromission	I
Vomiting	Vo	Ejaculation	AND
Condition of saddles	IS	Erection Pilot	FOOT
Pain Sensitivity	SD	Peak frequencies	FM
Emission of a sound	EMS	Intrusion frequencies	FI
Queue status	EQ	Ejaculation Frequency	FAITH
Ptosis	Ptosis	Activity start time	TAA
Number of deaths	NM	Mount latency	TLM
Vigilance	Vi	Intromission latency time	TLI
		Ejaculation latency time	TLE

After capture, the animals are placed in winch cages to evaluate the different parameters grouped into general behavior and specific sexual behavior of the animal, presented in the following table V:

Results of General Mice Behavior

The results concerning the mice's general behavior allowed for the evaluation of several physiological and behavioral parameters. These included mobility, which provides information on the subjects' activity level and responsiveness ; aggression, observed through interactions between individuals; vomiting, a potential indicator of discomfort or reaction to treatment; vocalization, which can reflect a form of communication or distress ; fecal and tail condition, used as markers of general well-being and stress ; and ptosis, characterized by drooping eyelids, often associated with neurological impairment or extreme fatigue. All of these observations contribute to a comprehensive picture of the animals' health and behavior during the study.

The results show that the extracts of *Imperata Cylindrica* , particularly the DCM/AE fractions at 50 mg/kg, induces marked neurofunctional activation in mice, resulting in improved mobility, alertness, vocalization, and tail condition, while also regulating certain autonomic functions such as defecation and pain sensitivity. The absence of vomiting and the low incidence of ptosis indicate good tolerability, reinforcing the hypothesis of an adaptogenic and neuroprotective effect . The consistency of the positive responses suggests a synergy between the plant fractions, and all the observations converge on the idea that these extracts act as natural adaptogens , capable of stimulating alertness, emotional reactivity, and sexual disposition, while maintaining physiological homeostasis, thus conferring

significant biomedical potential for the valorization of local resources in community health.

The results show that administration of the extracts led to a marked improvement in the mice's overall behavior. Compared to the negative control, sildenafil increased mobility, alertness, and grooming, reflecting behavioral stimulation. However, the DCM/AE extracts, particularly the 50/50 mixture, outperformed sildenafil by inducing higher scores across all parameters, suggesting a more potent and comprehensive stimulant effect.

Sexual Activity and Latency

The extracts significantly reduced initiation times and prolonged sexual stamina.

The data show that the extracts, especially the 50/50 blend, combine two major effects: rapid sexual stimulation (reduced initiation and arousal times) and prolonged endurance (increased time to ejaculation). These results suggest a superior aphrodisiac potential compared to sildenafil, with remarkable efficacy across all parameters.

Table 1: Results relating to the general behavior of the mice

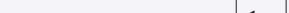
EXT		M				HAS				Vo				ES				SD				Vi				EMS				EQ				Ptosis				R+/36	
DAYS		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4						
DCM/AE (5/5)	50	+	+	-	+	+	+	+	-	+	+	-	+	+	+	+	+	+	-	+	+	+	-	+	+	+	+	-	+	+	+	+	-	+	-	+	28		
	25	+	-	+	+	-	+	+	+	-	+	-	+	-	+	+	+	+	+	+	+	+	-	+	+	+	-	+	+	-	+	+	+	-	+	27			
DCM/AE (4/5)	50	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	+	+	-	-	+	-	-	+	29		
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T-	1	+	+	-	-	+	+	-	+	+	+	-	+	+	+	+	+	+	+	+	+	-	+	-	+	+	+	-	-	+	+	+	+	+	+	+	+	27	

Table 2: Parameter of general mouse behavior

Treatment groups	Mobility (Score 0-10)	Vigilance (Score 0-10)	Grooming
Negative Witness	4.1 ± 0.6	3.8 ± 0.4	1.8 ± 0.5
Sildenafil (5 mg/kg)	7.6 ± 0.9	6.5 ± 0.7	4.2 ± 0.8
DCM/AE 50/50 (50 mg/kg)	8.5 ± 0.5	8.1 ± 0.4	5.3 ± 0.6
DCM/AE 40/60 (50 mg/kg)	7.8 ± 0.7	7.4 ± 0.6	4.9 ± 0.7

Table 2: Effect of extracts on parameters of sexual activity

Settings	Negative Witness	Sildenafil (5 mg/kg)	DCM/AE 50/50 (50 mg/kg)
Start-up time (s)	245 ± 30	48 ± 10	15 ± 4
Mounting latency(ies)	2650 ± 280	1100 ± 130	125 ± 25
Ejaculatory latency(ies)	610 ± 55	920 ± 85	2150 ± 160

Graphical Analysis

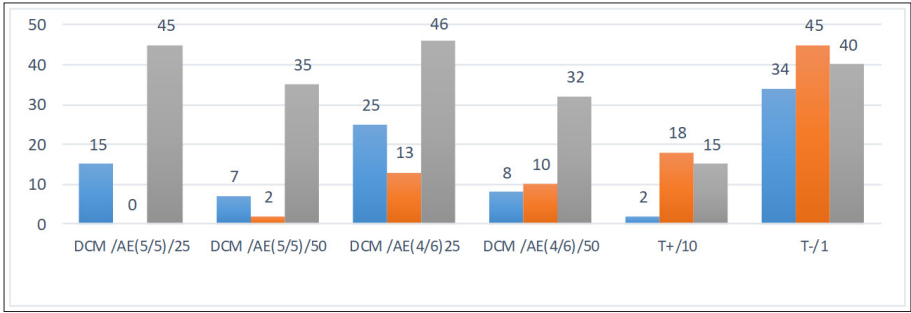


Figure 1: Evolution of latency of onset as a function of doses. A drastic drop in latency is observed with the 50 mg/kg dose of the DCM/AE 50/50 mixture, demonstrating immediate excitation

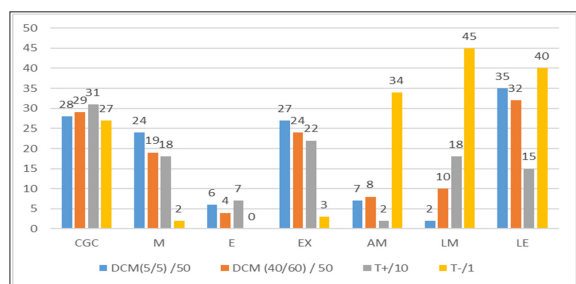


Figure 2: Comparison of initiation power. Histogram showing that the DCM/AE extract is significantly faster than sildenafil in inducing first sexual interest

Discussion

This study demonstrates that *Imperata cylindrica* possesses potent pro-sexual properties. The dramatic reduction in the latency of libido suggests a stimulating action on libido, probably mediated by modulation of central dopaminergic pathways (Miyasaka et al., 2025; Wei et al., 2025).

The presence of flavonoids and saponins identified in the rhizomes could explain the improvement in sexual performance. Flavonoids are known to increase the bioavailability of nitric oxide, thus promoting the relaxation of the corpora cavernosa [8,12]. Furthermore, the increase in ejaculatory latency suggests an effect on ejaculatory control, a crucial parameter in the treatment of sexual dysfunctions [11].

Contrary to some studies reporting deleterious effects of the ethanolic extract on long-term sperm quality our short-term study with the DCM/AE fractions shows excellent tolerability and neurofunctional activation. Compared to other traditional plants such as *Pausinystalia yohimbe* *Terminalia ivorensis* *Imperata cylindrica* presents a very promising activity profile for the development of standardized phytomedicines [13-16].

Conclusion

Extracts from *Imperata* rhizomes *Cylindrica*, particularly the DCM/AE 50/50 fraction, exhibits remarkable aphrodisiac activity in mice. This study conducted at the UNILU laboratory scientifically validates its use in Katanga. Further studies are needed to elucidate the precise molecular mechanisms and assess long-term safety [17-44].

References

- Obadia PM, Mulaji GK, Musambo TM, Kitenge JP, Kuhangana TC, Kayembe-Kitenge T, Nkulu CB, Nemery B, Enzlin P. Natural aphrodisiacs consumption by male workers in the former Katanga province, DR Congo. medRxiv. 2024.
- Dau TD, Nguyen TH, Pham Q. Effects of *Cnidium monnieri* (L.) Cuss. fruit extract on sexual behaviors in male rats. Journal of Ethnopharmacology. 2020.
- Le Moëne O, Ågmo A. Modeling Human Sexual Motivation in Rodents: Some Caveats. Behavioral Brain Research. 2019.
- Van Damm L, Recovery Kitenge J, Enzlin P. Plant use and perceptions in the context of sexual health among people of Congolese descent in Belgium. Ethnobiology. 2024.
- Konda ku Mbuta M, Kalonji J, Tshiband K. Traditional medicinal plants. Equateur Province – DR Congo. Éditions de l'Équateur. 2012.
- Dhianawaty D, Suryani R, Pratama A. Quantification of four phytochemical parameters of *Imperata cylindrica* leaves to promote its use as a medicinal plant. Medicinal Plant Research. 2024.
- Khaerunnisa S, Putri R, Nugroho A. Phytochemical screening and antioxidant activity of *Imperata cylindrica* root extracts from different solvents. Journal of Physics. 2020.
- Nayim A, Rahman S, Chowdhury M, Karim H. Phytochemistry and pharmacology of *Imperata cylindrica*: A comprehensive review. Journal of Herbmmed Pharmacology. 2023.
- Banu K. General techniques involved in phytochemical analysis. IJARS. 2015.
- Shafodino FS, Rahman S, Karim H. Preparation of medicinally active extracts and phytochemical characterisation of phytoconstituents from medicinal plants. Methods. 2023.
- Mboumwa PV, Kalonji J, Tshibanda K. Aphrodisiac properties of aqueous roots extract of *Pycnocomma macrophylla* Benth (Euphorbiaceae) in male rats. BMC Complementary Medicine. 2020.
- Bivalacqua TJ, Musicki B, Kutlu O, Burnett AL, Champion HC. Sildenafil citrate-restored eNOS and PDE5 regulation in sickle cell mouse penis prevents priapism via control of oxidative/nitrosative stress. Journal of Sexual Medicine. 2013.
- Lubis A, Harahap R, Siregar M. Old mice epididymal sperm quality after short-term gavage of cogon grass root ethanol extract. Biology Journal. 2018.
- Widyastuti R, Nugroho A, Suryani, R. Deleterious effect of short-term gavage of an ethanol extract of cogon grass (*Imperata cylindrica* L.) roots on testis and epididymal sperm quality. Journal of Animal Science. 2020.
- Ondele R, Kanyinda J, Kalonji MB, Tshibanda K. Aphrodisiac activity and acute toxicity of the aqueous extract of *Pausinystalia trunk bark Yohimbe* (K. Schum) Pierre ex Beille in male Wistar rats. Phytotherapy. 2015.
- Békro Y-A, Kouadio K, Konan A. Study of the aphrodisiac activity of *Terminalia ivorensis* A. Chev. (Combretaceae) in the Wistar rat Male. Pharmacognosy Review. 2007.
- Dikala Otete F, Mulenda JP, Kalonji MB, Tshibanda K. Ethnobotanical studies of reputed aphrodisiac plants used in traditional medicine in Haut-Katanga in DR of Congo. Plants. 2024.
- Boutet Q. Implementation of information on sexual dysfunctions, in pharmacies and for the use of patients. Pharmacy thesis. 2023.
- Damor R, Patel H, Singh P. Review of phytochemical and pharmacological analysis of Poaceae family plants (Gramineae). Global Journal of Science Frontier Research. 2025.
- Raza M, Khan S, Ali T, Hussain A. Evaluation of ethno-veterinary grasses from suburbs through microscopic technique: Insights into antioxidant defense system and phenol. Agronomy. 2024.
- Dhianawaty D, Suryani R, et Pratama A. Separation and quantification of sinensetin, imperatorin and total tannin

- content as active phytoconstituents of methanol extract of *Imperata cylindrica* root from Kendari. Open Access Journal. 2021.
22. Razafindrakoto ZR, Rakotoarivelo N, et Randrianarivelo J. Antioxidant, analgesic, anti-inflammatory and antipyretic properties, and toxicity studies of the aerial parts of *Imperata cylindrica* (L.) Beauv. Plants. 2021.
23. Konan AML, Kouadio K, Yao, D Antioxidant and anti-inflammatory activities of *Imperata cylindrica* (L.) P. Beauv. (Poaceae) extracts in relation to extraction methods and plant organ. Poaceae Journal. 2023.
24. Jung Y-K, Shin D. *Imperata cylindrica*: A review of phytochemistry, pharmacology, and industrial applications. Molecules. 2021.
25. Mohamed GA, Ibrahim SRM, El-Halawany AM. Chemical composition and hepato-protective activity of *Imperata cylindrica*. Pharmacognosy Magazine. 2009.
26. Lalthanpuii PB, Lalchandama K, Zohmingthanga J. Chemical profiling, antibacterial and antiparasitic studies of *Imperata cylindrica*. Scientific Reports. 2019.
27. Put them in Chiribagula V, Mulenda JP, Kalonji MB. Ethnobotanical study of medicinal plants used in the treatment of sexual dysfunctions in traditional medicine in Kampemba -Lubumbashi, DR Congo. Ethnobotany Research. 2020.
28. Fear Mola A, Tshibanda K, Mulaji GK. Ethnobotanical survey of plants used against erectile dysfunction in the commune of Ngaba in Kinshasa / DR Congo. International Journal of Botany. 2022.
29. Sukmaningsih AASA. Potential aphrodisiac activity of tabah bamboo shoots (*Gigantochloa nigrociliata*) in male mouse. Journal of Biology. 2017.
30. Sudiman J, Nugroho A, Widyastuti R. Effect of short-term gavage of ethanolic extract of cogon grass (*Imperata cylindrica* L.) root on the ovarian activity and estrus behavior of female mice. Biological Research. 2020.
31. Kanedi M, Suryani R, et Pratama A. Root extract of Purwoceng (*Pimpinella pruatjan*) enhances aggressiveness, but not libido, in male mice. Medicine Journal. 2017.
32. Owaba AD, Adeyemi O, Okafor J. Aphrodisiac agents used in traditional medicine and their mechanism of action – A review. Pharmacology Review. 2021.
33. Mali VA, Patil R, Jadhav S. An overview: Some medicinal plants as aphrodisiac agents. Journal of Pharmacognosy. 2022.
34. Faustino MV, Silva R, Pereira J. Halophytic grasses, a new source of nutraceuticals? A review on their secondary metabolites and biological activities. Molecules. 2019.
35. Srinivas Y, Hosamath P. Phytochemical analysis of medicinal plants. Pharma Science. 2019.
36. Oladimeji AV, Valan MF. HPLC techniques for phytochemistry. Chemistry Journal. 2020.
37. Khade O, Sharma P, Gupta R. Plant secondary metabolites: Extraction, screening, analysis and their bioactivity. Biochemistry. 2023.
38. Natacha NA, Baka J, Mvondo P. Ethnobotanical study of medicinal plants used by Baka people in the treatment of erectile dysfunction. Journal of Ethnobiology. 2022.
39. Huang X, Chen Y, Li J. Effect of sublingual sildenafil citrate/apomorphine on sexual behaviour of male rats. Reproduction. 2009.
40. Baratti CM, Boccia, MM. Effects of sildenafil on long-term retention of an inhibitory avoidance response in mice. Behavioral Pharmacology. 1999.
41. Onde R, Kanyinda J, Kalonji MB, Tshibanda K. Aphrodisiac activity and acute toxicity of the aqueous extract of *Pausinystalia* trunk bark Yohimbe (K. Schum) Pierre ex Beille in male Wistar rats. Phytotherapy. 2015.
42. Anonymous. Spermatogenic efficacy of *Pausinystalia yohimbe* (K. Schum.) Pierre ex Beille roots in male rats. Biology Research. 2020.
43. Udofia OE, Akpan IA, Etim EE, Okon EU. Aphrodisiac potentials of methanol extract of *Homalium* root letters in bad mice. Journal of Pharmacology. 2023.
44. Béboy SNE, Nguema JR, Mavoungou JF, Essono A. Effects of the aqueous extract of *Pycnanthus angolensis* (Myristicaceae) on male rat sexual behavior and nitric oxide release. Ethnopharmacology. 2023.