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Evaluation of Anticonvulsant and Anxiolytic Effects of Aqueous Extract of *Draceana reflexa* Leaves in Rats

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Abstract: Naturally, Anxiety is a public disorder of high co-morbidity related to epilepsy, an enduring neurologic disease considered by persistent seizures. Existing drugs used for these situations have some restrictions for example spiking side effects, deterioration, and ineptness in certain people needing the look for other possibilities. The aqueous extract of *Draceana reflexa* leaves is broadly used for its several health-promoting effects with release of seizures and anxiety in ethnomedicine. Medicinal plants used for the epilepsy therapy have been systematically revealed to own hopeful anticonvulsant and anxiolytic effects during the anticonvulsant activity in animal experiments and can be a basis of fresher antiepileptics. Then, *Draceana reflexa* as a plant which belongs to the Asparagaceae family has been used in traditional medicine in Congo Republic for treating epilepsy and anxiety. Therefore, the current research work aimed to assess anticonvulsant and anxiolytic effect of *Draceana reflexa* including its mechanism on severe and long-lasting administration when using rats. Extracts of *Draceana reflexa* leaves were investigated for anticonvulsant effect induced seizures in rats at doses of 50,100 and 200 mg/Kg, respectively. The results found indicated that the extract of *Draceaena reflexa* leaves at all doses increases and decreases significantly the time of onset and the duration of convulsions respectively. *Draceaena reflexa* aqueous extract shows also *a* significant decrease in motor activity as does Diazepam and an increase in the immobility time by using the forced swimming test. This study suggests that *Draceaena reflexa* leaves considering social interaction-promoting effect might be of profit as an accessory in refining the life superiority of epileptic patients.

Keywords: *Draceana reflexa*, Extract, Anticonvulsant, Anxiolytic, Medicinal Plants

1. Introduction

There has been an increasing attention worldwide on plants research, especially on medicinal plants with curative properties. Therefore, the development of traditional medicine has become a motivation of scientific researches. Many plants cover compounds that have curative or protective properties against various diseases [1]. Therefore, when disorder strikes the modern African man, this victim finds himself in a way faced with an impasse. Generally, two medicines coexisting but whose methods are deeply different, offer him their expertise in order to release his suffering or put an end to it [2]. The study focused on traditional medicine is indisputably very fashionable. Of many publications of a very varied nature, scientific and otherwise, testify to a growing interest in phytotherapy and other alternative therapeutic methods, and for what these methods can bring to humans. In Europe, more and more eyes are turning to traditional medicine in the hope of finding in them what it is requested not to have been found in modern

medicine [3, 4].

Traditional medicine includes traditional knowledge related to medicinal plants and developed over generations based on traditional principles of many civilisations, comprising native peoples, before the contemporary medicine period. In many countries of Asia and Africa Continents, up and about to 80% of habitants consider traditional medicine as vital for the main health care necessities [5]. Therefore, believing in traditional culture the traditional medicine stands often an alternative medicine [6].

The World Health Organisation (WHO) transcripts, however, that "inappropriate use of traditional medicines can have negative or dangerous effects" and so "additional research is required to determine the effectiveness and safety" about medicinal plants [7, 8]. Then, Traditional medicine is a knowledge reservoir that is quiet significantly unexploited [9]. It offers effective and available treatment opportunities for predominant pathologies in communities. The medicinal plant preparation for laboratory tests includes the correct plant collection, expert validation with acceptable drying and crushing, monitored from extraction, fractional process, and bioactive compound separation where relevant [10-12]. Lately, plant as a basis of medicine is ahead global reputation due to its natural source, accessibility in local populations, inexpensive, administration comfort and maybe minus troublesome. Moreover, traditional medicine can become a beneficial substitute therapy for many side effects and medicine confrontation [13].

Medicinal plants extraction includes the separation of alkaloids, flavonoids, glycosides, steroids, and saponins from inactive substantial by means of normal practise of extraction. Plants with enough quantity of flavonoids were considered to own anticonvulsant activities, and therefore can be used to treat many diseases such as epilepsy's disease and anxiety [14].

Therefore, epilepsy is considered as neurological disorders which sufficient attention must be paid for medicinal plants with possible remedies potential of epilepsy [15]. The contemporary medication considers epilepsy as a long-lasting brain syndrome of many aetiologies characterised by persistent troubles and frequently related to loss of mindfulness. The seizure is because of extreme emancipation in the brain [3]. Epilepsy can be controlled but not treated with drugs [16]. Presently accessible medications of epilepsy can resourcefully control seizures in around 50% of patients and 25% are in progress while the rest has no advantage considerably. Moreover, disagreeable side effects of medications recycled clinically repeatedly reduce difficulties of treatment, leading to a petition for innovative anticonvulsants [17]. Anxiety disturbs close to one- eighth of people in the world. Benzodiazepines is considered as compounds used to treat anxiety owing a fine care margin among anxiolytic effects and irritate side effects [18]. In Congo Republic, Draceaena reflexa is used in the treatment of female infertility as well [19]. It is an ornamental plant of Malagasy origin which belongs to Asparaceae family with usage as medicinal plant due to its therapeutic virtues such as mollucid, anti-inflammatory, antimicrobial antifungal and also treats epilepsy and anxiety [20]. Despite the interesting properties in traditional medicine of Draceaena reflexa, this plant covers a few studies about activities related to anxiety and anticonvulsant. Therefore, the current work treats to provide experimental sustenance to traditional medicine from the use of aqueous extract of Draceaena reflexa leaves in the epilepsy management and anxiety as well. Our hypothesis is that the aqueous extract of Draceaena reflexa leaves is current in inhibition of STR induced convulsions and anxiolytic activity in rats. Then, the present work is focused on the assessment of the anticonvulsant and anxiolytic effects of Draceaena reflexa leaves in rats.

2. Materials and Methods

2.1. Plant Materials and Extraction

Draceana reflexa leaves harvested ware collected in June 2018 from a scrubland in Nkombo District, Brazzaville City, Congo Republic. The, plant *Draceana reflexa*, was authenticated by Dr. Jean Marie Mountsambote, Botanist at National Institute of Forestery, Marien Ngouabi University, Brazzaville, Congo Republic and a Coupon number (021) remained in the herbarium.

2.2. Preparation of Aqueous Extract

Extraction was carried out with the fresh leaves of *Draceana reflexa* during two weeks after being washed, dried and crushed (Sutapa, 2012). Then the powder was run in distilled water at room temperature for 24 h with sporadic shaking, filtered by using a filter paper for obtaining aqueous extracts. The filtrate of liquid aqueous was submitted to evaporation for waterlessness at 60°C in an oven during four (4) days. The dry extracts were kept in a fridge-freezer at 4°C for the future pharmacological tests.

2.3. Drugs

STR, diazepam then clomipramine injections were acquired from Brazzaville Pharma, Congo Republic. After that, all drugs have been newly prepared in distilled water according to the required concentration.

2.4. Animal Material

Female and male rats, weighing 147 and 288 g, bred in the animal house of the Faculty of Sciences and Techniques of Marien Ngouabi university were used in this present research work. The animals were kept in cages making groups of four rats at 24.0 ± 2°C for light and dark cycle of 12 hrs with access to diet and drinking water. Animals were safe in experimental Laboratory of Pharmacodynamics and Experimental Physiopathology (L2PE) of Faculty of Sciences and Technology, Marien Ngouabi University of Brazzaville-Congo, for seven days preceding pharmacological tests to familiarise with test site conditions.

Individually, a rat is used only once during the experimentats from 9:30 to 14:30 hours in conformity with the guidelines of animal's experiments. Experimental procedure followed standards of the Scientific Guidelines for the usage and protection of tested animals.

3. Methods

3.1. Preparation of the Aqueous Extract of Draceana reflexa

Draceana reflexa leaves were collected and dried in the shade. The shade-dried leaves of the plant were powdered and boiled in water 1500 ml during 15 minutes and the liquid extract was decanted. After cooling and filtration, the filtrate was evaporated and a dry residue of 15 g was obtained.

3.2. Pharmacological Tests

3.2.1. Evaluation of the Anticonvulsant Effect of Draceana reflexa on Strychnine-Induced Seizures

Groups of five rats each were made up and treated as follows: the negative control group received distilled water 0.5 ml/kg; the positive control group was treated with Diazepam 10 mg/kg and the test groups were treated with the aqueous extract of *Draceana reflexa* at doses of 50, 100, and 200 mg/kg. One hour after all the treatments, the convulsions were induced by intraperitoneal injection of strychnine 2.5 mg/kg. The animals were observed for 10 minutes, the time of appearance as well as the duration of the convulsions were evaluated.

3.2.2. Effect of Draceana reflexa Extract on Motor Activity (Open Field Test)

Groups of five rats each were made up and treated orally as follows: The negative control group received 0.5 ml/kg of distilled water; the treatment for positive control group was carried out with 10 mg/kg Diazepam and the test groups were treated with the *Draceana reflexa* aqueous extract at respective doses of 50, 100 and 200 mg/kg. After one hour of the products administration, the rats were placed in order in the center of an open field whose ground has a grid of 25 equal squares and observed for 5 minutes, the number of squares crossed by each animal was thus noted.

3.2.3. Evaluation of the Anxiolytic Activity of Draceana reflexa

Wistar rats of 147 and 288 g were casually separated in groups of five (5) rats each. The powder of leaves of *Draceana reflexa* was boiled by using distilled water, airconditioned, filtered and put on a hotplate for evaporation, and then weighed and stored. All types of groups formed received *Draceana reflexa* extract at doses of 50, 100, and 200 mg/kg, 10 mg/kg diazepam, by using oral feeding, respectively. Then, anxiolytic activity was evaluated in rats as well.

3.2.4. Effect of the Aqueous Extract of Draceana reflexa Leaves on Forced Swimming

Groups of five rats each were formed and treated orally as follows: the negative control group was treated with 0.5 ml/kg distilled water. The positive control group was cured with 25 mg/kg of Clomipramine where test groups were treated with *Draceana reflexa* aqueous extract at doses of 50,100, and 200 mg/kg. One (1) hour after all treatments, the animals were put in order in a jar containing water. Observation was made for six minutes, the time of swimming, climbing and immobility was noted.

3.3. Statistical Analysis

Values were analysed statistically for seizure latency, duration of convulsions, number of squares crossed, time of convulsions were analysed by using variance analysis (ANOVA) shadowed from comparison tests. Comparison was made between control and test groups considering the Tukey's and Sidak's tests. Results obtained are expressed as mean ±Standard error of mean (SEM) for groups of rats. P values less than 0.05 ($P < 0.05$) represent a criterion of statistical significance.

4. Results

4.1. Effect of the Aqueous Extract of Draceana reflexa Leaves on Time to Onset of Seizures

Figure 1 shows the effect of *Draceana reflexa* on the onset time of convulsions, the results indicate that *Draceana reflexa* extract revealed a very significant increase in the threshold of onset of convulsions in rats in comparison with the control group.

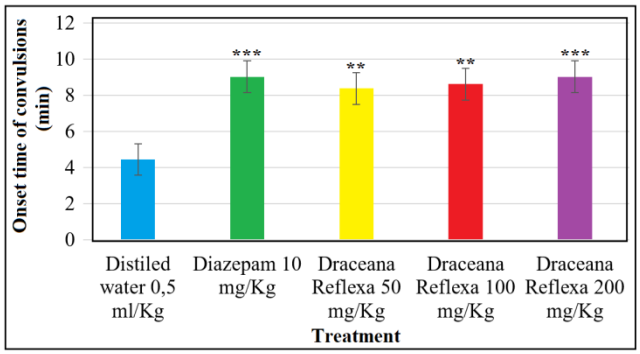

Figure 1. *Effect of the aqueous extract of Draceana reflexa leaves on seizure onset time.*

The results are expressed as mean ± standard error, n = 5, ***p < 0.001, significant difference compared to the control

4.2. Effect of the Aqueous Extract of Draceana reflexa Leaves on Seizure Duration

Figure 2 shows the effect of *Draceana reflexa* on seizure duration. Results indicate that the *Draceana reflexa* aqueous extract does not affect the seizure duration.

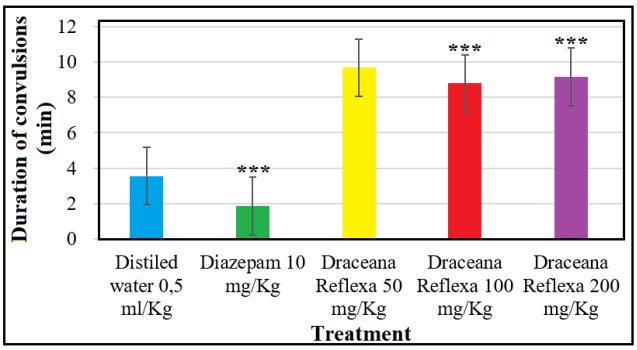

Figure 2. *Effect of the aqueous extract of Draceana reflexa leaves on seizure duration. The results are expressed as mean ± standard error, n = 5, ***p < 0.001, significant difference compared to the control.*

4.3. Effect of the Aqueous Extract of Draceana reflexa Leaves on Motor Activity

Figure 3 shows aqueous extract effects of *Draceana reflexa* leaves on motor activity in rats. It appears that aqueous extract at 50 and 200 mg/Kg doses caused an important decrease in motor activity in rats.

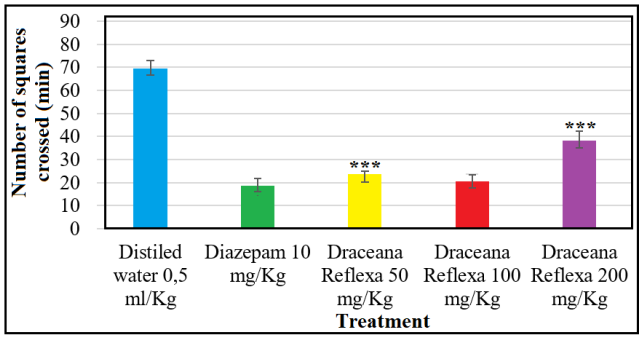

Figure 3. *Effect of aqueous extract of Draceana reflexa on motor activity. The results are expressed as mean ± standard error, n = 5, ***p < 0.001; **p < 0.01 significant difference from control.*

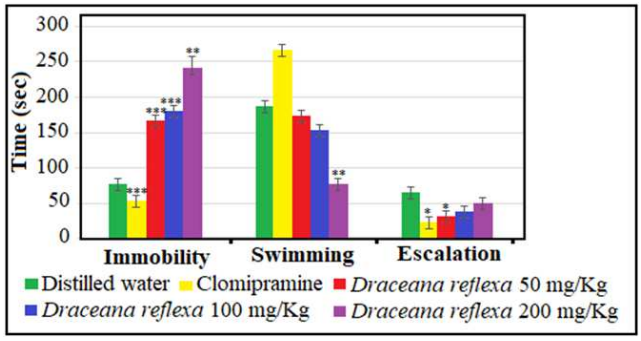

Figure 4. *Effect of aqueous extract of Draceana reflexa on forced swimming. The results are expressed as mean ± standard error, n = 5, ***p < 0.001; **p < 0.01 significant difference from control.*

4.4. Effect of the Aqueous Extract of Draceana reflexa Leaves on Forced Swimming

Figure 4 shows the aqueous extract effects of *Draceana reflexa* leaves on forced swimming. Then, it seems that the extract at different doses caused an important increase in the immobility duration of 166 ± 12.79; 178, 8 ± 14.42 and 236.6 ± 33.74 (sec) in rats treated with doses of 50, 100 and 200 mg/kg respectively, a decrease in climbing time of 57.4 ± 14.23 (sec) in the control group at 22.8 ±10.6; 30.8 ± 11.72 and 40.6 ± 12.58 in the treated groups as well as a decrease in swimming time from 184.4 ± 13.58 in the control group to 168.4 ± 32.54; 145.8 ± 21.7 and b72 ± 26.15 (sec) in the treated groups.

5. Discussion

These experimental works are based on stress induction on unfamiliar, luminously struck, and open environment which causes anxiety and inhibits rats' normal behaviour. Important difference between the severe and recurrently treated groups was not observed from results interpretation. Behavioural variations were observed in comparison with diazepam and *Draceana reflexa* at doses of 50, 100 and 200 mg/kg from observation of onset time and duration of convulsions. Regarding the anticonvulsant activity, the *Draceana reflexa* leaves extract at doses of 50,100, and 200 mg/kg led to an important increase in the threshold of appearance of convulsions, this deduces that the aqueous extract of *Draceana reflexa* would have some organ which is responsible of the effect observed. While, the anxiolytic effect of *Draceana reflexa* leaves was comparable to diazepam at low doses and better than diazepam at a higher dose. A dose-dependent anxiolytic action was also observed in rats. Aqueous extract of *Draceana reflexa* leaves at a dose of 50 mg/kg caused a very important decrease in motor activity in comparison with control group. These results suppose that *Draceana reflexa* may have an anxiolytic effect [20]. However, the extract of *Draceana reflexa* caused an increase in immobility duration, where this immobility reflects a behaviour of despair which testifies to a state of mental depression which is reduced by antidepressants [21].

6. Conclusion

This study evaluated the anticonvulsant and anxiolytic effects of leaves of *Draceana reflexa*. In the current study, anticonvulsant and anxiolytic effects of *Draceana reflexa* have been evaluated from experimental models and may become a reference model. It seems that the aqueous extract of *Draceana reflexa* leaves reduces significantly the motor activity in rats, and therefore, it is observed the number of squares crossed by the latter.

These results are identical in animals treated with the reference molecule such as diazepam, where *Draceana reflexa* extract increases the time of immobility as well as the time of onset of convulsions in rats. The results obtained confirmed the use of this plant by traditional healers to treat epileptic disorders but anticonvulsant effects of *Draceana reflexa* extract may have non-specific mechanisms. Nevertheless, wide investigations are required for specific mechanism(s) assessment, active principles, *Draceana reflexa* care profile as a remedy for convulsive disorders.

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