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Evaluation of Anxiolytic Activity of Aqueous Extract of Root of *Guziotia abyssinica* (L.f.) Cass.

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Abstract

The present study was designed to study anxiolytic property of aqueous extracts of *Guziotia abyssinica* (L.f.) Cass. an oil yielding plant and is used for its various medicinal properties. The anxiolytic activity was evaluated with the adult mice by the light–dark box test, and motor coordination with the rota rod test. The efficacy of the root extract at the dose of 200 and 400 mg/kg was compared with the standard anxiolytic drug diazepam (1 mg/kg i.p.) The results indicate that root extract increased the time spent in the brightly-lit chamber of the light/dark box, as well as in the number of times the animal crossed from one compartment to the other. These results provide support for anxiolytic activity of selected plant.

Keywords: Diazepam, Plant Extract, Anxiolytic

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Introduction

Being nervous for the entirety of one's life has effects on one's physical health as well as their longevity and subjective well-being. Anxiety is an uncomfortable state of internal turmoil that is frequently accompanied by tense behaviour, somatic complaints, and ruminating. When anxiety is extreme, it may be deemed an anxiety disorder and can significantly reduce quality of life by causing many psychosomatic disorders. Agoraphobia, Specific Phobia, Social Anxiety Disorder (Social Phobia), Panic Attack, Separation Anxiety Disorder, and Selective Mutism are included in this class of disorders. Anxiety is defined as "a state of intense apprehension, uncertainty, and fear resulting from the anticipation of a threatening event or situation," frequently to the point where it interferes with normal physical and psychological functioning. About two-thirds of

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anxious patients respond to the treatments that are currently available, but the extent of the improvement is still disappointing. In addition, these patients also produce a variety of systemic side effects and show dependence and tolerance to long-term medication, which has now raised serious questions about the use of the medications that are currently available. [1-3]

Guizotia abyssinica (L.f.) Cass. belonging to family Asteraceae (Compositae), commonly known Niger, blackseed (E) Ramtil, Kalatil (H). It is an erect, stout, branched annual herb, grown for its edible oil and seed. The plant is used traditionally in antimicrobial agents, contraceptives etc., Besides this, it has been utilized in medicines for thousands of years. [4-5]

The selected plant were also used for the treatment of anxiety as reported in ancient folk-lore literature, however, only limited data are available concerning the anxiolytic activity of this plant. Therefore the present work was undertaken

Material and Methods

Collection and authentication of Plant Material

The roots of *Guziotia abyssinica* (L.f.) Cass. was collected in the months of July-December 2021 from the Jabalpur, (M.P.) and identified & authenticated by Dr. S. N. Dwivedi, Retd. Prof. and Head, Department of Botany, Janata PG College, A.P.S. University, Rewa, (M.P.) and was deposited in our Laboratory. Voucher specimen No. J/Bot/2021-GAR 017 was allotted.

Extraction of Plant Material

Sample were shattered and screened with 40 mesh. The shade dried coarsely powdered plant material (250gms) were loaded in Soxhlet apparatus and was extracted with water until the extraction was completed. Further After completion of extraction, the solvent was removed by distillation. The extracts were dried using rotator evaporator. [6-7]

Acute toxicity study of extract (LD_{50})

Acute oral toxicity studies have been conducted separately followed by using OECD guideline 423. The method used defined doses of 5, 50, 300, 2000 mg/kg *p.o.* body weight. Results were allowed substance rank and classify according to the Globally Harmonized System (GHS) for classification of chemicals which causes acute toxicity. From LD_{50} determination, $1/10^{th}$ of the dose was focused as the medial for pharmacological screening. Since all the animals were alive; no mortality, no toxicity and no significant changes in the body weight between the control and treated group were observed at a dose of 2000 mg for duration of 72 hours. All experimental

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protocols were reviewed and accepted by the Institutional Animal Ethical Committee (IAEC) prior to the initiation of the experiment. [8]

Anxiolytic Activity (By Elevated plus maze apparatus)

An elevated plus maze consisting of two open arms (35×6 cm) and two enclosed arms (35 × 6 × 15 cm) has been used. The maze has been elevated to the height of 40 cm. Mice has been placed individually in center of apparatus, facing towards enclosed arm. The time spent by the mouse during the next 05 minutes in open & enclosed arm has been recorded on second and seventh day of dosing schedule. The animals received vehicle (1ml/kg) or plant extracts 60 minutes before and diazepam (1mg/kg, *i.p.*), 30 min. before placement on the apparatus. The increased exploratory activity in the open arm has been taken as an indicator of anxiolytic activity. [9-10]

Statistical Analysis

Results are expressed as means ± standard error of the mean (SEM). Comparisons between the averages of series of values were performed by ANOVA followed by Dunnett's multiple comparisons test. Data analysis employed Graphpad INSTAT version 2.0 software; statistical significance was set at $P<0.05$.

Results and Discussion

The present study was done with an objective to explore the anxiolytic activity of aqueous root extract of *Guziotia abyssinica* (L.f.) Cass. in mice and the results are summarized in table 1. The results obtained indicate that the extract found to have significant ($P < 0.05$) anxiolytic activity. The aqueous extract at the test doses 400 mg/kg b.w. showed maximum activity when compared with standard drug .

Table 1: Anxiolytic activity of root extract of *Guziotia abyssinica* (L.f.) Cass. by elevated plus maze apparatus in mice

Group	**Treatment (mg/kg) , *p.o.***	**Time Spent in Closed Arm (Sec.) (2^{nd} Day)**	**Time Spent in Closed Arm (Sec.) (7^{th} Day)**	**Time Spent in Open Arm (Sec.) (2^{nd} Day)**	**Time Spent in Open Arm (Sec.) (7^{th} Day)**
Normal Control	Saline	200.43 ± 0.20	225.50	31.23± 0.11	25.39
Positive control	Diazepam (1 mg/kg) *i.p.*	122.41 ± 0.28	106.15	66.32 ± 0.05	34.21
Test 1 200 mg/kg	AEGAR	182.11 ± 0.21	192.33	31.05 ± 0.03	27.31
Test 2 400 mg/kg	AEGAR	172.03 ± 0.39	196.25	40.12 ± 0.38	31.09

* $P<0.05$, compared to control (ANOVA followed by Dunnett's multiple comparisons test).

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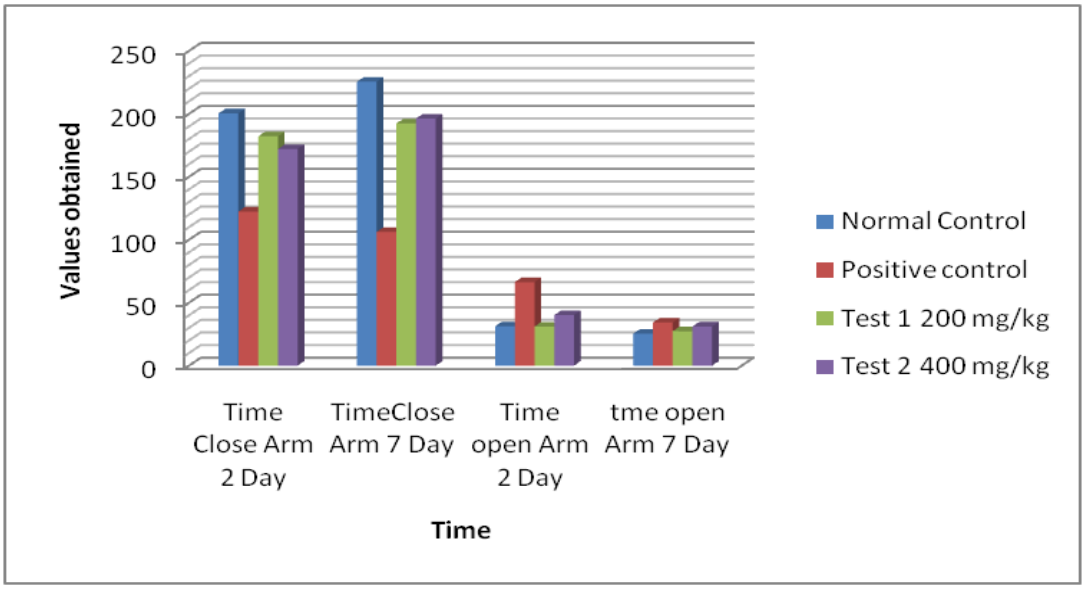

Graph 1: Anxiolytic activity of root extract of *Guziotia abyssinica* (L.f.) Cass.

Conclusion

The study shows that the *Guziotia abyssinica* (L.f.) Cass. root extract had marked effects on the anxiety-related behavioural parameters on exposure to the light/dark test in mice. The extract causes an "anxiolytic" behaviour comparable with the effects of diazepam. Future studies will be focused on the neurobiological mechanisms of action and possible interactions of *s* with classical neurotransmitters and the phytoconstituent(s) responsible for the observed central effects has to be isolated and identified.

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