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Evaluation of Anti-depressant activity of *Centratherum anthelminticum* Seeds

Anees Ghosi

Chameli Devi Institute of Pharmacy, Indore, (M.P.) – India

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Abstract

The antidepressant activity of methanolic extract of *Kalijiri (Centratherum anthelminticum) seeds* was studied. *Kalijiri* seeds extracts were obtained by soxhlet extraction method solvent using solvents methanol. The methanolic extract of *C. anthelminticum* was used for antidepressant activity by forced swim test and tail suspension test. The results showed that mehtanolic extract of CA has good antidepressant activity with 200 mg/kg dose of seed extract respectively with compare to standard (Imipramine). *C. anthelminticum* contains Flavonoids and terpenoids which are responsible for its antidepressant action. This evidence supports the antidepressant activity of *C. anthelminticum.*

Key words: Kalijiri, *Centratherum anthelminticum*, FST, TST.

Introduction

Depression is a major problematic disease nowadays because it not only affects the patient's life but also degrade the quality of life of their family. In depression the patient are not able to understand what to do as disease affects the mental level of patient. Many research works have done so far but till date there is no proper treatment of disease. However, Depression nowadays considerable contributor to the global burden of disease and affects people in all communities across the world. Depression affects millions people nowadays. This is established that average about 1 in 20 people reported having an episode of depression in the previous year according to The World Mental Health Survey conducted in 17 countries. This is found that depression often starts at a young age which is reduced people's functioning, their qualities and often are recurring.

Depression can be easily diagnosed and also be treated in primary stage. According to WHO Intervention Guide 6, the treatment is based on psychological support with antidepressant medication; psychotherapy plays an important role in the care of these patients. The available treatments of depression are effective but it can lead drug addiction which is very common in these patients. Challenges for the clinicians are to evaluate the behavioral parameters and decide the dosing according to their conditions. [1]

Despite the fact that we all feel depressing, changeable or low from time to time, some people experience these feelings intensely, for long periods of time (weeks, months or even years) and sometimes without any apparent reason. Depression cannot be ignored as it's a serious condition which affects patient's physical and mental health. Depression is a very critical psychological condition which needs accepting and medical care. Society treats the disease as an evilness which also disturbs the quality of life of patients and family too.

***Corresponding Author**

The role of family as well as clinician is very important as far as disease understanding concern, if diagnosed in early stages can be treated effectively. [2]

Most of Pharmaceutical industries have changed their plans in favor of natural product drug development and discovery. The standardization of Ayurdevic medicines is the need of hour as they are safe and effective. The data reported by various national pharmacopoeias revealed that many chemical constituents of plant have antidepressant activity. This has been achieved through chemical and pharmacological screening of only 6% of the total plant species. [3]

With the purpose of make sure the safe use of these medicines, a necessary first step is to establish the standards of quality, safety and efficacy. The plant *Centratherum anthelminticum* (Hindi; Kalijiri, Somraj) belonging to family Asteraceae is used in current study. In India nine species of this genus are found, of which *C. anthelminticum* is threadworms. The plant is widely distributed throughout India up to 1650m altitude in the Himalaya and Kashi hills. Seed has hot sharp test. The plant is reported in Indian Ayurvedic Pharmacopoeia for its Antiasthmatic and Antitussive activity. The chemical constituents which are responsible for these activities are glycosides, carbohydrates, phenolic compound and tannin, flavonoids, protein, saponins, sterol, lipids, fats. [4]

Material and Methods

Procurement of the plant parts

The seed of the *Centratherum anthelminticum* was collected from the local market, Indore, Madhya Pradesh.

Treatment and Preparation of the aqueous extracts

The seed were washed with the water and keep dried for 2 hr. The seed of *Centratherum anthelminticum* was extracted with the help of soxhlet apparatus. The soxhlet solvents extracts were obtained by soxhlet extraction of 50g of dried seeds in 200ml-300ml of solvents at 65° C using soxhlet apparatus. The extract was concentrated to 10ml on a water bath and dried at room temperature. Percentage yield of various extracts were noted in each solvent. [5]

Phytochemical evaluation

The phytochemical evaluation of methanolic extract of *Centratherum anthelminticum* seed were carried out as per standard methods .The presence of flavonoids will determined by lead acetate test, tannins by acetic acid test, saponins by foam test and steroids will determine.

Pharmacological Methods

Animals

Wistar albino mice, weighing 25-30 gm, were obtained from the animal house of the Department of Pharmacology of the Chameli Devi Institute of Pharmacy, Indore, India. Animals were housed at four per cage, allow free access to water and food, and maintain under constant temperature (23±1 0C) and humidity (60±10%) under a 12-h light/dark cycle (light on 07.30–19.30 h). Animal treatment and maintenance was conducted in accordance with the Principles of Laboratory Animal Care (NIH publication no. #85-23 revised 1985).

Experimental design

The experimental design has been designated according to CPCSEA (Committee for the purpose of control and supervision on Experiments) guidelines. All the animals used in this experiment were overnight fasted animals and randomly selected for the administration of vehicle, standard and test drug. Each animal was placed in FST and TST model after 1 hour of dose administration. All the doses have given through intraperitoneal route to the animals.

A total number of 24 mice were divided into four groups of six mice each:

Group I: control (Normal Saline, 2ml/kg) ; Group II: standard (Diazepam, 2mg/kg); Group III: Test (Methanolic extract of *C. anthelminticum*, 100mg/kg); Group IV: Test (Methanolic extract of *C. anthelminticum*, 200mg/kg)

The antidepressant activity was carried out using two different models. Behavioural tests:

Forced swim test (FST) -- Forced swim test is very commonly used model for the screening of the Antidepressant activity in rodents. Mice were individually forced to swim in open glass chamber (25 ×15 × 25cm) containing fresh water to a height of 15 cm and maintained at 26°±1°C. On this height animal is not able to touch the bottom and side wall of the chamber. Used water of the chamber can alter the behavior of other animal so

water should be changed after subjecting each animal to FST. Animal showed continuous movement till 2 minute from initial time. The duration of immobility was manually recorded during the next 4 min of the total 6 min testing period. Mice were considered to be immobile when they stopped struggling and remained floating motionless in water, making only those movements necessary to keep their head above water. Following swimming session, mice were towel dried and returned to their housing conditions.

Tail suspension test (TST)

All the mice of either sex were divided in four different groups. The first group assigned as control receiving only vehicle (NaCl 2ml/kg). The other three groups received acute dose of ext., fraction (100, 200 mg/kg). The fourth group received standard drug Imipramine. The total duration of immobility induced by tail suspension will measured according to the methods. [6]

Statistical analysis

All the data represent mean ± S.E.M. values. All the data analyzed by the means of analysis of variance (ANOVA). Whenever ANOVA was significant, further multiple comparisons were made using Dunnett's test as the post hoc test. All analyses were performed through the primer-E statistical software. The levels of statistical significance ranged from $p<0.05$ to $p<0.001$.

Results and Discussion

Table 1: Indicating presence of various phytochemical constituents.

S. No.	Test	Positive/ Negative
1.	Carbohydrate	+
2.	Terpenoids	-
3.	Flavone Glycoside	+
4.	Phenolic Compound	+
5.	Flavonoids	+
6.	Saponins	-
7.	Sterols	+

Note:- + = Present; - = Absent

Table 2: Effect of Methanolic extract of *C. anthelminticum* on Immobility Period (sec) of mice using Forced Swim Test

Group	Drug	Dose	Immobility period (secs)
1	Control	2ml/kg i.p.	185±3.25
2	STD	10mg/kg i.p.	105±1.75
3	MECA-I	100mg/kg	132±1.8
4	MECA-II	200mg/kg	125±2.5

Where, STD – standard (Imipramine), MECA – Methanolic extract of *Centratherum anthelminticum.*

All value are given in mean±SEM, *P <, **P < as compare with the control group (one way ANOVA followed by Dunnett's test).

Table 3: Effect of Methanolic extract of *C. anthelminticum* on immobility period (secs) of mice using Tail Suspension Test

Group	Drug	Dose	Immobility period (secs)
1	Control	2ml/kg i.p.	141
2	STD	10mg/kg i.p.	101
3	MECA-I	100mg/kg	126
4	MECA-II	200mg/kg	119

Where, STD – standard (Imipramine), MECA – Methanolic extract of *Centratherum anthelminticum.*

All value are given in mean ± SEM, *P <, **P < as compare with the control group (one way ANOVA followed by Dunnett's test).

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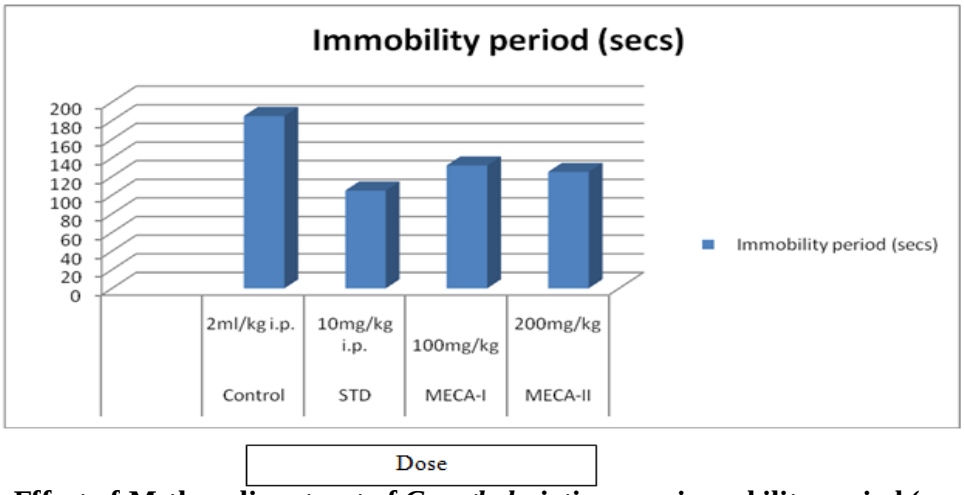

Figure 1: Effect of Methanolic extract of *C. anthelminticum* on immobility period (secs) of mice using Force Swim Test

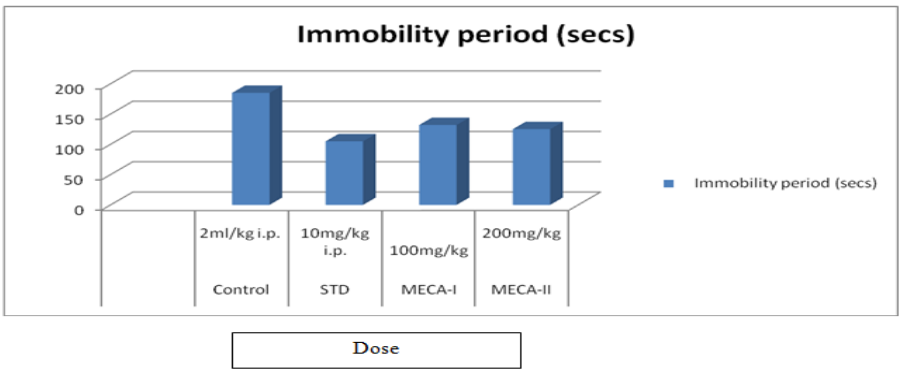

Figure 2: Effect of Methanolic extract of *C. anthelminticum* on immobility period (secs) of mice using Tail Suspension Test.

Conclusion

Depression is affecting globally as many reports revealed that the disease is increasing day by day. The current available treatment with antidepressants proved its efficacy but adverse effects too. Various antidepressant drugs are now available, which acts via different mechanisms based on the serotonergic, noradrenergic and dopaminergic systems. Diverseness of clinical response to antidepressant and mood- stabilizing drugs and susceptibility to adverse effects are major clinical problems. Therefore, new drugs are still needed for the control of depression-related disorders. FST & TST are the models of depression are widely used to screen new antidepressant drugs.

In the present study of antidepressant activity of *C. anthelminticum* has been studied. The methanolic extract of *C. anthelminticum* (200 mg/kg) shows significant antidepressant activity in TST and FST. Tail suspension test and forced swim test represent the behavioral despair model and they produce a state similar to human depression. These tests are quite sensitive, specific and state of despair is reduced by several agents like tricyclics, 5-HT reuptake inhibitors, and MAO inhibitors and atypical. *C. anthelminticum*

(200 mg/kg) produced significant antidepressant effect in mice in TST and FST as compared to the control group and indicated that imipramine possess stronger antidepressant activity than *C. anthelminticum* (200 mg/kg). *C. anthelminticum* contains Flavonoids and terpenoids which are responsible for its antidepressant action. This evidence supports the antidepressant activity of *C. anthelminticum*.

The antidepressant activity of *C. anthelminticum* can be increased if *C. anthelminticum* extract is given with combination of Estrogen because estrogen studies have proved that estrogen produce antidepressant action by them and importantly facilitate the action of clinically antidepressants. The tests are quite sensitive and relatively specific to all major classes of antidepressant drugs including TCAs, SSRIs, and MAOI. The TST, immobility reflects affirm of depression which can be reduced by various agents which are therapeutically effective in human depression. Similarly, in the FST rats are forced to swim in restricted area from which they cannot escape. This induces a state of behavioral despair in them, which is claimed to reproduce a condition similar to human depression. It has been seen that the TST is less stressful and has higher pharmacological sensitivity than FST.

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