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Antidepressant Activity of Dahiman Plant (Cordia macleodii)

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ABSTRACT:

Cordia macleodii is an 8-10 m high small sized tree belongs to the family Boraginaceae and commonly used as Dahipalas or Dahiman Ped. It is distributed in moist and dry deciduous forest of India such as Chhattisgarh, Madhya Pradesh, Odisha and widely used to cure various diseases. It contains various bioactive compounds including Phenols, Saponins, Volatile oils, Flavonoids, Glycosides, Alkaloids. These bioactive compounds made this plant as a valuable potent herbal drug. This review presents the Phytochemical constituents,

KEYWEORDS: Cordia macleodii, Antidepressant, Forced Swim Test, Tail Suspension Test.

I. INTRODUCTION:

Plant containing bioactive compounds have been beneficial for human health since time immoral. Cordia macleodii is an 8-10 m high small sized tree belonging to family Boraginaceae is an important medicinal tree. The plant is used ethomedicinally for various purpose like healing wounds, mouth sour, treating jaundice and also as an aphrodisiacs by the tribal people of Orissa, Chhattisgarh and Madhya Pradesh. Various medicinal plants have been identified as laboratories for the biosynthesis of a wide range of compounds including glycosides alkaloids etc. active plant constituents play an important role in the prevention and treatment of disease. Cordia is a genus of flowering plants it contains about 300 species of shrubs and trees.

PLANT USED FOR ANTIDEPRESSANT

The plant Cordia macleodii (Boraginaceace) is a small sized tree. The plant is used ethomedicinally for various purpose like healing wounds (leaf, bark), mouth sour (leaf), treating jaundice (bark) and also as an aphrodisiac (seed) by the tribal people of Orissa, Chhatisgarh and Madhyapradesh. Ethnomedicine is a subfield of ethnobotany or medical anthropology that deals with the study of traditional medicines.

Dahiman leaves act as Sanjivani herb. Severe disease like cancer can be cured by its use. So far, many people have got relief from its leaf. Apart from this, disease like mental pain, blood pressure and jaundice can also be eliminated.

The Boraginaceae family consist of about 2,700 species, which are distributed in tropical, subtropical and warmer regions around the world. It is composed of about 130 genera and six sub families, in which Cordiodeae is one. It contains the genus Cordia, which is comprised of evergreen trees and shrubs. Cordia macleodii, is frequently distributed in moist and dry decicuous forests of india such as Chhatisgarh, Madhyapradesh, Orissa, Chotanagpur, Maharashtra. In Chhatisgarh it is found in Marwahi forest Division, Pendra road Bilaspur and Koriya district.

Synonym: Dhiman, dahiipalas, kuhman.

Botanical name: Cordia macleodii.

Family: Boraginaceae.

USES

- Analgesic acivity
- Anti-inflammatory activity
- Antioxidant activity
- Antifungal activity.

PLANT DESCRIPTION

•**Cordia macleodi** is known as Dahiman or Dahipalas in Hindi. It is an 8-10m high tree with a corcy grey bark.

•There leaves are broad ovate, 5-10cm as long as broad, scabrous, base cordate and crenate- serrate margins. They are arranged alternate to sub-opposite.

•The flower are white in colour and polygamous, in short terminal axillary corymbs.

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•The calyx is densely tomentose the corolla lobes are oblong in shape and 0.6 to 0.8 cm long.
•The drupes are 1.2 to 1.9 cm long, ovoid acuminate at apex, seated at president calyx. The flower and fruits appear in February – August.

ANIMALS

Swiss Albino mice and Wistar rats were provided by the animal house of School of Pharmacy, CEC, Bilaspur Institutional Animal Ethics Committee (AICE).

METHODS

- Forced swim test (FST)
- Tail suspension test (TST)
- Open field test (OFT)

Forced Swim Test (FST)

This test was performed in two parts, first was known as pre test, which took place one day before the experiment for the selection of animals for further studied. The selected rats were divided four groups i.e. control, standard (Flouxitine), C, macleodii (100mg/kg and (500mg/kg). Each group contained animals. All the drugs were given by means of intraperitoneal route. After one hour of drug administration rats were again forced to swim in a glass tank (height 45cm, width 12cm) in which water level should not increases from 15cm from the duration of 6 min. In this period immobility time have to be counted (when rats stop struggling).

Tail Suspension Test (TST)

In this experiment male mice's were divided into four groups with members in each. Mice's were administered with control, standard (Flouxetine 15mg/kg), C. macleodii (100 mg/kg and 500mg/kg) respectively by intra peritoneal route. One hour later mice's were suspended with their tails to the edge of the table, 35 cm away from the bottom for 5 min interval. Immobility time was counted when mice hang submissively.

Open Field Test (OFT)

This test was carried out on mice's to evaluate the effects of investigational drug on mobility of animal. Open field equipment was made of plywood which is white in colour and measured 72 by 72 and wall is 36cm long in this test mice's were treated individually with standard drug Flouxetine (15mg/kg) and testing drugs extracts of C. macleodii (100mg/ml and 500mg/ml). Then placed them independently in the middle of the open field for 5 minutes to count Total Locomotion (TL) i.e. the total number of square crossed both outer and inner ones, Peripheral Locomotion (PL), and Central Locomotion (CL) respectively. The other factors, which were also evaluated, are number of rearing, leaning, grooming and defecation.

II. RESULTS

Table 1. Effects of C. macleodii on duration of immobility time in Forced Swim Test (FST)

SN	GROUPS	CONCENTRATION(mg/kg)	IMMOBILITY TIME (SEC)
1	Control	Saline	128.66 ± 8.45
2	Flouxetine	15	99.0 ± 3.78
3	C. macleodii	100	99.0 ± 1.73
4	C. macleodii	500	49.3 ± 3.17

Table 2Effect of C. macleodii on duration of immobility time in Tail Suspension Test (TST)

SN	GROUPS	CONCENTRATION (mg/kg)	IMMOBILITY TIME (SEC)
1	Control	Saline	164.33 ± 8.31
2	Flouxetine	15	96.6 ± 6.3

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3	C. macleodii	100	155.6 ± 4.6
4	C. macleodii	500	89.6 ± 7.8

Table 3 Effects of C. macleodii on duration of immobility time in Open Field Test (OFT)

	GROUPS	TL	CL	PL
1	Control	143.3± 6.5	31.0 ± 4	112.3 ± 2.51
2	Flouxetine (15mg/kg)	152.6 ± 2.72	36 ± 2.08	116.6 ± 2.33
3	C. macleodii (100 mg/kg)	119.3 ± 5.24	24.3 ± 2.4	95.0 ± 5.5
4	C. macleodii (500 mg/kg)	149.6 ± 17.87	27.3 ± 5.2	120.3 ± 17.2

Two different doses of extract (100 and 500 mg/kg) of Cordia macleodii were used to investigate the antidepressant effect of this plant showed in table 2 and 3. Injection of control did not exhibit significant effect on immobility time and swimming time in the forced swi mming test compared to pre injection status. Therefore all experimental groups were compared with saline as the control group. The administration of Flouxetine (15 mg/kg) as a positive control, in rats significantly decreased immobility time respectively compared to the control group. While extract (100 and 500mg/kg) significantly decreased immobility time 99.0±1.73, 63.6±5.84, 49.3±3.17 respectively.

C. macleodii extract and standard drug (Flouxetine 15 mg/kg) induced significant diminution of immobility time in tail suspension test (Control, 164.33 ± 8.37, C. macleodii 100 mg/kg and 500 mg/kg 155.6 ± 4.6, 89.6 ± 7.8 and Flouxetine 15 mg/kg, 96.6 ±6.3, compared with the control. The results obtained were shown in table.
The open field test provides simultaneous measure of locomotion, exploration and anxiety. The result of open field test were demonstrated in table.

III. DISCUSSION

The widespread use of FST is mainly due to its ability to detect a broad spectrum of antidepressant agents. The test is based on the observation that animals following initial escape-oriented movements develop an immobile posture when placed inside an inescapable cylinder filled with water. The immobility is thought to reflect either a failure of persistence in escape-directed behavior (i.e., despair behavior) or the development of a passive behavior, meaning the loss of the animal's ability to cope with stressful stimuli. The agents that decrease this behavior are presumed to have antidepressant effects.

There was no significant difference between the effect of the various doses of the Cordia macleodii extracts and that observed with Flouxetine group on the immobility time when the mice were exposed to the TST. Markedly showed a significant ($P<0.001$) decrease in the time spent immobile by animals. By performing tail suspension test, the reduced immobility time directed the antidepressant effect of extract.The antidepressant effect of methanolic extract of C. macleodii was also performed previously but its mechanism of action was not cleared.

For the open field test number of line crosses and the frequency of rearing are usually used as measures of locomotor activity, but are also measures of exploration and anxiety. A high frequency of these behaviors indicates increased locomotion and exploration and/or a lower level of anxiety. The number of central square entries and the duration of time spent in the central square are measures of exploratory behavior and anxiety. A high frequency/duration of these behaviors indicates high exploratory behavior and low anxiety levels.

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IV. CONCLUSION

From the results it was concluded that the doses of Cordia macleodii extract (100mg/kg and 500mg/kg) showed significant antidepressant activity.

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