CENTRAL NERVOUS SYSTEM DEPRESSANT ACTIVITY OF AERIAL PARTS OF *ABUTILON INDICUM* LINN.

Parimal V. Kotkar[1], Sunil A. Nirmal[1*], R. A. Rub[1], S. D. Sonawane[1], Shashikant R. Pattan[2], Nachiket S. Dighe[2] and Subhash C. Mandal[3]

[1]Department of Pharmacognosy, Pravara Rural College of Pharmacy, Loni-413736, M.S., INDIA.

[2]Department of Pharmaceutical Chemistry, Pravara Rural College of Pharmacy, Loni-413736, M.S., INDIA.

[3]Pharmacognosy and Phytochemistry Research Laboratory, Department of Pharmaceutical Technology, Jadavpur University, Kolkata, INDIA.

Summary

This study was designed to test CNS depressant activity of aerial parts of plant *Abutilon indicum* L. (Malvaceae) as it is used traditionally in depression. The *A. indicum* herb cultivated throughout tropical India and Ceylon. It contains various chemical constituents as alkaloids, leucoanthocyanins, flavonoids, sterols, triterpenoids, saponins and cardiac glycosides. The aerial parts of *A. indicum* were extracted with petroleum ether, chloroform, ethanol and aqueous extracts. All the extracts showed significant reduction in locomotor activity as compared to standard drug diazepam. The sleeping time was found to increase in mice after treatment with the extracts compared to standard phenobarbitone sodium. Amongst all the extracts chloroform extract showed better CNS depressant activity.

Keywords: *Abutilon indicum* Linn, locomotor study, phenobarbitone sodium, CNS depressant activity.

* Address for correspondence to:
Mr. Sunil Ashokrao Nirmal
Head, Department of Pharmacognosy,
Pravara Rural College of Pharmacy, Pravaranagar,
A/P-Loni, Tal- Rahata, Dist. - Ahmednagar
Pin- 413736, Maharashtra, India.
Phone: +91 9226564894
***E-mail address*:** nirmalsunil@rediffmail.com

Introduction

The herbal remedies for depression can effectively help in managing depression problem with fewer side effects. Hence, herbal treatment can be a better choice for the physiological treatment of depression symptoms. *Abutilon indicum* is a much branched, an erect, half-woody plant. It is velvety, shruby and grayish green in color. It grows up to one and half meters in length .The leaves are up to 9 by 5 cm., petiolate, cordate, ovate, acuminate, unequally toothed and rarely subtrilobate. The flowers are solitary and petioles are 3.8-7.5 cm. long, Stipules 9 mm. long, linear, acute and deflexed. Stem is round, often tinged with purple color. Seeds are 3-5, kidney shaped, dark-brown or black, tubercled or with minutely stellate hairs.[1] Plant contains gallic acid, two new sesquiterpene lactones, alantolactone and isoalantolactone. Presence of alkaloids, leucoanthocyanins, flavonoids, sterols, triterpenoids, saponins and cardiac glycosides are also reported.[2,3,4] Leaves, roots and seeds contain mucilage, tannin, organic acid, and traces of asparagine and ash containing alkaline sulphates, chlorides, magnesium phosphate and calcium carbonate.[5,6] .Dayani et al. studied cardiovascular stabilizing effect of *A. indicum* during pregnancy.[7] Sharma et al. carried out isolation of gallic acid from the petroleum extract of *A. indicum.*[2] Hansen et al. detected and isolated antihypertensive principle from *A. indicum.*[8] Qureshi et al. reported insecticidal and repellant activity of crude extracts of *A. indicum.*[4] Thangaraj et al. studied bactericidal activity of *A. indicum* plant extract on the growth of Flacherie causing bacterial in the silkworm *Bombyx mori* .[9] Viswanathan reported *A. indicum* for antiasthmatic activity.[10] Since detailed investigation of CNS depressant activity has not been carried out so far, the present study on the evaluation of CNS depressant activity of various extracts of aerial parts of *A. indicum* Linn was under taken.

Material and Method

Plant material and preparation of extract

Aerial parts of *A. indicum* were collected from Ahmednagar district, cleaned and dried at room temperature in shade and away from direct sunlight. The dried aerial parts were coarsely powdered in grinder before extraction. Dried and coarsely powdered aerial parts of *A. indicum* L. were subjected to successive solvent extraction in Soxhlet extractor using petroleum ether, chloroform and ethanol as solvent and the marc left was refluxed with water. All the extracts were vacuum dried to produce PEE (1.74%w/w), CE (2.5%w/w), EE (6.85%w/w) and AQE (16.66%w/w) respectively.

Animal

Albino mice (Swiss Webster strain, 20-25g) were used for the experiments. The animals were provided with standard laboratory food and tap water *ad libitum* and maintained at natural day and night cycle. All the experiments were conducted on an isolated and noiseless condition and Institutional Animal Ethical Committee approved all the experimental protocols.

Drugs and chemicals

Petroleum ether AR (PCL, India), Chloroform AR (PCL, India), ethanol AR (PCL, India), Phenobarbitone sodium injection I.P (Nicholas Piramal, India) and Diazepam (Ranbaxy, India).

Evaluation of Central Nervous System depressant activity

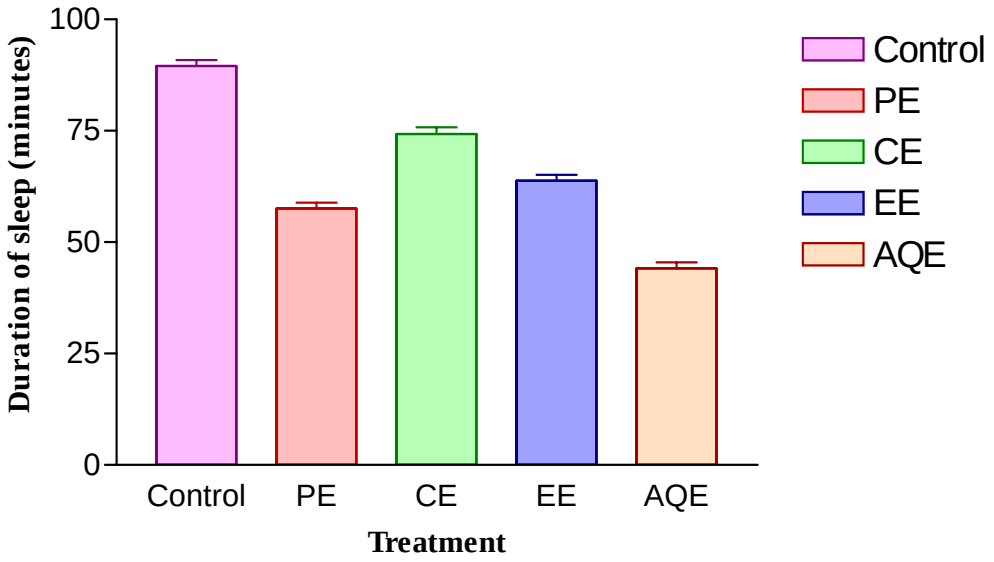
1. Phenobarbitone induced sleeping time

The activity was performed as described by Tambe et al.[11] Animals were divided into five groups (n=6). First group received vehicle (Distilled water containing 20 % Tween 80**,** p.o.) + Phenobarbitone (40 mg/kg, i.p.). Second group received petroleum ether extract (25 mg/kg, p.o) + Phenobarbitone (40 mg/kg, i.p). Third group received chloroform extract (25 mg/kg, p.o.) + Phenobarbitone (40 mg/kg, i.p.). Fourth group received ethanol extract (25 mg/kg, po) + Phenobarbitone (40 mg/kg, i.p.) and fifth group received aqueous extract (25 mg/kg, p.o.) + Phenobarbitone (40 mg/kg, i.p.). After one hour of administration of extracts, Phenobarbitone sodium (40 mg/kg) was administered. The duration of sleeping time was measured as the duration for which the righting reflex was lost.

2. Locomotor activity testing

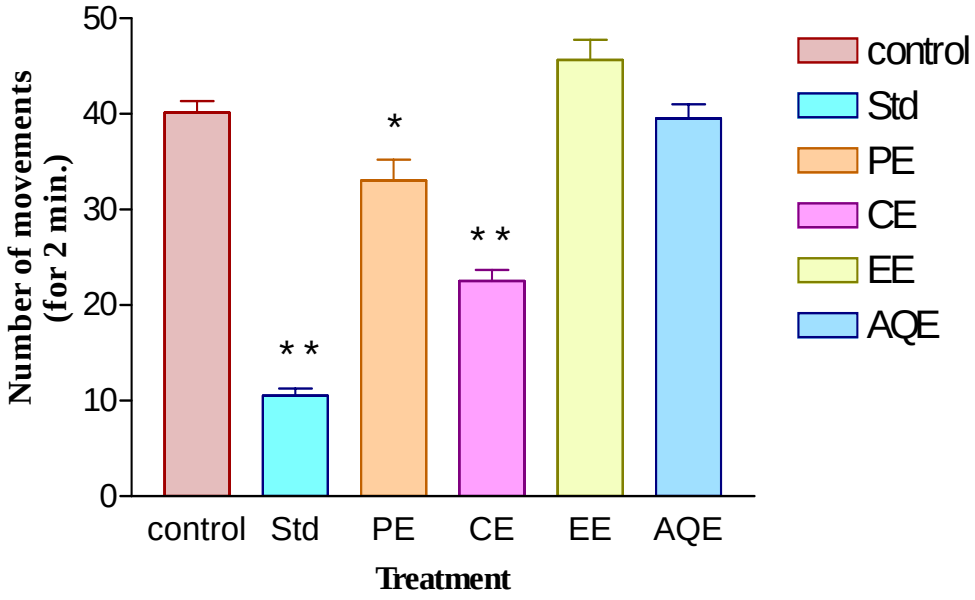
The activity was performed as described by Turner[12] and Tambe et al.[11] Animals were divided into six groups (n=6). First group received vehicle (Distilled water containing 20 % Tween 80**,** p.o). Second group received Diazepam (2 mg/kg, ip). Third to sixth group received petroleum ether extract (25 mg/kg, p.o.), chloroform extract (25mg/kg, p.o.), ethanol extract (25 mg/kg, p.o.), aqueous extract (25 mg/kg, p.o.) respectively. Mice were placed individually in photoactometer. Basal reaction time was noted before and after 1 hour of the administration of treatment. A count was recorded when the beam of light falling on the photocell of photoactometer is cut off by mice.

Figure 1. Effect of various extracts of aerial parts of *A. indicum* Linn on mice by phenobarbitone induced sleeping time test at 25 mg/kg.



All the values are expressed as mean ± SEM, n=6 in each group.

Figure 2. Effect of various extracts of aerial parts of *A. indicum* on mice by locomotors activity test at 25 mg/kg.



All the values are expressed as mean ± SEM, n=6 in each group. Data analyzed using one-way ANOVA, followed by Dunnett's test **P<0.001, *P<0.05 when compared to vehicle.

Results and Conclusions

As per noted in Figure 1, chloroform extract potentiated phenobarbitone sodium induced sleeping time in mice than other extracts. Results in Figure 2, revealed that in the animal treated with chloroform extract showed significant reduction in the locomotor activity compared with standard drug diazepam and other extracts. The Central nervous system depressants induce sedation, hypnosis and reduce the locomotor activity in the experimental animals. Prolongation of sleeping time in phenobarbitone sodium induced sleeping time test may be because of enhancement in brain GABA as it is known to have depression action in brain as reported by Iwama et al.[13] In locomotor activity testing, decrease in rearing along with locomotor activity is observed, that reveals depressive effect on Central nervous system as reported by Leewanich et al.[14] Overall we can say that Chloroform extract is having good Central nervous system depressant activity.

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