World Journal of Pharmaceutical and Life Sciences
WJPLS
www.wjpls.org
SJIF Impact Factor: 4.223

IN VIVO SEDATIVE ACTIVITY OF ETHANOL AND AQUEOUS EXTRACTS OF STEM OF *ABUTILON INDICUM*

Dhanapal. V.*[1], Samuel Thavamani B.[1], Muddukrishniah[1] and Sampath Kumar[2]

[1]Department of Pharmacognosy, Sanjo College of Pharmaceutical Studies, Velappara, Palakkad, Kerala – 678 702.
[2]Department of Pharmaceutics, Coimbatore Medical College, Coimbatore, Tamilnadu.

***Corresponding Author: V. Dhanapal**
Department of Pharmacognosy, Sanjo College of Pharmaceutical Studies, Velappara, Palakkad, Kerala – 678 702.

Article Received on 27/10/2017 **Article Revised on 17/11/2017** **Article Accepted on 08/12/2017**

ABSTRACT

Insomnia is one of the most common sleep disorders around the world. In this present study we evaluate the crude ethanol and aqueous extract of stem of *Abutilon indicum*, a medicinal plant which is laxative, anticonvulsant, diuretic, etc., using phenobarbitone-induced sleeping time test in mice. Ethanol extract produced a significant ($p>0.05$) and dose dependent reduction in the onset of sleeping and aqueous extract of 100 mg/kg and 200 mg/kg was significant in prolonging the sleeping time. These results suggest that the fraction obtained from the aqueous extract of stem of *Abutilon indicum* posses sedative activity may further lead to the pharmacological and pharmacokinetics of the plant to a useful sedative in future.

KEYWORDS: Insomnia, Phenoborbitone, laxative, *Abutilon indicum*, anticonvulsant, sedative.

INTRODUCTION

Insomnia is the most common sleep-related complaint and the second most common overall complaint (after pain) reported in primary care settings.[1] It is a prevalent and potentially serious condition that adversely affects the sleep, health status and life quality of people of all of age.[2] Insomnia can be treated pharmacologically and non-pharmacologically or with a combination of both.[3] Benzodiazepines, zolpidem, zopiclone, zaleplon, have been used for the treatment of insomnia.[4] The use of benzodiazepines in the management of insomnia is associated with well known problems such as 'hangover' effects, dependence, addiction, withdrawal symptoms and subsequent drug resistance.[5] Medicinal plants are now widely used all over the world for the management of several conditions including insomnia. The World Health Organization (WHO) encourages the inclusion of herbal medicine in health care because of the great potentials they possess.[6] Around the world have been used several plants like sleep inducers, such as Valerian, Passion flower, Melissa, Hops and Kava Kava (banned).[7] However, scientific research is needed to provide evidences of their safety and efficacy (WHO, 2000). A number of medicinal plants are traditionally endowed with anxiolytic or sedative properties.[7] One of such medicinal plants is *Abutilon indicum*. The present work describes the screen sedative activity of ethanol and aqueous extract of the stem of the medicinal plant, *Abutilon indicum*.

MATERIALS AND METHODS

Plant material

Abutilon indicum stem were collected during the month of January 2011, from Children's park, Guindy, Chennai, India and authenticated by Dr. P. Jayraman, Director of plant Anatomy Research Centre Chennai. The fresh stem were separated and kept for shade drying. Dried stem material was powdered using mechanical grinder and passed through 60 mesh sieve to get the powder of desired coarseness. Powdered material was preserved in an air tight container.

Extraction of Plant material

For preliminary phytochemical analysis, extract was prepared by weighing 600grams of the dried powdered stem were subjected to hot successive continuous extraction with different solvents as per the polarity, petroleum ether, benzene, chloroform, ethanol and finally with aqueous. The extracts were filtered in each step using Whatman filters paper. The filtrate was concentrated using a rotary evaporator at low temperature (40-45^{o}C) and pressure. The presence or absence of the primary and secondary phytoconstituents was detected by usual prescribed method.[8]

Chemicals and Drugs

Phenobarbitone and Tween 80 were purchased from Sigma Co. (Sigma St. Louis, MO). Absolute ethanol was of analytical grade and was purchased from Merck (German). The other reagents were of analytical grade.

Animals

Swiss albino mice (18-22 g) maintained in the Animal house Facility of the Department of Pharmacology, Annai Veilankanni;'s Pharmacy college, were used in these experiments. The animals were maintained on standard small animal feeds (Excel feed, Ilorin) and water *ad libitum*. This research was carried out in accordance with the rules governing the use of laboratory animals as accepted internationally. The experiment was conducted between the hours of 900 h and 1600 h. The experimental groups consisted of six animals. They were maintained at constant room temperature (22° ± 1 °C) and submitted to12 h light/dark cycle with free access to food and water.

Experimental procedure

Acute oral toxicity study

Acute oral toxicity was conducted as per OECD guidelines (organisation of economic cooperation and development) 423 (Acute toxic class method). The acute toxic class method is a step wise procedure of three animal of a single sex per step. Depending on the mortality and / or moribund status of animals, on the average 2-4 steps may be necessary to allow judgment on the acute toxicity of the test substance. This procedure results in the use of a minimal number of animals while allowing for acceptable data based scientific conclusion. The method uses defined doses, (5, 50, 300, 2000 mg/kg body weight) and the results allow a substance to be ranked and classified according to the globally harmonised system (GHS) for the classification of chemicals which causes acute toxicity. The method previously described by Lorke[9] was adopted.

Phenobarbitone – induced sleeping time test in mice

Albino rats of either sex weighing between 90-170gms were divided into five groups of five animals in each group was used for the study. The first group served as control and was treated with normal saline through intra peritoneal route. 30 min after treatment with normal saline or the fractions, all the rats were treated with phenobarbitone at a dose of 5mg/kg. The onset and duration of sleep was recorded for each rat. The loss of righting reflex was regarded as the onset of sleep while the time difference between the disappearing and the recovery of righting reflex was taken as the duration of sleep (sleeping time).[10]

Statistical analysis

The results were analyzed for statistical significance using Student t-test and p value <0.01 was considered significant.

RESULTS

Phenobarbitone induced sleep in mice

Ethanol extract of stem of *Abutilon indicum* produced a significant ($p<0.01$) and dose dependant reduction in the onset of sleep but duration of sleep in this dose is non-significant. The aqueous extract is non-significant on onset of sleep but it is significant evidently in prolonging the duration of sleep in both the doses, 100mg/kg and 200mg/kg (Table.1, Figure.1).

DISCUSSION

The data presented in this study showed that the ethanol extract produced a dose dependent reduction in the onset of sleep which is highly significant when compared with the aqueous extract and control but non-significant in the duration of sleep (0.45 mints in 100 mg/kg and 0.43 minutes in 200 mg/kg) when compared with aqueous extract and control as aqueous extract shows 1.01 minutes in 200 mg/kg, 0.97 minutes in 100 mg/kg, which is significant in $p<0.01$ value and control shows 0.57 minutes. These results indicate that there is no significant correlation between the onset of sleep and the duration of sleep. This may be due to the different chemical compositions of the crude extract and their timing to bind with GABA. A barbituric acid derivative that acts as a non selective central nervous system depressant promotes binding to inhibitory.

Table 1: Effects of fractions obtained from *abutilon indicum* on phenobarbitone -induced sleeping.

Group no.1	Drug treatment	Dose mg/kg	Mean onset of sleep (mins)	Mean Duration of sleep (mins)
1.	Control	Nacl 5ml/kg	0.28±0.004	0.57± 0.011
2.	AEAI	100	0.13±0.0054	0.97±0.14**
3.	AEAI	200	0.09±0.004	1.01±0.027**
4.	EEAI	100	0.61±0.017**	0.45±0.086
5.	EEAI	200	0.37±0.070	0.43±0.095

AEAI – Aqueous extract of *Abutilon indicum*, EEAI – Ethanolic extact of *Abutilon indicum*

One way ANOVA followed by Dunnet's test. Values are mean ± S.E.M. n=5, in each group $^{**}p < 0.01$ is significant.

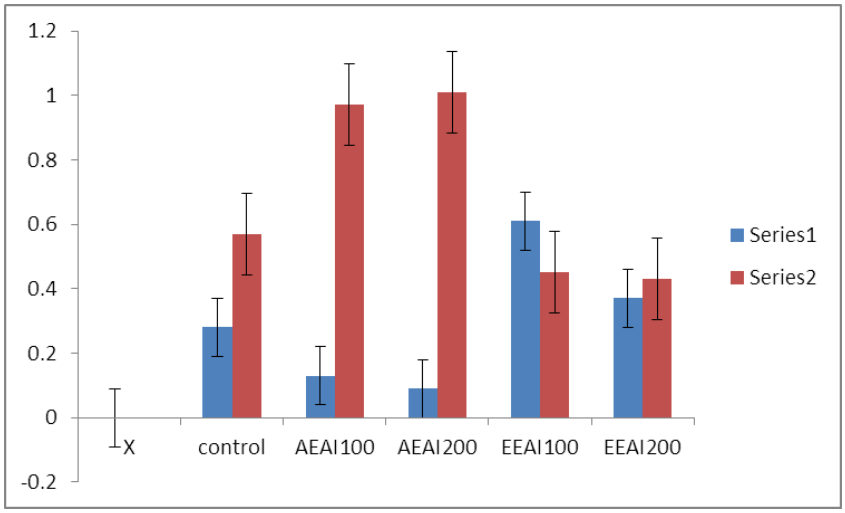

Figure 1: Sedative activity of Ethanol and Aqueous extract of stem of *Abutilon indicum*.

Gamma-aminobutyric acid subtype receptors, and modulates chloride currents through receptor channels and also inhibits glutamate induced depolarizations.

Research on herbs with sedative or antidepressant actions such as *Hypericum perforatum* (St. John's Wort) has recently centered on the BDZ receptor complex, but in general herbal extracts have been shown to have multiple pharmacodynamic and pharmacokinetic actions across a range of neurotransmitters and receptors.[11] Attempts to characterize sedative herb action as single active constituent effects paralleling orthodox drug action at single receptors have now been recognized as fruitless by most researcher. Further work has to be carried out to purify and isolate the sedative compound in order to use without much side effects.

REFERENCE

1. Mahowald MW, Kader G and Schenck, CH. (1997) Clinical categories of sleep disorders I. Continuum, 1997; 3(4): 35–65.
2. Edinger J and Means M. Cognitive-behavioral therapy for primary insomnia. Clinical. Psychology Review, 2005; 25: 539-558.
3. Benca, R. Diagnosis and treatment of chronic insomnia: A review. Psychiatric services, 2005; 56: 332-343.
4. Gottesmann C. GABA mechanisms and sleep. Neuroscience, 2002; 111: 231-239.
5. Tyrer P. Risk of dependence on benzodiazepine drugs: The importance of patient selection. British Medical Journal, 1989; 298: 102-105.
6. Amos S, Kolawole E, Akah P, Wambebe C and Gamaniel K. Behavioral effects of the aqueous extract of *Guiera senegalensis* in mice and rats. Phytomedicine, 2001; 8(5): 356-361.
7. Wheatley D. Medicinal plants for insomnia: a review of their pharmacology, efficacy and tolerability. Journal of Psychopharmacology, 2005; 19(4): 414-421
8. Khandelwal KR. Practical Pharmacognosy-Techniques and Experiments. Pune: Nirali Prakashan, 2002.
9. Lorke D. A new approach to acute toxicity testing. Archives of toxicology 1983; 54: 275-287.
10. Magaji MG, Yaro AH, Ahmed A, Yakubu MI and Anuka JA. Sedative activities of fractions obtained from Methanolic root bark extract of *Securinega virosa* in mice. Nigerian Journals of Pharmaceutical Sciences 2007; 6(2): 28-33.
11. Jeffrey M. Greeson, Britt Sanford and Daniel A. Monti. St. John's wort (*Hypericum perforatum*) a review of the current pharmacological, toxicological, and clinical literature. Psychopharmacology 2001; 153(4): 402-414.