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RESEARCH ARTICLE

Anticonvulsant Activity of Methanolic Extract of Jatamansi Churna

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ABSTRACT

Jatamansi churna was extracted with methanol and concentrated to obtain residue. The methanolic extract (MEJ) at a dose of 500mg/kg b.w, 250 mg/kg b.w by i.p route were tested for their anticonvulsant property against Maximum Electric Shock (MES) Induced Convulsion model in Swiss albino mice of either sex weighing between 18gms-22gms. A significant ($p<0.01$) anticonvulsant activity had been observed in the MEJ (500mg/kg b.w) followed by 250 mg/kg b.w. when compared to control group. Phytochemical screening reveals the presence of alkaloids, cardiac glycosides, flavonoids, steroids, tannins, triterpenoids, carbohydrates, proteins and saponins in the methanolic extract of jatamansi churna.

KEYWORDS

Jatamansi Churna, MEJ, Anticonvulsant, Maximum Electric Shock

INTRODUCTION

There are many thousands of medicinal plants in use throughout the world, with a tremendous range of action. Most have specific action on particular body systems and are known to be suitable for treating certain type of diseases. Normally plant medicines act on the body as a whole in a systematic way to produce a healthy balanced body system[1].

Epilepsy is one of the most common diseases of the brain, affecting at least 50 million persons worldwide. These are the group of CNS disorders characterized by paroxysmal cerebral dysrhythmia, manifesting as brief episodes (seizures) of loss or disturbance of consciousness, with or without characteristic body movements (called convulsion), sensory or psychiatric phenomena as well as excessive EEG (Electroencephalogram) discharge.

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It is also characterized by violent spasmodic contractions and relaxations of skeletal muscles rapidly and repeatedly and autonomic hyperactivity called convulsion. The term convulsion is sometimes used as a synonym for seizure. However not all epileptic seizures lead to convulsions and not all convulsions are caused by epileptic seizures[2,3,4].

Some herbal drugs reported as anticonvulsant like Myristica fragrans (Nutmeg) - Volatile oils of seeds[5], Croton zambesicus- Aqueous leaf extract[6], Dodanaea viscose- Ethanolic seed extract[7], Vitex negundo- Ethanolic leaf extract[8], Glycyrrhiza glabra- Ethanolic extracts of roots and rhizomes[9], Aloe barbadensis (Aloe-vera)[10], Poly-herbal extracts comprising of Withania somnifera[11], Bioflavonoids - Gossypin from various plants belonging to the family Malvaceae[12].

Nardostachys jatamansi DC, an important plant of the family Valerianceae commonly known as Indian spikenard, has a rich history of medicinal use and has been valued for centuries in

Ayurvedic (Indian) and Unani (ancient Greco-Arab) systems of medicine. It is classified as hypno-sedative in Ayurveda and is used in treatment of insomnia, hysteria and depressive illness. The plant has demonstrated several pharmacological activities including hepatoprotective, cardioprotective, hypolipidemic and antifungal. The significant effect is on the central nervous system, as diverse pharmacological actions, ranging from sedative to nootropic[13].

A number of synthetic antiepileptic drugs are available. However, their effectiveness does not hold true with the entire range of population. Further, a large number of drug interactions and their side effects make it more difficult to attain easy control on seizures. On the other hand, herbal medicines are widely used due to their applicability and efficacy coupled with least side effects, which in turn has accelerated the scientific research regarding the antiepileptic activity.

There is still a need for broadly acting anticonvulsant drugs possessing multiple mechanisms of action with decreased adverse effect, preferably originating from natural products, despite the beneficial effect of currently available drugs[14].

Traditionally the roots and the rhizomes of *N.jatamansi*, as mentioned in ayurveda, have been used in various herbal formulations including dietary supplements. This important traditional drug is also used to treat epilepsy, hysteria, syncope, convulsions, and mental weakness. The decoction of the drug is also used in neurological disorders, insomnia, and disorders of cardiovascular system[15,16].

In the light of the development cited, an attempt has been made to study the anti-convulsant activity of Jatamansi churna using maximum electric shock induced convulsions (*In-vivo*).

MATERIAL AND METHODS

Authentication and Collection of Jatamansi Churna

The Jatamansi churna were purchased from local market of herbs in Hyderabad, A.P. The Jatamansi churna has been identified and authenticated by botanist.

Preparation of the Extracts

Cold Maceration

100gm of powdered drug is subjected for cold maceration for 5days with 1.5lts of methanol. The solvent was then separated by filtration and the marc is air-dried. The yield was found to be 4%w/w.

Extraction of the Plant Materials

The air dried marc was subjected for extraction with methanol using soxhlet apparatus at 50^{o}C. Materials were extracted until liquid in the side arm of the soxhlet apparatus became colorless.

Mecilla were collected and combined with the macerates and subjected for solvent recovery using rotary evaporator. The extract is then dried in reduced pressure using vacuum. The dried extract is then stored at low temperature (4^{o}C) for further use. The yield was found to be 3%w/w.

Preparation of Plant Extract for Biological Screening

Methanol is the moderately polar solvent utilized to extract various groups of compounds present in the crude drug. In this process, methanol is used to obtain crude extract.

Preliminary Phytochemical Screening [17,18]

Various chemical tests has been done to identify the phytoconstituents present in methanolic extract of Jatamansi churna(MEJ) such as test for carbohydrates, proteins, alkaloids, glycosides, tannins, flavonoids, steroids, etc.

Experimental Animals

Swiss albino mice of either sex weighing between 18-22gms were used for the experimental work. Institutional Animal Ethical Committee approved the experimental protocol**.** Animals were maintained under standard conditions husbandry, room temperature 24±2^{0}C, relative humidity of 45- 55%, 12 hours dark-light cycle, in an animal house approved by the Committee for the Purpose of Control and Supervision of Experiments on Animals

(CPCSEA). Animals were obtained from the central animal house, G. B. N. Institute of Pharmacy, Edulabad. The animals had free access to standard diet and water and housed in the poly-propylene cages. All the animals were kept for fasting 12 hours prior to the experiment but allowed to free access to water.

Acute Toxicity Studies[19,20]

The procedure was followed as per OECD 423 guidelines. The extract was administered orally at a dose 2000 mg/kg body weight to different groups of mice and observed for signs of behavioral, neurological toxicity and mortality for 14 days.

Evaluation of Anticonvulsant Activity[21,22,23]

Anticonvulsant activity was evaluated in-vivo using methanolic extract of Jatamansi churna (MEJ).

Maximum Electric Shock Induced Convulsions (*In-vivo*)

In this model, the animals were divided into six groups with six animals in each group.

The animals of I group served as solvent control, received distilled water (1ml/100gm b.w); II group received Phenytoin (25mg/kg b.w), treated as positive control; III and IV groups treated with methanol extract at the dose of 250 mg/kg b.w, and 500 mg/kg b.w respectively. All the treated groups of animals were administered intra peritoneally 30 min prior to the electroshock. The electroshock induced in the entire animals by passing a current of 45 mA for 0.2 sec duration through electro convulsiometer (Techno India) using ear electrodes. The duration of flexion, extensor, clonus and stupor phases were noted.

RESULTS AND DISCUSSION

Preliminary Phytochemical Screening

Preliminary phytochemical screening reveals the presence of alkaloids, glycosides, flavonoids, steroids, tannins, triterpenoids, carbohydrates, proteins and saponins in the methanolic extract of jatamansi churna (Table 1).

Table 1: Preliminary Phytochemical Constituents Present in the Methanolic Extract of Jatamansi Churna

S.No	Chemical constituent	Test	MEJ
1.	Alkaloids	Mayer's test	+
		Wagner's test	+
		Dragendorff's test	+
		Hager's test	+
2.	Glycosides	Chrysorbin test	+
		Legal test	+
3.	Carbohydrates	Molisch test	+
		Fehling test	+
		Benedict's test	+
		Barfoed's test	+
4.	Proteins	Biurett's test	+
		Xanthoproteic test	+
5.	Steroids	Libermann buchard test	+
		Salkowski test	+
		Sulphur test	+
		Acetic anhydride Plus H_2SO_4 test	_
6.	Tannins	Ferric chloride test	+
7.	Triterpenes	Salkowski test	+
		Libermann storch morawski test	+
		Hirschorn test	+

		Tschujawes test	+
8.	Flavanoids	Ferric chloride test	+
		Shinoda test	+
		10% NaOH	+
		10% Lead acetate	+
		Mineral acid test	+
		Zinc dust test	+
9.	Saponins	Liberman Buchard Sterol Reaction	+
		Salkowski Reaction	+

Effect of Methanolic Extract of Jatamansi Churna on Maximal Electric Shock Induced Convulsion in Mice after 30mins.

Swiss albino mice were used for the screening of anticonvulsant activity in MES induced convulsions. The experiment had been performed where convulsions were induced after 30mins to each group of animals, following the i.p administration of methanolic extract as well as the standard drug phenytoin.

Methanolic extract exhibited a significant reduction in various phases of epileptic seizures on comparison with the standard drug phenytoin (25mg/kg b.w). There was also a significant reduction in the time required for righting reflex (recovery) in treated groups (Table 2).

Prominent anticonvulsant effect had been observed in MEJ (500mg/kg b.w and 250mg/kg b.w) when compared to the control group. Whereas, standard drug Phenytoin (25mg/kg b.w) completely abolished the convulsion and its phases.

Table: 2. Effect of Methanolic Extract of Jatamansi Churna on Maximal Electric Shock Induced Convulsion in mice after 30mins.

Groups	**Drug used**	**Flexion (in sec)**	**Extension (in sec)**	**Clonus (in sec)**	**Stupor (in sec)**	**Recovery /Death**
I	Control	25.80±0.02	43.02±0.03	54.02±0.02	86.02±0.01	Recovered
II	Phenytoin (25mg/kg)	Nil	Nil	Nil	Nil	Recovered
III	MEJ (250mg/kg)	3.62±0.02*	8.03±0.19*	19.34±0.43*	31.01±0.01*	Recovered
IV	MEJ (500mg/kg)	2.40±0.01**	4.70±0.02**	15.71±0.20**	26.10±0.12**	Recovered

Values represent the mean ± SD of six animals MEJ – Methanolic extract of Jatamansi churna, *=p<0.05, **=p<0.01, (the mean difference was considered significant at 0.01 level)

CONCLUSION

The methanolic extract showed significant ($p<0.01$) activity at 500mg/kg b.w followed by 250mg/kg b.w (($p<0.05$) by abolition of all the phases of convulsion in MES model. So the potency of anticonvulsant activity was found to be more with 500mg/kg b.w and 250mg/kg b.w by abolition of all the phases of convulsion in MES model. All the results indicate the broad spectrum anticonvulsant activity in absence seizures as well as tonic-clonic seizures. All the studied parameters in the present work clearly substantiate the traditional claim of anticonvulsant property of jatamansi churna. Moreover, the study clearly shows the MEJ at 500mg/kg b.w has got significant anticonvulsant property followed by 250mg/kg b.w.

Hence the anticonvulsant property of methanolic extract of jatamansi churna may be attributed to the presence of active principles such as flavanoids, steroids, triterpenoids and alkaloids.

The actual phytoconstituents responsible for anticonvulsant activity is needed to be determined. Hence, there is a further scope in detail phytochemical investigation and activity guided isolation of active constituents from the Jatamansi churna.

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