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Anticonvulsant Activity of *Psoralia corylifolia linn.* in PTZ Induced Mice Model

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ABSTRACT:
Objectives: To investigate the anticonvulsant activity of extract of *Psoralia corylifolia linn.* Leaves on PTZ (Pentylenetetrazole) induced seizures in swiss albino mice.
Materials and Methods: The extract of *Psoralia corylifolia linn.* leaves (120mg/kg and 60mg/kg i.p) was studied for its anticonvulsant effect on PTZ induced seizures in Swiss albino mice. In PTZ seizures, abolition of the convulsions was noted.
Results: The extract of leaves of *Psoralia corylifolia linn*. (120mg/kg and 60mg/kg, i.p) significantly ($p<0.005$) protected the animals from PTZ induced tonic convulsions.
Conclusion: The data suggests that the extract of *Psoralia corylifolia linn.* leaves may produce the anticonvulsant effect via multiple mechanisms since it abolished seizures produced by PTZ.
Keywords: Anticonvulsant, Pentylenetetrazole, Psoralia corylifolia linn., Swiss albino mice.

INTRODUCTION:

Over 70 million individuals worldwide suffer with epilepsy, a dangerous neurological condition with incidence rates of 50 per 100,000 per year or higher in high-income nations. 100 per 100,000 annually in developing nations [1]. Health systems, individuals, and their families all bear a heavy burden from epilepsy, which is still a very stigmatised disorder. [2] Epilepsy is precisely what its name implies; it is also referred to as the "chronic seizure disorder." This disorder is characterised by recurrent, unprovoked seizures in the affected individual.[3] Many affected individuals will experience a range of seizures, including tonic, clonic, and absence seizures, among others. Absence seizures are brief lapses in awareness or consciousness while tonic, clonic, and tonic-clonic seizures are characterised by uncontrollable jerking movements. Tonic seizures are when the muscles in the body freeze up and become stiff. Tonic-Clonic seizures are also known as Grand Mal seizures when they occur together. [4][5] Epilepsy is recognised to have a variety of causes, including genetic anomalies, brain damage, and developmental flaws. [6]

Indigenous herbs are used as remedies against various diseases in the traditional system of medicine or in ethnomedical practices. For the past few decades, compounds from natural sources have been gaining importance because of the vast chemical diversity they offer. This has led to a phenomenal increase in the demand for herbal medicine in the last 2 decades. They are relatively safe, easily available, and affordable to the masses. These drugs have given important lead in drug research, resulting in the discovery of novel molecules.

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Dry fruit of leguminous plant *Psoralea corylifolia* Linn. (syn: *Cullen* Linn.) is one of the most popular Traditional Chinese Medicine and officially listed in Chinese Pharmacopoeia.[41] *P. corylifolia* is an annual herb growing throughout the plains of India. The plant is of immense biological importance, and it has been widely exploited since ages for its magical effect against several skin diseases, such as psoriasis, leukoderma, and leprosy.[7]

MATERIAL AND METHOD:

Drugs and Chemicals

Phenobarbital (Abbott group, India). Pentylenetetrazole was obtained from Sysco Laboratories, Mumbai.

Collection of Plant extract

The medicinal plant leaves extract of *Psoralea corylifolia linn*. Were procured from Shivay herbal and healthcare Jaipur Rajasthan.
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Animals

Swiss albino mice of either sex weighing 25-35 gm was obtained from the animal house of Department of Pharmacology, Vidyabharti college of pharmacy, Amravati. All the animal are acclimatized to the animal house prior to use. they are kept in case in animal house with a 12hr light: 12hr dark cycle at temperature (25°C 1°C) with 50+ 55% of relative humidity. Experiments was performed in accordance with the committee for the purpose of control and supervision of experimental animal (CPCSEA) guideline after the approval of the experimental protocol by the institutional animals ethical committee (IAEC). Animal are fed on pellets and tap water ad libitum. The care and handling of animals in accordance with the internationally accepted standard guidelines of use of animals (CPCSEA).

Acute Toxicity Study

The acute toxicity of prepared extract was performed and reported.[8]

Selection of Dose Groups:

1. On the basis of acute toxicity study data, it was concluded that LD50 of *Psoralia coryliffolia linn*. is upto 138 mg/kg.
2. Therefore, the test group were divided as 60 mg/kg (low dose), 120 mg/kg (high dose)

Anticonvulsant Activity

Pentylenetetrazole (PTZ) induced convulsion

PTZ 70mg/kg i.p. was administered to mice. The parameter notes was duration of convulsions. The animals were divided into 5groups. Each group consisting of 6animals.
Group I: Vehicle
Group II: PTZ 70mg/kg on 10^{th} day.
Group III: Phenobarbital (1.2mg/kg orally) + PTZ (70mg/kg i.p.) on 10^{th} day. Group IV: Test extract (60mg/kg i.p.) + PTZ (70mg/kg i.p.) on 10^{th} day.
Group V: Test extract (120mg/kg i.p.) + PTZ (70mg/kg i.p.) on 10^{th} day.

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On 10th day, the test samples were given 1hour prior to induction of convulsions. Abolition of the convulsions was taken as a measure of efficacy in this test.[9]

Phytochemical screening of extract of *Psoralia corylifolia linn.* leaves

A preliminary phytochemical analysis of the extract was carried out for the presence of various phytoconstituents like alkaloids, flavonoids, carbohydrates, glycosides and fats.

Analysis

Statistical Significance

The results of the study was expressed as Mean ± SD, n=6. One way ANOVA was used to analyze and compare the data followed by Dunnett and Tukey multiple comparison tests.

Results

Anti-epileptic activity

PTZ induced seizures

Psoralia corylifolia linn leaves extract was evaluated for it's anticonvulsant effect using Pentylenetetrazole induced seizure model in mice. *Psoralia corylifolia linn* leaves extract reduced the duration of hind limb extension and the duration of recovery in a dose dependent manner in PTZ induced seizure model. At 60 and 120 mg/kg doses of extract a significant ($p<0.05$ when compared to control at both doses) reduction in the duration of hind limb tonic extension was observed representing 13.67±0.4216 seconds respectively while the duration of recovery time also showed significant ($p<0.05$ when compared to control and standard at low dose while $p<0.05$ when compared to control and standard resp. at high dose) reduction at these doses representing 29.50±0.6191 seconds respectively.

Table no.1 Observation table for behavioural parameters in PTZ model of Epilepsy

Sr.no	Groups	Treatment	Dose	Duration of Convulsions in sec
1	Positive Control	PTZ	70mg/kg	29.50 ± 0.6191
2	Standard	Phenobarbital	1.2mg/kg	10.33 ± 0.4944
3	Test 1	Leaves extract of *Psoralia corylifolia linn*	60 mg/kg	26.33 ± 0.7149
4	Test 2	Leaves extract of *Psoralia corylifolia linn*	120mg/kg	13.67 ± 0.4216

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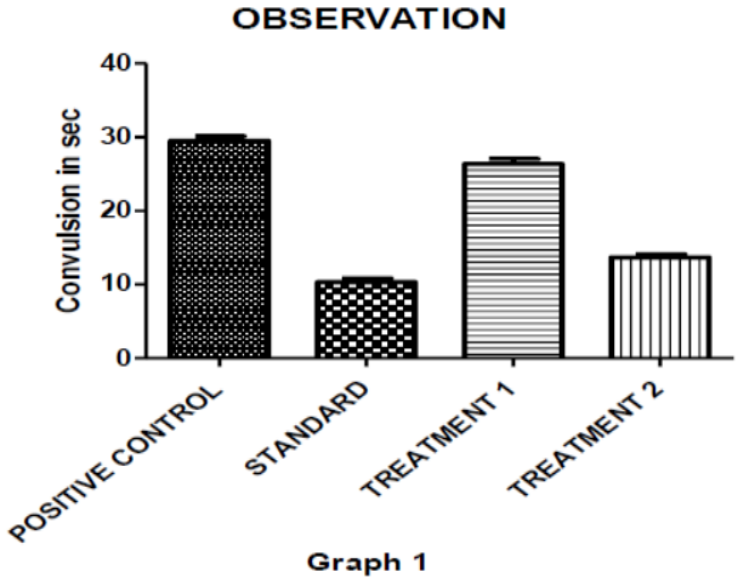

Graph 1

All data are expressed as mean ± SEM for group of 6 mice in each. One-way anova followed by Dunnett Multiple comparison test and values are statistically significant at *P < 0.05 Compared to Positive Control.

Table no.2 Observation table for % Protection

Sr. No	Groups	Time of Recovery	Number of animals showed convulsion	% Protection
1.	**Positive Control**	188.8±2.49	6	0
2.	**Standard**	72.5±1.40	0	100
3.	**Treatment 1**	125.5±1.198	3	50
4.	**Treatment 2**	94±0.764	2	66.67

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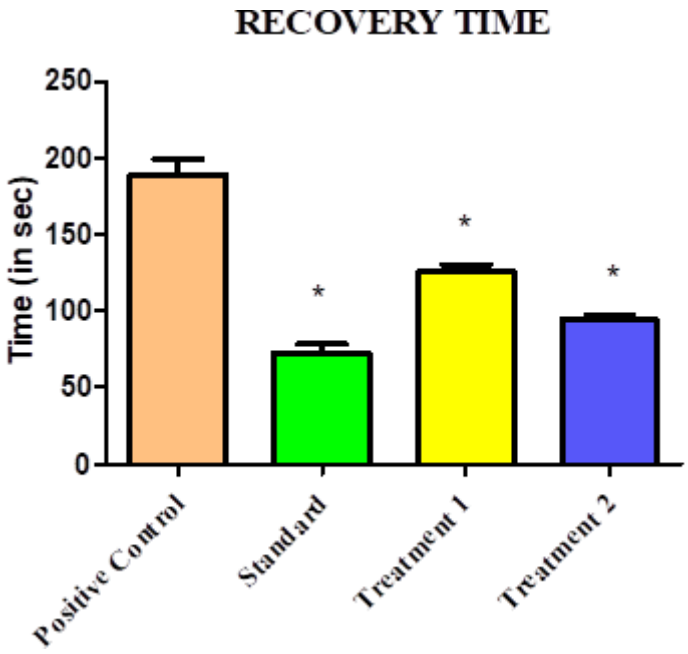

All data are expressed as mean ± SEM for group of 6 mice in each. One-way anova followed by Tukey Multiple comparison test and values are statistically significant at *P < 0.05 Compared to Positive Control.

Photochemical screening of the extract of *Psoralia corylifolia linn.* leaves

Preliminary phytochemical analysis of the extract confirmed the presence of various phytoconstituents like carbohydrates, alkaloids, glycosoids, flavonoids and fats. [Table.3]

Table .3 The phytochemical investigation of crude extract of *Psoralia corylifolia linn* are as follows.

Sr. No.	Chemical constituents	Name of the test	Result
1.	Carbohydrates	Molish test	+
2.	Flavonoids	NaOH test	+
3.	Glycoside	Killer-Killani Test	+
4.	Alkaloids	Dragendroff's Test	+
		Mayer's Test	+
5.	Fat	Saponification test	+

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Discussion

The findings of the study demonstrated that treatment with *Psoralea corylifolia Linn* extract significantly reduced the occurrence and duration of hind limb extension compared to the control group. These results indicate the potential anticonvulsant activity of *Psoralea corylifolia Linn* in the PTZ-induced seizure model.

The observed anticonvulsant effects of *Psoralea corylifolia Linn* could be attributed to its phytochemical constituents, such as flavonoids, coumarins, and furanocoumarins, which have been reported to possess neuroprotective and antiepileptic properties. These bioactive compounds may modulate neurotransmitter systems, ion channels, or other targets involved in epileptic seizures.

The current study adds to the growing body of evidence supporting the anticonvulsant potential of Psoralea corylifolia Linn. Previous studies have reported its beneficial effects in various neurological disorders, including epilepsy. These findings suggest that Psoralea corylifolia Linn may serve as a promising source for the development of novel antiepileptic drugs.

Conclusion

In conclusion, the hind limb extension study conducted in the PTZ-induced mice model supports the anticonvulsant activity of *Psoralea corylifolia Linn*. These findings highlight the potential of *Psoralea corylifolia Linn* as a natural source for the development of new antiepileptic agents. Further research is necessary to elucidate its precise mechanisms of action and evaluate its efficacy and safety profiles in more comprehensive experimental models and, eventually, clinical trials.

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