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Anti-psychotic activity of ethanolic extract of Tradescantia spathacea Swartz leaves by using albino mice.

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ABSTRACT :
Tradescantia spathacea Swartz is an herbaceous plant which is widely used for treating different diseases. The use of herbal medicine has increased now-a-days. The natural drugs are used popularly because of their fewer side effects than the conventional drugs and their effectiveness in treating . Drugs which are used to treat psychosis produce adverse effects like extra pyramidal side effects i.e., catalepsy .Present study was conducted to evaluate the Anti-psychotic activity of ethanolic extract of Tradescantia spathacea Swartz leaves (TSW) using different animal models. The animal models used are Haloperidol induced catalepsy and Tail suspension test in mice . Haloperidol induced catalepsy was assessed by using standard bar test .The results revealed that there is a dose dependent significant reduction in duration of catalepsy with TSE (100 mg/kg & 200 mg/kg) in haloperidol induced catalepsy . where as in tail suspension test , there is a dose dependent significant reduction in immobility duration when compared to standard imipramine (4mg/kg i.p.,). This investigation revealed that ethanolic extract of T. spathacea Swartz contained active phytochemical constituents which have antipsychotic effect in mice.

Keyword : Tradescantia spathacea Swartz, anti-psychotic, catalepsy, tail suspension, Imipramine.

I. INTRODUCTION :

Psychosis is a severe mental disorder in which person lost contact with reality. It is expressed as depression , sleep disorders , social withdrawal, illusion , false beliefs , impaired thoughts etc. Neuroleptics are the drugs which are used to treat Psychosis Typical antipsychotic drugs act by inhibiting dopaminergic neurotransmission. They are more effective when they block 72% of D2 dopamine receptors in brain. They also act by blocking in noradrenergic , cholinergic, histaminergic pathways whereas typical antipsychotic drugs act by blocking D2 receptor and also act as sertonin receptor antagonist.Haloperidol,atypicalantipsychotic drug, it causes extrapyramidal side effects which includes akinesia , muscle dystonia and tardive dyskinesia . considering these factors , this study was conducted to explore the herbal medicines for treatment of psychosis.

Tradescantia spathacea Swartzis an herbaceous plant of genus Tradescantia belongs to commelinaceae family. It is a herb native to Mexico with fleshy rhizomes.it has rosette of waxylance shaped leaves which are dark to metallic green and glossy purple colour underneath.it is well distributed in tropical and sub- tropical region.it is a traditional medicine used for treatment of coughs and loosen mucus , Vomiting of blood , Psoriasis , Burns ,scalds & dysentery etc. other reported activities are Antitumour , Antioxidant & antibacterial , Antimycobacterial, Anti chikungunya , anti- Helminthic , Anti – diabetic activities.

II. MATERIALS AND METHODS

Collection and identification of plant material:

Fresh Tradescantia spathacea Swartz (TSW) plant was collected in the month of January 2023 from the local park , secunderabad ,Telangana ,India .TSW was morphologically identified and authenticated bearing voucher No. OUAS-100 by professor A. Vijay Bhasker Reddy , Department of Botany ,Osmania University ,Telangana state . the plant material was cleaned & dried under shade. The plant material was powdered in an electric grinder .

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Drugs and chemicals used :

Haloperidol injection , Trihexyl phenidyl Tablets , Imipramine Tablets,Normal saline , Ethanol , Ethyl acetate , Hexane , Methanol .

Extraction Procedure :

The powdered plant material was taken and extracted with ethanol as a solvent by using Soxhlet apparatus . Further extract is filtered and resultant filtrate is evaporated in Rota evaporator .

Institutional Ethical Committee Approval :

The Institutional Animal Ethical Committee (IAEC) of Pulla Reddy Institute of Pharmacy has approved the experimental protocols for evaluation of Anti-psychotic activity of ethanolic extract of Tradescantia spathacea Swartz by using Albino mice and approval number is IAEC-III-PRIP-FEB-2023-Protocol 01.

Experimental Animals:

Male Albino mice (19-25 g) of age between 7-9 weeks were obtained. The animals were kept in well-ventilated room fed with pelletized diet & water ad-libitum was provided throughout the period of the experiment.

Haloperidol- induced catalepsy in mice:

Catalepsy is the condition in which the animal is unable to correct the externally imposed posture. Catalepsy was induced by Haloperidol and assessed by means of standard bar test at 30 min interval for 120 min. The present study was conducted according to the reported methods of Ferre et al.,(1990) & modified by Salam (2011). 30 adult mice were divided based on their body weight into 5 groups of 6 each. The first group received normal saline (10 ml/kg i.p.,) & second group received Haloperidol (1mg/kg i.p..,) & third group received Trihexyl phenidyl (10 mg/kg P.o.,) dispersed in 2% gum acacia& fourth & fifth group received EETSW (100 mg/kg, 200 mg/kg i.p.,) dispersed in gum acacia. After 30 min. of treatment each group received Haloperidol (1mg/kg). The mice were positioned such that their hindquarters were on the bench & their forelimbs rested on 1cm diameter horizontal bar that was $cm above the bench , this procedure was carried out for 30 min after Haloperidol administration. Mice was judged to be cataleptic , if they maintained the position , maximum time is 180 sec. assessed with the help of stopwatch . The endpoint of catalepsy is when both front paws were removed from the bar.

Tail suspension in mice :

The present study was conducted according to the methods of Steru et al (1993). Adult mice were divided into 4 groups of 6 each. First group received normal saline (10ml/kg)i.p.., second group received Imipramine (4mg/kg) i.p.., third & fourth group received EETSW (100 mg/kg & 200 mg/kg) i.pwhich are dispersed in gum acacia. After 30 mins of i.p .., treatment , each mice was suspended by the tail on the edge of a shelve 58 cm above a table top & length of immobility was recorded with stopwatch for about 6 mins. Mice was considered immobile when hung passively & remains motionless. Initial 2 minutes were not considered during which the mice is immobile .

Statistical analysis :

Values are expressed as Mean ± SEM (n=6). The statistical analysis of data was done using ANOVA (one way variance analysis) followed by Dunnett's t-test. Probability level less than 0.005 was considered to be statiscally significant.

III. RESULTS AND DISCUSSION:

The extract was prepared by soaking the powdered drug material in 4 different solvents i.e., Hexane, Ethyl acetate,Methanol, Ethanol for 24 hours with frequent shaking. 25 ml of solvent is filtered and evaporated to dryness. The percentage w/w of extractive values obtained are 3.2 % w/w, 6.4 % w/w, 64 % w/w, 22.4%w/w for Hexane, Ethyl acetate,Ethanol,Methanol. As a result, it was found that Ethanol solvent quantities were higher i.e., 64 % w/w. Hence ethanolic extract was used for the further study.

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Table 1:Below Table 1 describes the values of Tradescantia spathaceaSwartz leaves extracted using different solvents.

Solvent	Colour	Consistency	Percentage w/w
Hexane	Yellow 	Semisolid	3.2
Ethyl acetate	Pale green 	Semisolid	6.4
Ethanol	Pale green 	Semisolid	64
Methanol	Pale green 	Semisolid	22.4

Preliminary Phytochemical analysis :

The preliminary Phytochemical investigation was estimated by standard analytical procedures. The Ethanolic , Ethyl acetate & Methanolic extracts of Tradescantia spathacea Swartz revealed the presence of Alkaloids , carbohydrates,Tannins , steroids & Triterpeniods & Flavonoids .

Table 2 , represents Preliminary phytochemical analysis of Tradescantia spathacea Swartz in different solvents .

S.no	Phytoconstituents	Test	Ethanol	Ethyl acetate	Methanol
1	Alkaloids	Dragendroff's test	+ ve	-ve	+ve
		Mayer's test	-ve	- ve	- ve
2.	Carbohydrates	Molisch's test	-ve	- ve	+ve
3.	Aminoacids		-ve	- ve	- ve
4.	Tannins	Ferric chloride test	+ ve	+ ve	+ ve
5.	Steroids & Triterpeniods	Libermann-burchard's test	+ve + Ve	+ve +ve	+ ve + Ve
6.	Glycosides	Frothing test	- Ve	- ve	- ve

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7.	Flavoniods	Alkaline reagent	+ ve	+ ve	+ ve

Note :- Here (+ ve) represents presence and (– ve) represents absence of phytochemical constituents in different extracts of Tradescantia spathacea Swartz.

Ethanolic extract revealed the presence of Alkaloids , Tannins , Steroids and triterpeniods , Flavoniods .Ethyl acetate extract revealed the presence of Tannins , Steriods and triterpeniods ,Flavoniods. Methanolic extract revealed the presence of Alkaloids , carbohydrates , Tannins , Steriods and triterniods , Flavoniods .

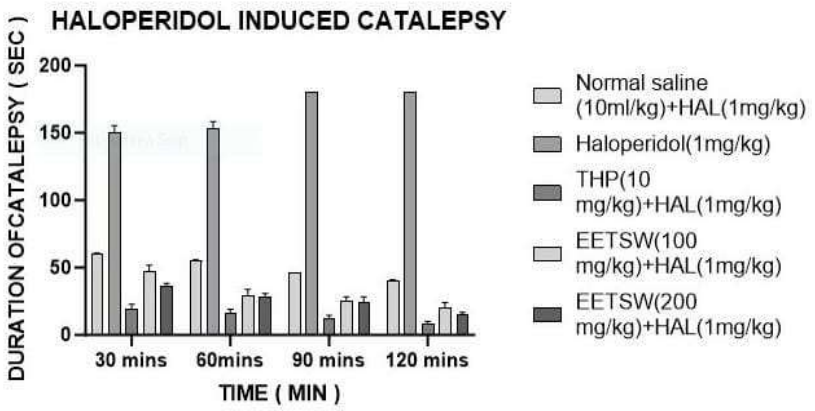
In-vivo antipsychotic activity :

Haloperidol induced catalepsy in mice :

In this study , in Haloperidol treated group prodoced maximum cataleptic activity at 90 & 120 mins I.e., 180 secs. Here Haloperidol is taken as positive control and Trihexyl phenidyl (THP) is taken as negative standard . when mice were treated with THP 30 mins prior to Haloperidol , THP reduced the cataleptic activity similarly the ethanolic extract of Tradescantia spathacea Swartz (EETSW) has showed significant reduction in cataleptic activity dose dependently at 100 mg/kg and 200 mg/kg . Here the ethanolic extract reduced the cataleptic activity induced by haloperidol Significantly ($p > 0.05$) when compared with control group.

Table 3 : Effect of EETSW treatment on Haloperidol induced catalepsy in mice.

S.no	TREATMENT (mg/kg)	CATALEPSY TIME (MEAN ± SEM)			
		30 MINS	60 MINS	90 MINS	120 MINS
1.	Normal saline (10 ml/kg)+ HAL (1)	60±1.82	55± 1.59	46± 1.68	40± 2.13
2.	Haloperidol (1 mg/kg)	150± 5.47****	153 ±5.47****	180 ± 0.00****	180 ± 0.00****
3.	THP (10)+ HAL(1)	19.33 ± 3.45**	16.66 ± 2.69	12.66 ± 1.88**	8.33 ± 1.72**
4.	EETSW (100)+HAL(1)	47 ± 4.74	29 ± 4.74*	25 ± 3.48*	20 ± 4.06*
5.	EETSW (200)+HAL(1)	36 ± 2.39*	28 ± 2.98*	24.66 ± 3.60*	15 ± 1.82**



TAIL SUSPENSION TEST :

Table4 , showed that EETSW significantly reduced the depression like behaviour in Tail suspension test in mice. Here , EETSW significantly reduced the duration of immobility when compared to the control group ($P < 0.0001$) . The higher antidepressant effect seen at EETSW dose at 200 mg/kg. The antidepressant effect of 200

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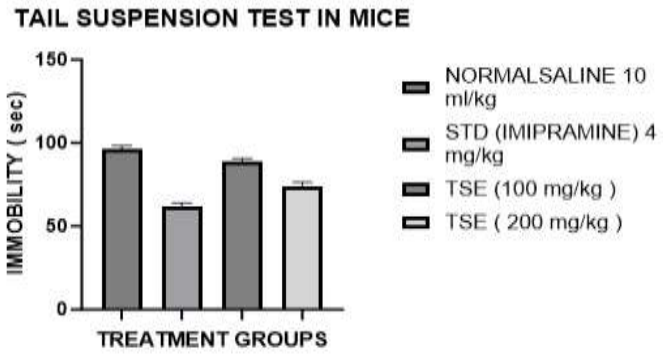
mg/kg EETSWis comparable to the standard Imipramine 4 mg/kg.Imipramine (4 mg/kg) decreased the duration of immobility in tail suspension test in mice compared to control group animals.

Table 4 : The effect of EETSW leaves extract in Tail suspension test in mice .

S.NO	TREATMENT (mg/kg)	IMMOBILITY (sec)
1.	Normal saline 10 ml/kg	96.66 ± 0.66
2.	IMP (4 mg/kg)	61.83 ± 0.83***
3.	EETSW (100 mg/kg)	89.16 ± 0.60***
4.	EETSW (200 mg/kg)	74 ± 0.96***



IV. DISCUSSION :

In the haloperidol induced catalepsy method , Haloperidol is a Typical neuroleptic drug which causes catalepsy I.e., inability to correct the imposed posture.Neuroleptic drugs have an inhibitory action on nigrostriatal dopaminergic system induced catalepsy while neuroleptics with little or no nigrostriatal blockade produce relatively little or no cataleptic behaviour . the EETSW produced no extrapyramidal symptoms as compared to Haloperidol . This may be as a result of selective blockade of D2 receptors i.e., limbic system which confers antipsychotic effects with little or no tendency to produce extrapyramidal sideeffects.

The EETSW significantly decreased the duration of immobility in Tail suspension test in mice when compared with control group . it is observed that higher antidepressant effect of ethanolic extract of Tradescantia spathacea Swartz is seen at 200 mg/kg. EETSW dose dependently reduced the duration of immobility compared to control group .

V. CONCLUSION :

Based on above results obtained , it can be concluded that the EETSW has the potential in decreasing extrapyramidal sideeffects & it also produced antidepressant activity .Further research work is needed to elucidate the mechanistic pathway involved in antipsychotic & antidepressant activity of Ethanolic extract of Tradescantia spathaceae Swartz .

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