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THE ANTIDEPRESSANT ACTIVITY OF AQUEOUS EXTRACT OF WITHANIA COAGULANS FRUITS IN SWISS ALBINO MICE BY TAIL SUSPENSION TEST.

Pharmacology

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ABSTRACT

Objective: To study the anti-depressant activities of aqueous extract of Withania coagulans fruits in Swiss albino mice using tail suspension test.
Materials And Methods: Tail suspension test (TST) was used for assessing the anti-depressive activity of Withania coagulans fruits aqueous extract. If the extract had antidepressant activity, then it was expected that the period of mobility would increase and immobility would decrease. This decrease in immobility, if found statistically significant, was considered for antidepressant activity.
Results: There was statistically significant (p-value < 0.001) association observed between aqueous extract of Withania coagulans fruits with depressive effect on mood in Swiss albino mice by tail suspension test.
Conclusion: The aqueous extract of Withania coagulans fruits did not demonstrate antidepressant activity in Swiss albino mice. In contrast it revealed depressive effect on the mood in the Tail suspension test (TST).

KEYWORDS

Antidepressant, Swiss Albino Mice (SAM), Withania coagulans, Tail suspension test (TST).

INTRODUCTION

The depression interferes with daily life and normal working. It can cause pain for both the person with depression and those who care about him or her. This is called 'depressive disorder,' or 'clinical depression'. Moreover, depression often comes with symptoms of anxiety. These problems can become chronic or recurrent and lead to substantial impairments in an individual's ability to take care of his or her everyday responsibilities. About 350 million people globally are suffering from depression(Marcus, Yasamy, van Ommeren, Chisholm, & Saxena, 2012). The gravity of problem can be understood from the fact that about 1 in 20 people reported had an episode of depression previously(Marcus et al., 2012).

There are numerous allopathic medicines existing for the treatment of depression. However, these medicines cause many adverse effects on human body. Immobility time in mice can be related to the depressive symptoms in humans. However, rise in mobility time is seen clinically with administration of anti-depressive drugs (Petit-Demouliere, Chenu, & Bourin, 2005). Therefore, the phenomenon of tail suspension test can be utilized for determining the effectiveness of anti-depressive drugs.

Withania coagulans is considered as 'vulnerable species'(Pandey, Meena, Padhye, & Singhadiya, 2012). Consequently, not much work is done on this plant to see the outcome on mood. In 1977 Budhiraja et.al, reported Central Nervous System (CNS) depressant action of this herb (Budhiraja, Bala, & Garg, 1977). Afterward very little work was done to discover its CNS activity, though lot of work was done on Diabetes and other diseases. Therefore, it was thought sensible to explore anti-depressive activities of Aqueous Extract of Withania coagulans.

MATERIALS & METHODS

Control, Standard And Test Drugs:

Distilled water was given as vehicle for control. Imipramine was used as the standard drug. The animals were treated 30 min before the experiment with the test drugs (WCFAqE of 200 mg/kg, 500 mg/kg and 1000 mg/kg doses p. o.). However, the test drug was given every day for 30 days throughout the period of experiment. The mice were observed for 5 min. Recordings were done on Day 1, Day 8, Day 15, Day 23 and Day 30 for all the groups. The recordings were taken half an hour after drug administration to the respective group.

Drugs were given in the following manner in both the models of antidepressant activity:

Control: Vehicle (Distilled Water) 2 ml/kg p. o. once a day for 30 days.

Standard: Standard drug (Imipramine) 15mg/kg i. p. once half an hour before test.

AQ-200: WCFAqE 200 mg/kg p. o. once a day for 30 days.

AQ-500: WCFAqE 500 mg/kg p. o. once a day for 30 days.
AQ-1000: WCFAqE 1000 mg/kg p. o. once a day for 30 days.
Where WCFAqE = Withania coagulans fruits aqueous extract

Tail Suspension Test (TST):

Mice were individually suspended 50 cm above the surface of the table with an adhesive tape placed 1 cm from the tip of the tail. After 1 minute acclimatization, immobility duration was recorded for 5 minutes. Mice were considered immobile only when they hung passively and were complete motionless. The index of depression in this experimental model was taken as the immobility duration over a specified period. When an antidepressant drug was administered, it was expected that the period of mobility would increase and immobility would decrease compared to that of control.

RESULTS

Effect of oral administration of WCFAqE on time spent in seconds (Mean±SD) in Mobility and Immobility positions in the Tail Suspension Test. (n = 6 in each group)

		Control	Standard	AQ-200	AQ-500	AQ-1000
Day1	Mobility	132.66±6.08	121.50±24.48	128.33±10.42	146.50±22.97	137.66±17.67
	Immobility	167.33±6.08	178.50±24.48	171.66±10.42	153.50±22.97	162.33±17.67
Day8	Mobility	139.33±7.20	173 ±32.82*	134 ±31.59	134 ±20.37	146 ±64.32
	Immobility	160.66±7.20	127 ±32.82*	166 ±31.59	166 ±20.37	154 ±64.32
Day15	Mobility	145.16±13.07	201.83±9.26***	116.16±9.10***	114.33±7.11***	108.50±6.83***
	Immobility	154.83±13.07	98.16±9.26***	183.83±9.10***	185.66±7.11***	191.50±6.83***
Day23	Mobility	130.50±9.69	224 ±35.44***	89.16±16.14***	84.50±16.35***	75.83±18.17***
	Immobility	169.50±9.69	76 ±35.44***	210.83±16.14***	215.50±16.35***	224.16±18.17***
Day30	Mobility	136.83±14.83	239.33±21.09***	57.83±14.63***	51.33±8.01***	46.50±8.06***
	Immobility	163.16±14.83	60.66±21.09***	242.16±14.63***	248.66±8.01***	253.50±8.06***

* p < 0.05, ** p < 0.01 and *** p < 0.001 when compared to control group

WCFAqE: Withania coagulans fruits aqueous extract.

Mobility: Time spent by mice in active movement.

Immobility: Time spent by mice by staying motionless.

Control: Vehicle (Distilled Water) 2 ml/kg p. o. once a day for 30 days.

Standard: Standard drug (Imipramine 15mg/kg) i. p. half an hour before test.

AQ-200: WCFAqE 200 mg/kg body weight p. o. once a day for 30 days.

AQ-500: WCFAqE 500 mg/kg body weight p. o. once a day for 30 days.

AQ-1000: WCFAqE 1000 mg/kg body weight p. o. once a day for 30 days.

As shown in above Table, on Day 1 and Day 8 there were no statistically significant differences in both the parameters like the average time spent by mice in active movement (Mobility) and average time spent by mice by staying motionless (Immobility) for all the three doses of 200 mg/kg, 500 mg/kg and 1000 mg/kg of WCFAqE compared to control. However, on Day 15, Day 23 and Day 30, there were statistically highly significant differences observed in both the parameters of Mobility and Immobility for all the three doses of 200 mg/kg, 500 mg/kg and 1000 mg/kg of WCFAqE compared to control.

Mobility:
As clarified from the Table, the average mobility period by the mice in the tail suspension test decreased highly significantly ($p<0.001$) on days 15, 23 and 30 for all the three doses of 200 mg/kg, 500 mg/kg and 1000 mg/kg of WCFAqE compared to control. Furthermore, the dose response relationship was observed for this decrease. In contrast, for the standard highly significant increase was observed for the same.

Immobility:
As clarified from the Table, the average immobility period by the mice in the tail suspension test increased highly significantly ($p<0.001$) on days 15, 23 and 30 for all the three doses of 200 mg/kg, 500 mg/kg and 1000 mg/kg of WCFAqE compared to control. Furthermore, the dose response relationship was observed for this increase. On the other hand, for the standard highly significant decrease was observed for the same.

DISCUSSION

Tail suspension test (TST) is the best test for screening of antidepressant drugs(Crowley, Blendy, & Lucki, 2005)**.** Its advantage over forced swim test is that there is no risk of hypothermia due to submersion in water(Thierry, Stéru, Simon, & Porsolt, 1986). The immobility exhibited by mice when subjected to an unavoidable and inescapable stress had been postulated to reflect behavioral despair which is equivalent to depressive disorders in humans. Therefore immobility time is used for assessment of the results(Steru, Chermat, Thierry, & Simon, 1985).

As clarified from the Table, the average immobility period by the mice in the tail suspension test increased highly significantly ($p<0.001$) on days 15, 23 and 30 for all the three doses of 200 mg/kg, 500 mg/kg and 1000 mg/kg of WCFAqE compared to control. Furthermore, the dose response relationship was observed for this increase. In contrast as seen in above Table, opposite effect was observed for mobility period for the above doses of WCFAqE on those days. There are no earlier studies reported which studied the Withania coagulans effect on the TST in mice.

From results of the above test it is obvious that WCFAqE did not display the antidepressant activity on mood. In contrast, they might exhibit the depressant activity on mood. However, TST is used for screening of antidepressant drugs. We cannot extrapolate the depressant effect of the test substance. For this reason the extracts need to be tested on depressant models of rodents.

REFERENCES

1. Budhiraja, R. D., Bala, S., & Garg, K. N. (1977). Pharmacological investigations on fruits of Withania coagulans, Dunal. *Planta Med*, *32*(2), 154–157. https://doi.org/10.1055/s-0028-1097575
2. Crowley, J. J., Blendy, J. A., & Lucki, I. (2005). Strain-dependent antidepressant-like effects of citalopram in the mouse tail suspension test. *Psychopharmacology*, *183*(2), 257–264. https://doi.org/10.1007/s00213-005-0166-5
3. Marcus, M., Yasamy, M. T., van Ommeren, M., Chisholm, D., & Saxena, S. (2012). Depression: A global public health concern. *WHO Department of Mental Health and Substance Abuse*, *1*, 6–8.
4. Pandey, R. P., Meena, S. L., Padhye, P. M., & Singhadiya, M. K. (2012). A review of depleting plant resources, their present status and conservation in Rajasthan, India. *Biological Forum*, *4*(1), 213–230. Satya Prakashan.
5. Petit-Demouliere, B., Chenu, F., & Bourin, M. (2005). Forced swimming test in mice: A review of antidepressant activity. *Psychopharmacology*, *177*(3), 245–255. https://doi.org/10.1007/s00213-004-2048-7
6. Steru, L., Chermat, R., Thierry, B., & Simon, P. (1985). The tail suspension test: a new method for screening antidepressants in mice. *Psychopharmacology*, *85*(3), 367–370.
7. Thierry, B., Stéru, L., Simon, P., & Porsolt, R. D. (1986). The tail suspension test: Ethical considerations. *Psychopharmacology*, *90*(2), 284–285. https://doi.org/10.1007/BF00181261