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A PRELIMINARY STUDY OF EVOLVULUS ALSINOIDES ON LEARNING AND MEMORY IN ALBINO RATS

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ABSTRACT:

One group of Wistar albino rats weighing 150 – 180 gms were intubated with 200 mg/kg body weight of aqueous extract of *Evolvulus alsinoides* per day for 20 days (group - II) and another group of Wister albino rats were intubated with the same dose of alkaline extract of *Evolvulus alsinoides* for 20 days (group - III).Another group of Wister albino rats (group - I) as control. The tests animals as well as the control (group – I) animals were subjected to "Discrimination learning test" in "T" maze. The percentage of correct response and the latency period to reach the goal area were evaluated at the end of 20 days and the same were assessed on the 31st day, 10 days after withdrawing the drug (table-1). *Evolvulus alsinoides*, both aqueous and alkaline extract treated rats exhibited a significantly high percentage of correct response when compared to the control rats. The latency period to reach the goal area of both aqueous and alkaline extract treated rats were reduced significantly when compared to the control rats and this was interpreted as good retention performance. Thus the study shows that both aqueous extract and alkaline extract of *Evolvulus alsinoides* improves learning and memory process in albino rats The percentage of correct response and the latency period to reach the goal area of both the extracts of this plant, *Evolvulus alsinoides* are compared on the 20th day of drug administration and on the 31st day, 10 days after withdrawal of drug (table-2). There is no significant difference in the memory enhancing ability and memory retention between them.

Introduction:

Learning and memory forms an important tool for an organism to interact with the environment, resulting in modification of behavior so as to survive in the environment. **Memory** is the ability to recall a past experience, while **learning** is the ability to change the behavior or develop a new behavior on the basis of memory.[1]

Physiologically memories are established by **changes in the capability of synaptic transmission**[2] from one neuron to the next, as a result of previous neural activity[2]. These result in new pathways called **memory traces (engram)** to develop, for the transmission of signals, through the neural circuits of the brain. They are important because, once established, they can be activated by reinforcement.

A number of medicinal plants are mentioned in ancient Indian literature as '**intelligence promoters'** whose mechanisms of actions were not understood fully. These

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plants are often used by herbal physicians and Ayurvedic vaidyas as intelligence promoters. Some of the examples are, Aswagandha (Withania Somnifera), Malkangani (Celastrus Paniculatus) , Mandookparni(Centella Asiatica[5]) Shankapusphi (Evolvulus alsinoides) and Brahmi (Bacopa Monnieri)[3].

A few studies have been conducted on the memory enhancing ability of various extracts of the plant , **Evolvulus alsinoides**[4,7,8] eventhough studies on the memory enhancing ability of mentat, a combination of extracts of 5 herbal plants were done. In this present study, we are going to study the memory enhancing ability of the aqueous and alcoholic extracts of this plant, **Evolvulus alsinoides**

Evolvulus alsinoides

Evolvulus alsinoides[4], commonly known as Vishnu Krantha in Tamil, Shangapushpi in Hindi, and Morning Glory in English is a perennial herb, growing amidst grass in waste places throughout tropical and subtropical countries. It belongs to Convolvulaceae family [4].

Aim and Objective:

To study and compare the effect of Aqueous and alcoholic extracts of Evolvulus alsinoides on learning and memory in albino rats.

Materials and Methods:

The effects of the aqueous and alcoholic extracts of Evolvulus alsinoides on learning and memory was studied experimentally in **Wistar strain** male albino rats. Experimental animals were all healthy and weighed about 150-180grams. The animals were maintained under common laboratory condition and were allowed to have food and water under standard condition. The rats were divided into three groups,

Group-I as control rats, 15 in number
Group-II, Test rats treated with aqueous extract of Evolvulus alsinoides in the dose of 200 mg/kg body weight/day, 15 in number

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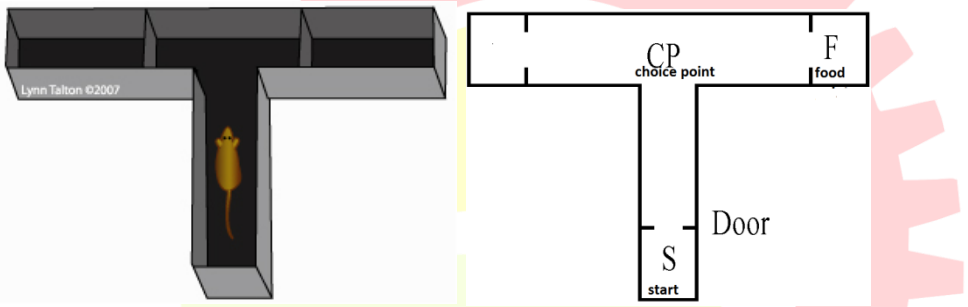
Group-III. Test rats treated with alcoholic extract of Evolvulus alsinoides in the dose of 200 mg/kg body weight/day as a single dose 15 in number. The extracts were given intragastrically.

The animals were subjected to discrimination learning in T- maze[6]. Here, the animal distinguishes between two symmetric stimulus response sets. **The right and left discrimination** was employed. This was done under appetite motivation. All 3 group rats were trained in T maze daily after 24 hours fast. S is the starting point of the animal, which reaches the choice point from where it goes to either right or left. Food was placed in the right goal area and was maintained throughout the study.



The test rats as well as the control rats were assessed on the 20th day individually for the number of correct response out of 10 trials and the latency period to reach the goal area from the starting point (table-1,). The **percentage of correct response** was evaluated by using the formula, **number of correct response x 100 / 10**. Latency period is the time taken for the rat to reach the goal from the start. The test rats were given the extracts throughout the period of 20 days as explained earlier. The extracts were not given to the test rats from 21st day onwards. The rats were assessed again on the 31st day, (table-2) to see whether these rats develop good retention of memory[7,8].

Results:

Table: 1 20th day of administration of drug

Percentage of correct response for 10 trial			latency period to reach the goal (in sec)		
Group-I (Control rats)	Group-II (Aqueous extract treated rats)	Group-III (Alcoholic extract treated rats)	Group-I (Control)	Group-II (Aqueous extract treated rats)	Group-III (Alcoholic extract treated rats)
80	90	100	40	25	24
70	90	90	38	28	26
80	100	90	35	24	24
70	90	90	44	30	27
70	90	100	42	23	29
70	90	90	37	27	24
80	100	100	39	26	22
70	90	90	45	22	25

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80	90	100	40	25	24
70	90	90	38	28	26
80	100	90	35	24	24
70	90	90	44	26	27
80	90	100	42	23	25
80	90	90	37	27	23
70	100	100	39	22	21
74.67 ± 5.16	92.67 ± 4.58	94 ±5. 07	39.67 ±3.17	25.33± 2.38	24.56± 1.98

Mean and SD were given

Table: 2 31st day of drug administration

Percentage of correct response for 10 trial			latency period to reach the goal (in sec)		
Group-I (Control rats)	Group-II (Aqueous extract treated rats)	Group-III (Alcoholic extract treated rats)	Group-I (Control)	Group-II (Aqueous extract treated rats)	Group-III (Alcoholic extract treated rats)
80	100	100	35	23	22
70	100	100	43	22	24
70	90	90	37	26	20
70	90	90	40	25	24
80	90	100	42	21	21
80	100	90	39	23	20
70	90	90	34	24	23
80	100	100	32	22	25
70	90	100	40	23	23
80	0	100	34	25	22
70	90	90	39	22	24
80	90	100	38	26	22
70	100	90	40	24	23
80	90	100	39	23	22
80	90	90	38	20	24
75.33 ± 5.16	93.33 ± 4.88	95.33 ± 5.16	37.6±3.46	23.95 ± 2.11	22.63±1.45

Mean and SD were given

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Table-3 20th day of administration 31st day, 10 days withdrawal

Rat groups	Percentage of correct response	Latency period in sec	Percentage of correct response	Latency period in sec
Group-I(Control)	74.67 ± 5.16	39.67 ±3.17	75.33 ± 5.16	37.6±3.46
Group-II (Aqueous extract treated rats)	92.67 ± 4.58**	25.33± 2.38**	93.33 ± 4.88**	23.95 ± 2.11**
Group-III (Alcoholic extract treated rats)	94 ± 5.07**	24.56± 1.98 **	95.33 ± 5.16**	22.63±1.45**

** Statistically significant

All the datas were analysed by Anova for significance
P < 0.01 – Group-I (Control) Vs Group-II (Aqueous extract treated rats)
P < 0.01 – Group-I (Control) Vs Group- III (Alkaline extract treated rats)

Table-4 20th day of administration 30th day, 10 days withdrawal

Rat groups	Percentage of correct response	Latency period in sec	Percentage of correct response	Latency period in sec
Group-II (Aqueous extract treated rats)	92.67 ± 4.58	25.33± 2.38	93.33 ± 4.88	23.95 ± 2.11
Group-III (Alcoholic extract treated rats)	94 ± 5.07 P=0.4835	24.56± 1.98 P=0.3766	95.33 ± 5.16 P=0.4065	22.63±1.45 P=0.3467

All the datas were analysed by Anova for significance

P > 0.01 – not significant

Discussion:

The results of the discrimination learning tests shows that both the aqueous extract of Evolvulus alsinoides and alcoholic extract of Evolvulus alsinoides (table-3) exhibited **a significantly high percentage of correct response** and **decreased latency period** while comparing to control rats on the 20th day of drug administration. This shows the memory enhancing ability of both aqueous and alcoholic extracts of the plant Evolvulus alsinoides [9,10].

After withdrawal of the drug for 10 days, on the 31st th day, the test rats treated with the aqueous extract and alcoholic extract of Evolvulus alsinoides were subjected to the same test, exhibited **a significantly high percentage of correct response** and **decreased latency period (**(table-3) while comparing to control rats. This is interpreted as good retention of memory of both these extracts.

The percentage of correct response and the latency period to reach the goal area of the test rats treated with aqueous extract of the Evolvulus alsinoides and alcoholic extract of Evolvulus alsinoides were compared on the 20th day of drug administration(table-4) and on the 31st day , 10 days after withdrawal of drugs (table- 4). There is **no significant difference in the memory enhancing ability and memory retention of both aqueous and alcoholic extracts of Evolvulus alsinoides** (table- 4).

From our present study, we can understand that **both aqueous** and **alkaline extracts** of Evolvulus alsinoides **enhances memory** and there is **no significant difference** in the **memory enhancing ability and memory retention of both aqueous and alcoholic extracts of Evolvulus alsinoides**

Conclusion:

Thus the present study confirms the memory enhancing ability of both aqueous and alcoholic extracts of the plant Evolvulus alsinoides and there is no significant difference in their memory enhancing ability and memory retention.

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