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COMPARATIVE STUDY ON THE EFFECTS OF AQUEOUS EXTRACTS OF EVOLVULUS ALSINOIDES AND CENTELLA ASIATICA ON LEARNING AND MEMORY IN ALBINO RATS

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ABSTRACT:

The effect of the aqueous extract of Evolvulusalsinoides and aqueous extract of Centellaasiatica on learning and memory in albino rats was studied experimentally in **Wistar strain** male albino rats, all healthy and weighed about 150-180 grams. Group-l, control rats, 15 in number. Group-ll, treated with aqueous extract of Evolvulusalsinoides, 200 mg/kg body weight/day as a single dose, 15 in number, Group-lll treated with aqueous extract of Centellaasiatica, 200 mg/kg body weight/day as a single dose, 15 in number. The extracts are given intragastrically.

All 3 group rats were trained in T maze for discrimination learning daily after 24 hours fast. 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. The percentage of correct response was evaluated by using the formula, **number of correct response x 100 / 10**. The test rats were given the extracts throughout this period of 20 days. The extracts are not given to the test rats from 21st day onwards. The rats were assessed again on the 30th day to see whether they have retention of memory.

The results of the discrimination learning tests shows that both the aqueous extracts of Evolvulusalsinoides (table-1) and Centellaasiatica (table-2) exhibited **a significantly high percentage of correct response** and **decreased latency period** while comparing to control rats. This shows the memory enhancing ability of the aqueous extracts of these plants. After withdrawal of the drug for 10 days, the test rats and control rats are subjected to the same test. The test rats still exhibited **a significantly high percentage of correct response** and **decreased latency period ((**table-3, 4) while comparing to control rats. This was interpreted as good retention of memory.

The percentage of correct response and the latency period to reach the goal area of both the extracts of the plants, Evolvulusalsinoides and Centellaasiatica are compared on the 20th day of drug administration (table-5) and on the 30th day, 10 days after withdrawal of drugs(table-6). There is **no significant difference in the memory enhancing ability of the aqueous extract of Centellaasiatica and the aqueous extract of Evolvulusalsinoides.**

Introduction:

Learning and memory forms an important tool for an organism to interact with the environment,

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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** 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 are not understood fully. These plants are often used by herbal physicians and Ayurvedicvaidyas as intelligence promoters. Some of the examples are, Aswagandha (WithaniaSomnifera), Malkangani (CelastrusPaniculatus) , Mandookparni(CentellaAsiatica) Shankapusphi (Evolvulusalsinoides) and Brahmi (BacopaMonnieri)[3].

A few studies have been conducted on the memory enhancing ability of aqueous extracts of the plants,**Evolvulus alsinoides[7,8] and Centella Asiatica[9,10].**In this present study, we are going to compare the memory enhancing ability of the aqueous extracts of these plants.

Evolvulusalsinoides

Centellaasiatica

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].

Centella asiatica[5,] commonly Mandukaparni in Sanskrit, Vallarai in Tamil, is a small, herbaceous, annual plant of the family Mackinlayaceae and is native of India, Sri Lanka, northern Australia, Indonesia, Iran, Malaysia, Melanesia, Papua New Guinea, and other parts of Asia.

Aim and Objective:

To compare the effect of the aqueous extracts of Evolvulusalsinoides and Centellaasiatica on learning and memory in albino rats.

Materials and Methods:

The effect of the aqueous extracts of Evolvulusalsinoides and Centellaasiatica 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-l as control rats, 15 in number; Group-ll as test rats, 15 in number, treated with aqueous extract of Evolvulusalsinoides, in the dose of 200 mg/kg body weight/day as a single dose; Group-lll as test rats 15 in number, treated with aqueous extract of Centellaasiatica in the dose of 200 mg/kg body

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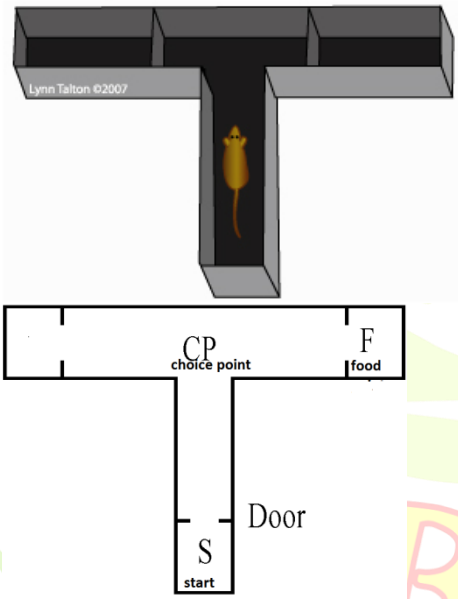
weight/day as a single dose. The extracts are given intragastrically.

The animals are subjected to discrimination learning in T- maze[6]. Here, the animal distinguishes between two symmetric stimulus response sets. **The right and left discrimination** is 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, 2). 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 are not given to the test rats from 21st day onwards. The rats were assessed again on the 30th day, (table-3and 4) to see whether these rats have retention of memory.

Results:

Table -1 (20th day of drug administration) EA is Evolvulusalsinoides

Rat groups	Percentage of correct response	Latency period in sec
Group-l (Control)	70.67 ± 9.61	31.60 ± 2.38
Group-ll (EA treated rats)	86.67 ± 8.17**	23.33 ± 3.11**

** Statistically significant P = < 0.01
P = < 0.01

EA = aqueous extract of Evolvulusalsinoides

Table-2 (20th day of drug administration)

Rat groups	Percentage of correct response	Latency period in sec
Group-l (Control)	70.67 ± 9.61	31.60 ± 2.38
Group-lll (CA treated rats)	91.33 ± 6.40**	21.87 ± 1.41**

** Statistically significant P= < 0.01
P= < 0.01

CA = aqueous extract of Centellaasiatica

Table – 3 (30th day, 10 days withdrawal of drug)

Rat groups	Percentage of correct response	Latency period in sec
Group-l (Control)	71.33 ± 7.43	29.27 ± 2.28
Group-ll (EA treated rats)	87.33 ± 7.99**	22.93 ± 2.60**

** Statistically significant P= <0.01
P= < 0.01

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Table- 4 (30th day, 10 days withdrawal of drug)

Rat groups	Percentage of correct response	Latency period in sec
Group-l (Control)	71.33 ± 7.43	29.27 ± 2.28
Group-lll (CA treated rats)	92 ± 6.76**	22.2 ± 1.15**

** Statistically significant P= < 0.01 P= < 0.01

Table-5 (20th day of drug administration)

Rat groups	Percentage of correct response	Latency period in sec
Group-ll (EA treated rats)	86.67 ± 8.17	23.33 ± 3.11
Group-lll (CA treated rats)	91.33 ± 6.40	21.87 ± 1.41

P = 0.0936 (not significant) P = 0.1137 (not significant)

Table – 6 (30th day, 10 days withdrawal of drug)

Rat groups	Percentage of correct response	Latency period in sec
Group-ll (EA treated rats)	87.33 ± 7.99	22.93 ± 2.60
Group-lll (CA treated rats)	92 ± 6.76	22.2 ± 1.15

P = 0.0953 (not significant) P = 0.3323 (not significant).

Discussion:

The Results of the discrimination learning tests shows that both the aqueous extracts of Evolvulusalsinoides (table-1) and Centellaasiatica (table-2) 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 the aqueous extracts of the plants, Evolvulusalsinoides and Centellaasiatica. 7,8,9,10.

After withdrawal of the drug for 10 days , the test rats treated with the aqueous extracts of Evolvulusalsinoides and that of Centellaasiatica are subjected to the same test , exhibited **a significantly high percentage of correct response** and **decreased latency period ((**table-3,&4) while comparing to control rats. This was interpreted as good retention of memory of these extracts.

The percentage of correct response and the latency period to reach the goal area of the aqueous extracts of the plants, Evolvulusalsinoides (table-5) and Centellaasiatica (table-6) are compared on the 20th day of drug administration and on the 30th day , 10 days after withdrawal of drugs. There is **no significant difference in the memory enhancing ability of the aqueous extract of Centellaasiatica and aqueous extract of Evolvulusalsinoides**(table5, 6).

Conclusion:

Thus the present study confirms the memory enhancing ability of aqueous extracts of both the plants Evolvulusalsinoides(aqueousextract) and Centellaasiaticaand there is no significant difference in their memory enhancing ability.

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