

ANTI-AMNESIC ACTIVITY OF *ACACIA NILOTICA* ON SCOPOLAMINE-INDUCED AMNESIA IN EXPERIMENTAL ANIMALS

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ABSTRACT

The present study was undertaken to evaluate the anti-amnesic activity of the ethanolic extract of *Acacia nilotica* bark against scopolamine-induced amnesia in Swiss albino mice. Phytochemical screening revealed the presence of alkaloids, flavonoids, tannins, glycosides, saponins, and terpenoids. Memory and learning were assessed using the Elevated Plus Maze, Morris Water Maze, Passive Avoidance Test, and Novel Object Recognition Test. Treatment with the extract significantly improved cognitive performance compared to the scopolamine-induced group ($p < 0.0001$). The higher dose (75 mg/kg) produced greater improvement and showed effects comparable to the standard drug piracetam. The findings suggest that the ethanolic extract of *Acacia nilotica* possesses significant anti-amnesic and memory-enhancing activity.

Keywords: *Acacia nilotica*, Anti-amnesic activity, Scopolamine, Memory, Cognitive function.

INTRODUCTION

Memory is one of the brain's most important functions. It allows us to store past experiences and use them to respond better to our surroundings. In this way, memory plays a key role in learning, adaptation, and survival¹. The word amnesia comes from the Greek roots a- (without) and mnesis (memory). It is generally defined as a significant loss of memory caused by brain injury, illness, or the effects of drugs and alcohol. Individuals with amnesia may struggle to remember past experiences, previously learned information, and may also have difficulty in forming new memories or learning new skills². Amnesia is broadly classified into several types based on the underlying cause and pattern of memory impairment, including anterograde, retrograde, transient global, post-traumatic, infantile (childhood), dissociative (psychogenic), and drug-induced amnesia. **Anterograde amnesia** is characterized by the inability to form new memories after the onset of the disorder, whereas **retrograde amnesia** involves the loss of previously stored memories. Transient global amnesia is a temporary condition characterized by the sudden onset of memory loss that usually resolves within 24 hours. **Post-traumatic amnesia** occurs following brain injury and is associated with confusion and impaired memory. **Dissociative**

(psychogenic) amnesia results from severe psychological stress or trauma rather than structural brain damage. **Infantile amnesia** refers to the inability to recall memories from early childhood, while **drug-induced amnesia** occurs as a consequence of medications or substances that interfere with memory processes³. Among experimental models, scopolamine-induced amnesia is widely used to evaluate cognitive impairment. Scopolamine, a muscarinic acetylcholine receptor antagonist, disrupts central cholinergic neurotransmission, producing reversible learning and memory deficits similar to those observed in dementia and Alzheimer's disease. Therefore, scopolamine-induced amnesia is widely used as an experimental model for evaluating the anti-amnesic potential of novel therapeutic agents^{4,5}.

Acacia nilotica Linn., commonly known as Babul or Kikar, has been used for centuries in Unani and other Indian systems of medicine for preventing and treating various ailments. It was first described by Linnaeus in 1773 and belongs to the family Fabaceae, one of the largest plant families with about 1,350 species. *A. nilotica* is widely distributed across tropical and warm temperate regions of Asia, Africa, Australia, and America. The plant contains a variety of phytoconstituents such as alkaloids, essential oils, phenols, glycosides, and terpenes, which contribute to its therapeutic effects. Traditional reports highlight its rich nutritional and medicinal value, capable of preventing and managing several infectious and degenerative conditions. Experimental studies in animal models have confirmed its antibacterial, anti-inflammatory, antidiabetic, anticancer, and antihypertensive properties. Additionally, *A. nilotica* is considered a safe medicinal plant that exerts multiple therapeutic benefits with minimal adverse effects^{6,7}. Therefore, the present study was undertaken to evaluate the anti-amnesic activity of the ethanolic bark extract of *Acacia nilotica* against scopolamine-induced amnesia in Swiss albino mice using behavioral models of learning and memory.

MATERIALS AND METHODS

Collection and Authentication of Plant:

The bark of *Acacia nilotica* was collected from a regional farm in Amravati District, Maharashtra, India. The collected plant material was identified and authenticated by Dr. Bansod, Department of Botany, Vidyabharati Mahavidyalaya, Amravati. The bark was cleaned, shade dried, and stored in an airtight container for further experimental studies.

Experimental Animals:

Swiss albino mice of either sex weighing 25–30 g were obtained from the animal house of the Department of Pharmacology, Vidyabharati College of Pharmacy, Amravati (CPCSEA Registration No. 1504/PO/RE/S/11/CPCSEA). The animals were acclimatized to laboratory conditions prior to the experiment. They were housed in cages under standard environmental conditions with a 12 h light/12 h

dark cycle at a temperature of $25 \pm 1^\circ\text{C}$ and relative humidity of 50–55%. The animals were provided with standard pellet diet and water ad libitum. All experimental procedures were carried out in accordance with the guidelines of the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) after approval from the Institutional Animal Ethics Committee (IAEC). The care and handling of animals were performed according to internationally accepted ethical guidelines for laboratory animal use and care.

Instruments and Equipments:

Digital balance, Morris water maze apparatus, Elevated plus maze apparatus, Passive avoidance apparatus and object recognition test apparatus etc.

Drugs and Chemicals:

Scopolamine is obtained from (Yarrow Chem Products) and Piracetam nootropic drug from medical stores, Amravati.

Preparation of Doses:

The ethanolic extract of *Acacia nilotica* bark was suspended in 1% carboxymethyl cellulose (CMC) solution and administered orally at doses of 25 mg/kg and 75 mg/kg which were selected based on a previous acute toxicity study and Fresh suspensions were prepared daily before administration to ensure uniformity and stability of the extract. Scopolamine hydrobromide was dissolved in normal saline and administered intraperitoneally at a dose of 1 mg/kg to induce amnesia in experimental animals.

Preparation of Ethanolic Extract:

The bark of *Acacia nilotica* was collected, shade dried, and coarsely powdered. The powdered material was subjected to extraction using 70% ethanol in a Soxhlet apparatus for 24–48 hours until the solvent in the siphon tube becomes colorless. The obtained extract was concentrated under reduced pressure using a rotary evaporator and dried to yield a crude solid mass. The dried extract was stored in an airtight container at 4°C until further use. For pharmacological evaluation, the required dose of the extract will be freshly suspended in 0.5% carboxymethylcellulose (CMC) solution and administered to experimental animals.

Phytochemical Screening:

The Ethanolic extract of *Acacia nilotica* undergoes different phytochemical tests for identification of different phytochemical such as Flavonoids, Alkaloids, Tannins, Terpenoids etc.

A) Test for Alkaloids:

1. Mayer's Test: 1ml of extract in 1ml of Mayer's reagent (potassium mercuric iodide solution), Whitish yellow or cream colour precipitate observed, which shows the presence of alkaloid.

2. Wagner's Test: 1ml extract in 2ml of Wagner's reagent (iodine in potassium iodide). Formation of reddish brown precipitate, which shows the presence of alkaloid.

3. Dragendroff's Test: 1 ml of extract in 1ml of Dragendroff's reagent (potassium bismuth iodide solution). Reddish orange precipitate was observed, which shows the presence of alkaloid.

B) Test for Tannins:

Ferric Chloride Test :- About 0.5g of the dried powdered sample were boiled in 20ml of distilled water in a test- tube and then filtered. A few drops of 0.1% ferric chloride added and observed for brownish green or a blue- black coloration.

C) Test of Flavonoids: 1ml of extract + few drops of dil. NaOH was added. An intense yellow colour was produced which become colourless on addition of few drop of dil. HCl, indicate presence of flavonoids.

D) Test for Terpenoids :

Salkowski Test : Five ml of each extract was mixed with 2 ml of chloroform, and 3 ml concentrated H₂SO₄ was carefully added to form a layer. A reddish brown coloration of the interface was formed to show positive results for the presence of terpenoids.

E) Test for Glycosides:

Borntrager's Test: Take 2 ml of filtered hydrolyte, 3 ml of chloroform is added and shaken, chloroform layer is separated and 10% ammonia solution is added to it. Pink color indicates presence of glycosides.

F) Test for Saponin:

Foam Test: The extract (50 mg) is diluted with distilled water and made up to 20 ml. The suspension is shaken in a graduated cylinder for 15 minutes. A two cm layer of foam indicates the presence of Saponin⁸.

Treatment Protocol:

In each model the animals will be divided into 5 groups Containing six animals each.

Table No. 1:

Sr.No.	Groups	No. of Animals	Treatment and Dose	Route of Administration
1.	I (Control Group)	6	Saline treatment	IP
2.	II (Inducing Group)	6	Scopolamine (1mg/kg)	IP
3.	III (Standard Group)	6	(Piracetam, 200 mg/kg)+ Scopolamine (1mg/kg)	IP
4.	IV (Treatment 1)	6	EEAN (25mg/kg) + scopolamine (1mg/kg)	IP and Oral
5.	V (Treatment 2)	6	EEAN (75 mg/kg) + scopolamine (1mg/kg)	IP and Oral
EEAN: Ethanolic extract of <i>Acacia nilotica</i>			I.P : Intraperitoneal	

Experimental Procedure:

Swiss albino mice (25–30 g) of either sex will be used and randomly divided into Five groups. Each group contain six animals and total Thirty animals where used. The first group was the control group, which was given normal saline for 14 days; Mice in the second group received an inducing agent Scopolamine [1mg/kg] by intra-peritoneal route. While Mice in the third group, called as standard group received Scopolamine [1mg/kg] and Piracetam [200mg/kg] by intra-peritoneal route . The animals of the fourth, fifth group had Scopolamine [1mg/kg] + low dose extract of *Acacia nilotica*[25mg/kg] and Scopolamine [1mg/kg] + High dose extract of *Acacia nilotica*[75mg/kg] for 14 days respectively. In this model, amnesia is induced by administering scopolamine hydrobromide (1 mg/kg, intraperitoneally, i.p.) to mice, 30 minutes prior to behavioral testing. This dose reliably produces memory impairment without causing severe locomotor or systemic toxicity. Cognitive performance is then assessed using established behavioral paradigms such as the Elevated Plus Maze (EPM), Passive Avoidance Test, Morris Water Maze, or Novel Object Recognition Test. Improvement in performance following treatment with test extract or standard drug (e.g., Piracetam 200 mg/kg i.p.) indicates anti-amnesic potential.

10) Behavioural Tests:

Elevated Plus Maze Model: The elevated plus maze served as the exteroceptive behavioral model (where in stimulus existed outside the body) to evaluate learning and memory in mice. The apparatus consists of two open arms (16 cm x 5 cm) and two covered arms (16 cm x 5 cm x 12 cm). The arms extended from a central platform (5 cm x 5 cm), and maze is elevated to a height of 25 cm from the floor. On the first day of training session i.e (14th day), each mouse was placed at the end of open arm, facing away from the central platform. Transfer latency (TL) was taken as the time taken by mouse to move into one of the covered arm with all its four legs. TL was recorded on the first day. If the animal did not enter into one of the covered arms within 90 sec, it is gently pushed into one of the two covered arms and the TL was assigned as 90 seconds. The mouse was allowed to explore the maze for 10 seconds and then returned to its home cage. Memory retention was examined on the second day i.e (15th day), 24 hours after the first day's trial ^{9,10}.



Figure 1. Elevated Plus Maze Apparatus

Morris Water Maze Test: Briefly, MWM consisted of a circular pool (150 cm in diameter, 45 cm in height) filled to a depth of 30 cm with water maintained at 25°C. The water was made opaque with non-toxic white colored dye. The tank was divided into four equal quadrants with the help of two threads, fixed at right angle to each other on the rim of the pool. A submerged platform (10 cm²), painted in white was placed inside the target quadrants (Q4 in present study) of this pool 1 cm below surface of water. The position of platform was kept unaltered throughout the training session. The mice try to find the safe place in the pool and climb the platform to escape from the necessity of swimming. To assess the learning

potential of the mouse with a maximum time of 120 s (cut-off time) to find the hidden platform and the animals is allowed to stay on it for 30s. This time taken by the mouse to climb on platform was considered as EL(Escape latency) ¹¹.



Figure 2. Morris Water Maze test

Passive Avoidance Test: Passive avoidance test apparatus consist of (27-27-27) having three walls of wood and one wall of plexiglass. featuring a grid floor (3 mm. of stainless steel rods set 8 mm apart) with a wooden platform (10-7-1.7) in the center of grid floor. The box is illuminated with 15 w during the experimental period. Electric shock (20 v AC) was delivered to the grid floor. Passive avoidance behavior based on negative reinforcement was used to examine the long term memory. Training was carried out in two similar sessions. Each mouse gently placed on the wooden platform set in the center of the grid floor. When the mouse stepped down and placed all it's paw's on the grid floor. Shock was delivered for 15 s and step down latency was recorded. SDL was defined as the time taken by the mouse to step down from wood platform to grid floor with all it's paws. Animals showing SDL in the range (2-15 s) during the test were used for the second session and the retention test. The second session was carried out after 90 min. of first test. When the animals stepped down before 60 s. electric shock was delivered for 15 sec. During the second test, the animals removed from the shock free zone if they did not step down for 60 s. Retention was tested after 24 h in a similar manner, except that the electric shocks was not applied to the grid floor. Each mouse again placed on the platform and the SDL was recorded with upper cutoff time 300s ¹².



Figure 3. Passive Avoidance test Apparatus

Novel Object Recognition Test: Object recognition apparatus consist open white colored plywood box (70×60×30 cm.) with a well furnished floor. The box is illuminated by 60 w lamp suspended above the box. The object to be discriminated made of plywood in two different shape of 8 cm and colored black and white. The object recognition test is a behavioral test that is widely used to examine animal's memory performance. Memory performance in the ORT is based on the natural tendency of animals to explore novel objects. The day before the test, mice was given habituation session where they were left to freely exploring the box for 2 min. No object was placed in the box during the habituation trial. On the day of test, two identical objects were presented in two opposite corner of the box during the first trial (T₁), and the amount of time taken by each mouse to complete 20 s of object and/or touching it with nose or forepaw. Turning around or sitting on the object was not considered as an exploratory behavior During the second trial (T₂ 90 min. after T₁) one of the objects presented in the T₁ (i.e familiar objects) was replaced by new object and mice was left in box for 5 min. The time spent (s) for exploration of the familiar (F) and new (N) object was recorded and discrimination index was calculated ¹³.

$$\text{Discrimination Index} = \frac{N-F}{N+F}$$

Where,

N= Exploration of the new object

F- Exploration of the familiar object



Figure 4. Novel Object Recognition Test

Statistical Analysis:

Data were expressed as Mean $\pm$ SEM. Statistical analysis was performed using GraphPad Prism version 11. Two-way ANOVA followed by Dunnett's multiple comparison test was used for EPM and MWM data, whereas One-way ANOVA followed by Dunnett's test was used for PAT and NORT data. A value of $p < 0.05$ was considered statistically significant.

RESULTS:

Phytochemical Screening:

Phytochemical testing carried out to find out the secondary metabolite because secondary metabolic possess biological activity. Phytochemical studies of *Acacia nilotica* performed for the presence of Terpenoids, Glycosides, Alkaloids, Saponins, Tannins, Flavonoids etc.

Sr.no.	Chemical constituents	Name of the test	Result
1.	Alkaloids	Mayer's Test	+
		Wagner's Test	
		Dragendroff's Test	
2.	Saponin	Foam test	+
		Alkaline reagent test	
3.	Flavonoids		+
4.	Glycosides	Borntrager's test	+
5.	Tannins	Ferric chloride test	+
6.	Terpenoids	Salkowski test	+

2) Behavioural Testing:

Elevated Plus Maze Test:

Table No. 3: Effect of Ethanolic Extract of *Acacia nilotica* on transfer latency(in sec)

Groups	Initial Transfer Latency in sec			Retention Transfer Latency in sec
	Day 1	Day 7	Day 14	Day 15
Control	47.50 ± 0.43	39.33 ± 0.49	31.33 ± 0.49	39.00 ± 0.97
Induced	46.50 ± 0.62	40.67 ± 0.61	35.33 ± 0.33	50.50 ± 1.89
Standard	48.50 ± 0.43	33.00 ± 0.52	24.33 ± 0.92	21.83 ± 0.31
Treatment 25 mg/kg [EEAN]	48.33 ± 0.49	37.00 ± 0.37	31.00 ± 0.93	32.00 ± 0.58
Treatment 75 mg/kg [EEAN]	47.50 ± 0.43	35.00 ± 0.37	27.50 ± 0.56	25.17 ± 0.70

All values were expressed as Mean ± SEM, (n = 6), (****p < 0.0001) compared with each group at different days (1, 7, 14 and 15), followed by Two-way ANOVA using Dunnett's test.

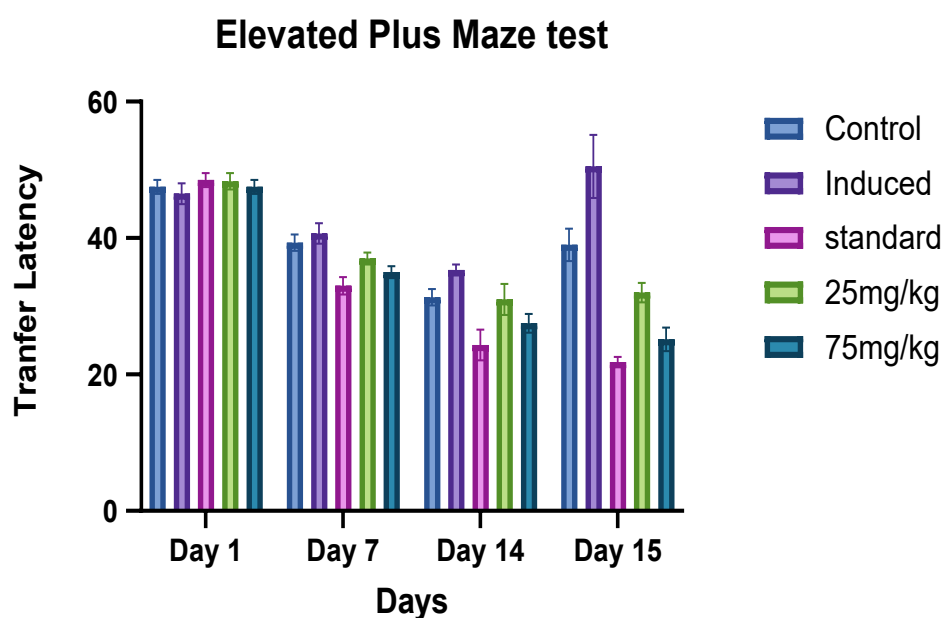


Figure 5. Effect of Ethanolic Extract of *Acacia nilotica* on transfer latency (in sec).

The effect of different treatments on transfer latency in the Elevated Plus Maze test was evaluated using Two-way ANOVA followed by Dunnett's multiple comparison test, comparing all treatment groups with the induced group. The analysis revealed a statistically significant difference among the groups ($p < 0.0001$), indicating significant improvement in learning and memory following treatment. The induced group showed increased transfer latency compared to the control group, confirming successful induction of cognitive impairment. Treatment with the standard drug significantly decreased transfer latency compared to the induced group ($p < 0.0001$), demonstrating potent anti-amnesic activity. Both treatment doses (25 mg/kg and 75 mg/kg) also significantly reduced transfer latency compared to the induced group ($p < 0.0001$), suggesting effective memory-enhancing activity. Among the treatment groups, the 75 mg/kg dose showed greater improvement than the 25 mg/kg dose, indicating a dose-dependent effect. The ethanolic extract of *Acacia nilotica* exhibited significant anti-amnesic activity comparable to the standard drug.

Morris Water Maze Test:

Table No.4 : Effect of Ethanolic Extract of *Acacia nilotica* on escape latency(in sec)

Groups	Escape Latency in sec Acquisition Latency			Escape Latency in sec Retention Latency
	Day 1	Day 7	Day 14	Day 15
Control	47.50 ± 0.76	38.67 ± 0.84	27.67 ± 0.33	17.17 ± 0.31
Induced	49.83 ± 0.60	40.83 ± 0.60	29.83 ± 0.70	28.00 ± 0.58
Standard	45.50 ± 0.43	32.83 ± 0.60	21.83 ± 0.48	12.00 ± 0.37
Treatment 25				
mg/kg	48.50 ± 0.43	36.50 ± 0.43	25.50 ± 0.43	19.17 ± 0.48
[EEAN]				
Treatment 75				
mg/kg	47.50 ± 0.43	34.50 ± 0.43	23.50 ± 0.43	13.67 ± 0.42
[EEAN]				

All values were expressed as Mean ± SEM, (n = 6), (**** $p < 0.0001$) compared with each group at different days (1, 7, 14 and 15), followed by Two-way ANOVA using Dunnett's test.

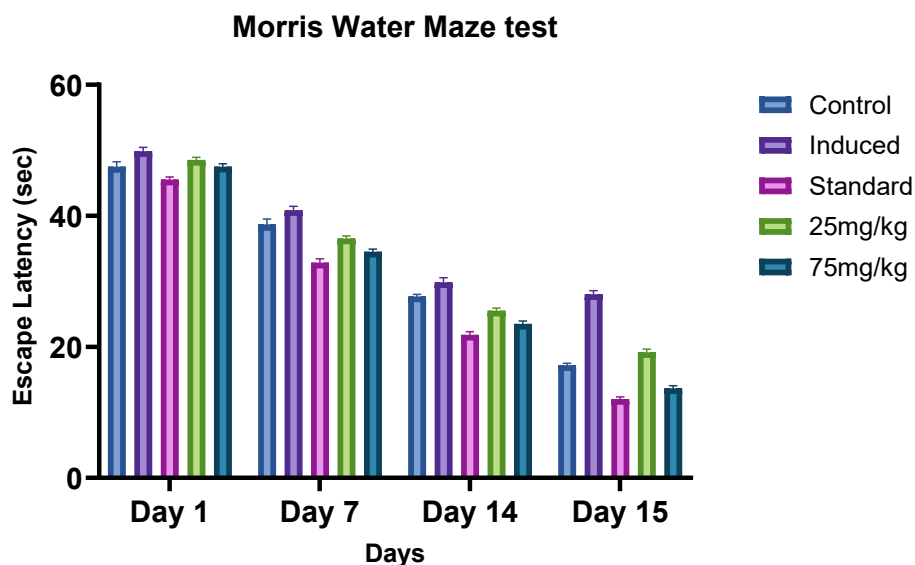


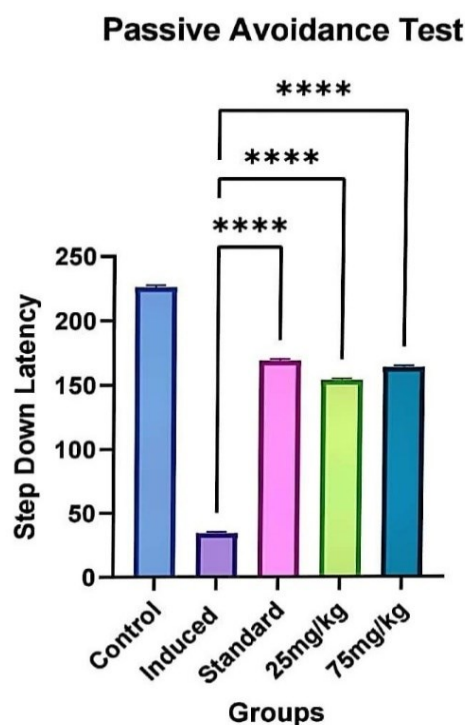
Figure 6 . Effect of Ethanolic Extract of *Acacia nilotica* on escape latency (in sec)

The effect of different treatments on escape latency in the Morris Water Maze test was evaluated using Two-way ANOVA followed by Dunnett's multiple comparison test, comparing all treatment groups with the induced group. The analysis revealed a statistically significant difference among the groups ($p < 0.0001$), indicating significant improvement in spatial learning and memory following treatment. The induced group showed increased escape latency compared to the control group, confirming successful induction of cognitive impairment. Treatment with the standard drug significantly decreased escape latency compared to the induced group ($p < 0.0001$), demonstrating potent anti-amnesic activity. Both treatment doses (25 mg/kg and 75 mg/kg) also significantly reduced escape latency compared to the induced group ($p < 0.0001$), suggesting effective memory-enhancing activity. Among the treatment groups, the 75 mg/kg dose showed greater improvement than the 25 mg/kg dose, indicating a dose-dependent effect. The ethanolic extract of *Acacia nilotica* exhibited significant anti-amnesic activity comparable to the standard drug.

Passive Avoidance Test:**Table No. 5 : Effect of Ethanolic Extract of *Acacia nilotica* on step-down latency (in sec)**

Group	Step-down latency Mean $\pm$ SEM (sec)	% of Control
Control	226.17 $\pm$ 0.60	100
Induced	34.50 $\pm$ 0.43	15.25
Standard	169.00 $\pm$ 0.58	74.73
Treatment (25mg/kg) [EEAN]	154.00 $\pm$ 0.58	68.09
Treatment (75mg/kg) [EEAN]	164.17 $\pm$ 0.48	72.57

All values were expressed as Mean $\pm$ SEM (n = 6). Statistical analysis was performed using One-way ANOVA followed by Dunnett's multiple comparison test. (****p < 0.0001) was considered statistically significant when compared with the induced group.

**Figure 7. Effect of Ethanolic Extract of *Acacia nilotica* on step-down latency (in sec).**

The effect of different treatments on step-down latency in the Passive Avoidance Test was evaluated using one-way ANOVA followed by Dunnett's multiple comparison test, comparing all treatment groups

with the induced group. The analysis revealed a statistically significant difference among the groups ($p < 0.0001$), indicating significant improvement in learning and memory following treatment. The induced group showed a marked decrease in step-down latency compared to the control group, confirming successful induction of cognitive impairment. Treatment with the standard drug significantly increased step-down latency compared to the induced group ($p < 0.0001$), demonstrating potent anti-amnesic activity. Both treatment doses of the ethanolic extract also significantly increased step-down latency compared to the induced group ($p < 0.0001$), suggesting effective memory-enhancing activity. Among the treatment groups, the high dose showed greater improvement than the low dose, indicating a dose-dependent effect. The ethanolic extract of *Acacia nilotica* exhibited significant anti-amnesic activity comparable to the standard drug.

Novel Object Recognition Test:

Table No.6 : Effect of Ethanolic Extract of *Acacia nilotica* on Discrimination Index (DI)

Group	Mean DI [Discrimination Index]	% DI [Discrimination Index]
Control	0.367 ± 0.010	100
Induced	0.030 ± 0.005	8.21
Standard	0.351 ± 0.012	95.45
Treatment (25mg/kg) [EEAN]	0.194 ± 0.005	52.86
Treatment (75mg/kg) [EEAN]	0.308 ± 0.016	83.92

All values were expressed as Mean ± SEM (n = 6). Statistical analysis was performed using One-way ANOVA followed by Dunnett's multiple comparison test. (**** $p < 0.0001$) was considered statistically significant when compared with the induced group.

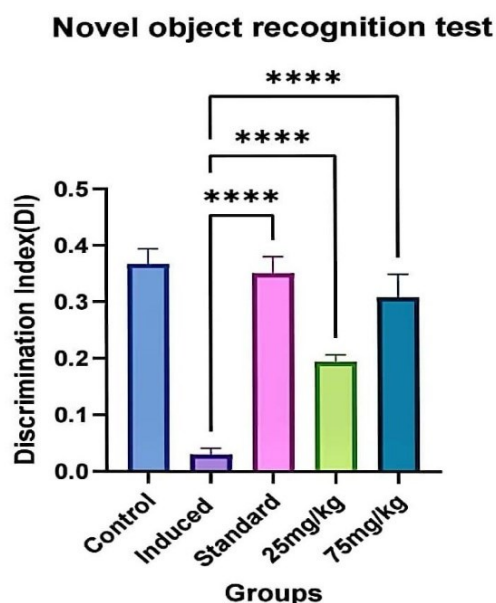


Figure 8. Effect of Ethanolic Extract of *Acacia nilotica* on Discrimination Index (DI).

The effect of different treatments on the Discrimination Index (DI) in the Novel Object Recognition Test was evaluated using one-way ANOVA followed by Dunnett's multiple comparison test, comparing all treatment groups with the induced group. The analysis revealed a statistically significant difference among the groups ($p < 0.0001$), indicating significant improvement in recognition memory following treatment. The induced group showed a marked decrease in the discrimination index compared to the control group, confirming successful induction of cognitive impairment. Treatment with the standard drug significantly increased the discrimination index compared to the induced group ($p < 0.0001$), demonstrating potent anti-amnesic activity. Both treatment doses of the ethanolic extract (EEAN) also significantly increased the discrimination index compared to the induced group ($p < 0.0001$), suggesting effective memory-enhancing activity. Among the treatment groups, the high dose showed greater improvement than the low dose, indicating a dose-dependent effect. The ethanolic extract of *Acacia nilotica* exhibited significant anti-amnesic activity comparable to the standard drug.

DISCUSSION:

Scopolamine-induced amnesia is a widely accepted experimental model for evaluating learning and memory deficits because it produces cognitive impairment through blockade of muscarinic cholinergic

receptors. In the present study, scopolamine administration resulted in significant impairment of memory and learning in experimental animals, as evidenced by altered performance in the Morris Water Maze, Elevated Plus Maze, and Passive Avoidance tests. Treatment with the ethanolic extract of *Acacia nilotica* significantly improved behavioral performance in scopolamine-treated animals. The reduction in escape latency and transfer latency, along with improved retention of the learned response, indicates enhancement of learning and memory functions. These findings suggest that *Acacia nilotica* is capable of attenuating scopolamine-induced cognitive deficits. The results obtained in the present study are consistent with previous reports on medicinal plants possessing memory-enhancing properties. Similar improvements in cognitive performance have been reported for several herbal drugs in experimental models of amnesia. The observed effects of *Acacia nilotica* may be attributed to the presence of bioactive phytoconstituents such as flavonoids, tannins, alkaloids, and phenolic compounds, which have been reported to possess pharmacological activities beneficial for cognitive function.

Thus, the behavioral findings of the present study demonstrate the significant anti-amnesic potential of *Acacia nilotica* against scopolamine-induced memory impairment.

CONCLUSION:

The present study demonstrated that the ethanolic extract of *Acacia nilotica* possesses significant anti-amnesic activity against scopolamine-induced memory impairment in experimental animals. Treatment with the extract significantly improved learning, memory, and cognitive performance, as evidenced by its effects in the Morris Water Maze, Novel Object Recognition Test, and Passive Avoidance Test. The higher dose (75 mg/kg) produced greater improvement in memory and showed effects comparable to the standard drug. The observed activity may be associated with the presence of phytoconstituents such as flavonoids, tannins, and polyphenolic compounds reported in *Acacia nilotica*. Overall, the findings suggest that *Acacia nilotica* has promising potential for the management of memory impairment and warrants further investigation.

Future Prospective: Further studies are required to isolate and characterize the bioactive constituents responsible for the anti-amnesic activity of *Acacia nilotica*. Detailed mechanistic and toxicological investigations are needed to elucidate its mode of action and establish its safety profile. Additionally, clinical studies are warranted to evaluate its efficacy and therapeutic potential in the management of memory-related disorders, including Alzheimer's disease.

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