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NEUROPROTECTIVE EFFECT OF AERVA LANATA PLANT EXTRACT IN SCOPOLAMINE INDUCED COGNITIVE IMPAIRMENT AND OXIDATIVESTRESS IN MICE

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Abstract

The present study was conducted with the aim of investigating pharmacological screening of the *Aerva lanata* extract for Management in AD, Antioxidant property, Acetylcholin esterase inhibition, Locomotor activity using the drugs scopolamine and donepezil in male albino rats who after the treatment are subjected to different evaluation tests and also invivo methods and from the results revealing that The oxidative stress was significantly reduced by the treatment of the aerial parts of Aerva *lanata* showed the maximum protective effect.

Introduction

Alzheimer's disease (AD) is progressive neurodegenerative disorder that slowly destroys memory and thinking skills. Results from impaired function – in cortex and hippocampus. Symptoms include memory loss, apraxia, disorientation, impaired executive function, behavioural disturbances.

Plant profile: Plant name: Aerva *lanata*

Family :Amaranthaceae

Telugu name :Pindi dhonda

Traditional and Medicinal uses:

- The plant is used as diuretic and anthelmintic, antidiabetic, expectorant a arresting haemorrhage during pregnancy.
- It is also used in burn healing, as an anti-inflammatory, headache, skin diseases, to dissolve stones of kidney and gallbladder, for uterus clearance after delivery and to prevent lactation etc ,.

Materials and Methods

DRUGS: Scopolamine (Cadila Health Care Ltd)

Donepezil (Alkem Laboratories Ltd)

Chemicals:

Hydrogen peroxide, Acetylthiocholine, Trichloro acetic acid, Formalin 10%, DTNB(5,5-dithiobis(2-nitrobenzoic acid)) reagent, DPPH(1,1-diphenyl-2-picrylhydrazyl) reagent.

Animal: Male Swiss albino mice (age 4 weeks in 6 groups of 6 animals each)

- Group-I Normal Control Vehicle (0.1% CMC).
- Group-II Disease control Scopolamine (1.4 mg/kg) i.p.
- Group-III Standard Donepezil (5 mg/kg) oral + Scopolamine (1.4 mg/kg) i.p..
- Group-IV Test-I *Aerva lanata* (200mg/kg) oral.+ Scopolamine (1.4 mg/kg) i.p.
- Group-V Test-II *Aerva lanata* (100 mg/ kg)oral + Scopolamine (1.4 mg/kg) i.p.
- Group-VI Test-III *Aerva lanata* (50 mg/kg) oral + Scopolamine (1.4 mg/kg) i.p.

Experimental Design

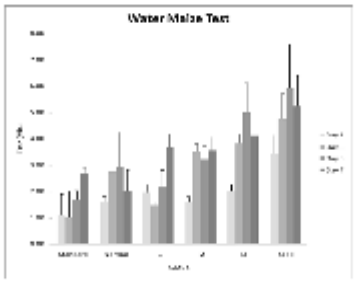
Results

Morris water maze:

Table 1: Latency time in morris water maze

Group	Day1		Day3		Day5		Day7	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Standard	1.08***	0.81	1.03***	0.99	1.72***	0.30	2.70**	0.21
Normal	1.62	0.19	2.74	0.68	2.92	1.36	2.02	0.80
T1	1.97**	0.28	1.47***	0.15	2.15***	0.65	3.69**	0.49
T2	1.63*	0.18	3.50	0.29	3.23**	0.49	3.54*	0.55
T3	2.02	0.26	3.82	0.36	5.01	1.09	4.11	1.07
Scop	3.41	0.76	4.74	0.96	5.91	1.69	5.23	1.17

Effect of Aerva lanata extracts on transfer latency in water maize test:



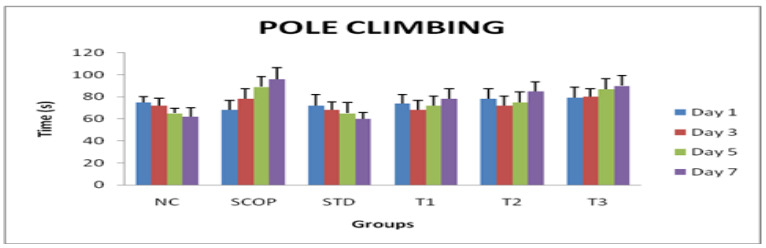
Values were expressed as (mean ± SD, n = 6). *** p< 0.001, ** p < 0.01, * p < 0.05 compared with corresponding values of disease control.

Pole climbing test:

Table 2:Latency time in pole climbing apparatus

DAYS	NC		SCOP		STD		T1		T2		T3	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Day 1	75	5.2	68	8.9	72	9.8	74	7.9	78	9.2	79	9.5
Day 3	72	6.8	78	9.2	68	7.3	68	8.6	72	8.5	80	7.4
Day 5	65	4.4	89	9.5	65**	9.6	72*	8.5	75	9.6	87	9.6
Day 7	62	8.2	96	10.2	60***	5.9	78**	9.2	85	8.7	90	9.2

Effect of Aerva *lanata* on trnsfer latency in pole climbing test



Values were expressed as (mean ± SD, n = 6). *** p< 0.001, **p < 0.01, * p < 0.05 compared with corresponding values of disease control.

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Locomotor activity:

Table 3: No. of crossings in actophotometer

Group	Day 1		Day 3		Day 5		Day 7	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Std	208.75***	37.36	221.25***	46.28	208.75***	75.09	222.50***	62.75
Cont	218.50	34.10	230.00	52.01	235.50	43.58	211.50	67.14
T 1	198.00***	28.14	198.75**	29.25	155.25*	19.36	191.00**	70.50
T 2	150.25	46.36	159.33	52.31	123.00	20.78	150.50*	23.97
T 3	125.25	23.00	68.50	37.12	60.50	30.32	57.67	33.47
Scp	105.50	39.74	79.25	26.70	61.00	33.41	45.00	26.77

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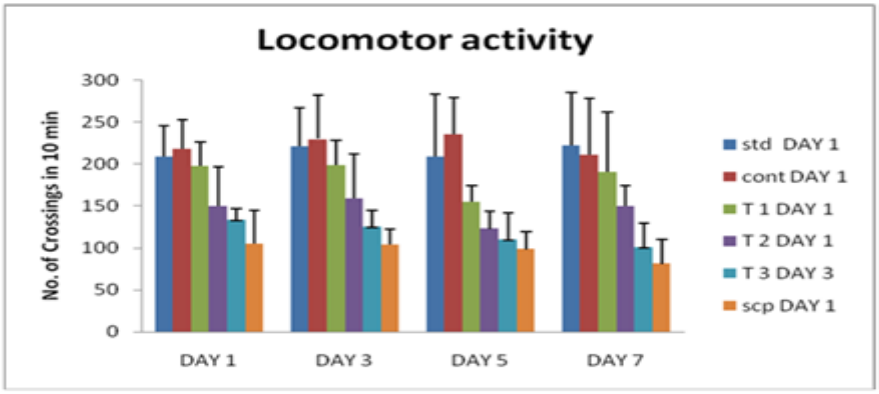
Effect of Aerva *lanata extract's on locomotor activity*



Values were expressed as (mean ± SD, n = 6). *** p< 0.001, **p < 0.01, * p < 0.05 compared with corresponding values of disease control.

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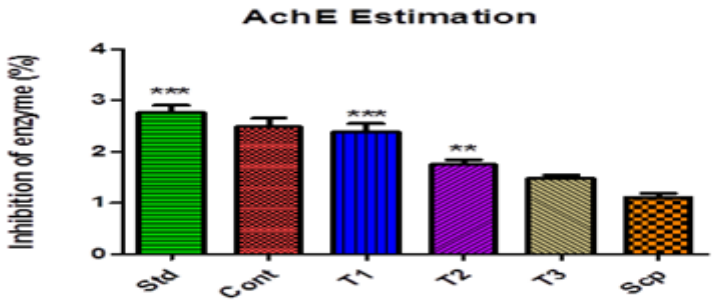
AcHE Estimation

Group	Mean	SD
Standard	2.761***	0.280
Control	2.483	0.340
T1	2.388***	0.320
T2	1.746**	0.180

T3	1.474	0.140
Scopolamine	1.111	0.150

Effect of aerva lanata extract's on % inhibition of AChE enzyme:



Values were expressed as (mean ± SD, n = 6). *** p< 0.001, **p < 0.01, * p < 0.05 compared with corresponding values of disease control.

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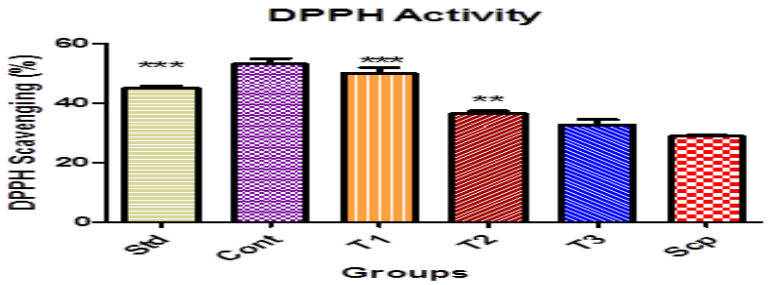
DPPH

Table 5:

Group	Mean	SD
Standard	44.932***	1.807
Control	53.054	3.798
T1	49.995***	3.939
T2	36.367**	1.998
T3	32.746	3.498
Scopolamine	28.822	0.789

Effect of Aerva lanata extract's on % inhibition of DPPH



Values were expressed as (mean ± SD, n = 6). *** p< 0.001, **p < 0.01, * p < 0.05 compared with corresponding values of disease control.

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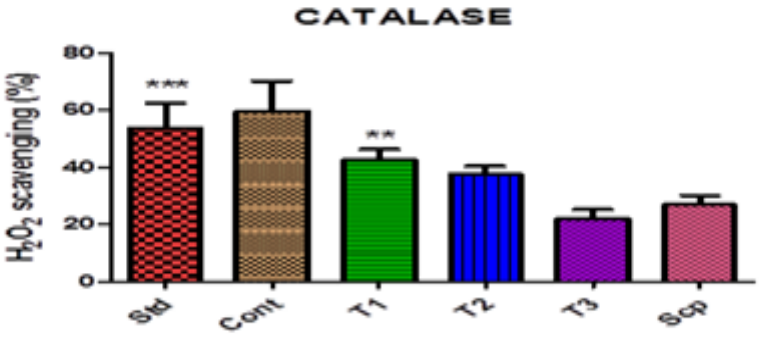
Catalase activity:

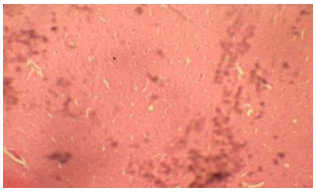
Table 6:

Group	Mean	SD
Standard	53.74***	8.65
control	59.65	10.54
T1	42.54***	3.75
T2	37.50**	2.84
T3	22.04	3.16
Scopolamine	26.99	3.22

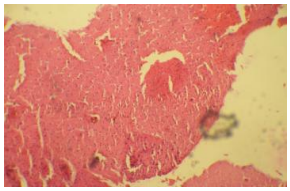
Effect of Aerva lanata extract's on H_2O_2 scavenging activity :



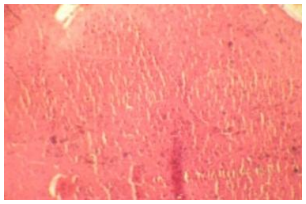
Values were expressed as (mean ± SD, n = 6). *** p< 0.001, **p < 0.01, * p < 0.05 compared with corresponding values of disease control.



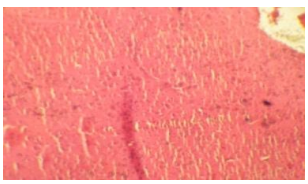
Control



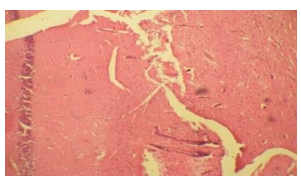
scopolamine



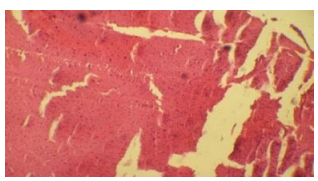
Standard



Test $_1$



Test$_2$



Test$_3$

Conclusion

The oxidative stress was significantly reduced by the treatment of the aerial parts of Aerva *lanata* showed the maximum protective effect.

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