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NEURO PROTECTIVE POTENTIAL OF CINNAMON IN THE MANAGEMENT OF ALZHEIMER' SDISEASE

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ABSTRACT

Alzheimer's disease is a progressive neurodegenerative disorder characterized by cognitive decline, stress, and neuronal damage. The present study aimed to evaluate the neuroprotective potential of cinnamon through in vitro antioxidant activity. Cinnamon powder was extracted using methanol by maceration, followed by photochemical screening. The antioxidant activity was assessed using lipid peroxidation inhibition assay and compared with ascorbic acid as standard. The extract demonstrated significant concentration-dependent anti oxidant activity, with marked reduction in oxidative stress markers. The findings suggest that cinnamon pos- sesses promising neuroprotective properties due to its antioxidant and anti-inflammatory phy- toconstituents. Further in vivo and clinical studies are required to establish its therapeutic role in Alzheimer's disease.

KEYWORDS: Alzheimer's disease; Cinnamon; Neuroprotection; Antioxidant activity; Oxida- tive stress.

INTRODUCTION

Alzheimer's disease is the most common form of dementia and is characterized by progres- sive cognitive impairment, memory oss, and behavioral disturbances.[1,2] The pathogenesis in- volves accumulation of beta-amyloid plaques, neurofibrillary tangles composed of hyper- phosphorylated tauprotein, oxidative stress, and neuroinflammation.[3,4]

Oxidative stress plays a critical role in neuronal degeneration by increasing reactive oxygen species and lipid perox- idation.[5,6] Natural antioxidants from medicinal plants have gained attention as safer therapeu- ticalternatives. Cinnamon (Cinnamomum species), belonging to the family Lauraceae, Is widely used a spice and traditional medicine.[7,8] It

contains bioactive compounds such as cinnamaldehyde, eugenol, and polyphenols, which exhibit antioxidant, anti-inflammatory, and neuroprotective properties.[9,10] The present study evaluates the in vitro neuroprotective potential of cinnamon based on its antioxidant activity.

MATERIALS AND METHODS

Cinnamon bark powder was procured and authenticated. The powdered material was subject- ed to methanolic extraction by maceration for 72 hours with intermittent shaking. The extract was filtered and concentrated using a rotary evaporator under reduced pressure. Preliminary phytochemical screening was performed to identify alkaloids, flavonoids, tannins, phenols, and saponins. The antioxidant activity was evaluated using lipid peroxidation inhibition assay. Various concentrations of cinnamon extract were prepared and compared with ascorbic acid as standard. Absorbance was measured spectrophotometrically, and percentage inhibition was calculated using the formula: Percentage inhibition = (Control absorbance−Sample absorbance/Control absorbance) × 100. All experiments were conducted in triplicate, and results were ex- pressed as mean percentage inhibition.

Figure 1: Cinnamon powder.

Figure 2: Maceration extraction of cinnamon.

RESULTS

Phytochemical screening of "CINNAMOMUM ZEYLANICUM" extract was found to be:

S.NO.	PLANT CONSTITUENTS	TEST	RESULT
1	Alkaloids	Dragendorff 's test	POSITIVE
2	Glycosides	Molisch test	POSITIVE
3	Flavonoids	Shinoda test	POSITIVE
4	Saponins	Froth test	POSITIVE
5	Steroids	Salkowski test	POSITIVE
6	Phenolic compounds	$Fecl_3$test	POSITIVE
7	Coumarins	NaOH test	POSITIVE
8	Anthraquinones	Borntrager's test	POSITIVE
9	Carbohydrates	Fehling's test	POSITIVE
0	Proteins	Ninhydrin test	POSITIVE

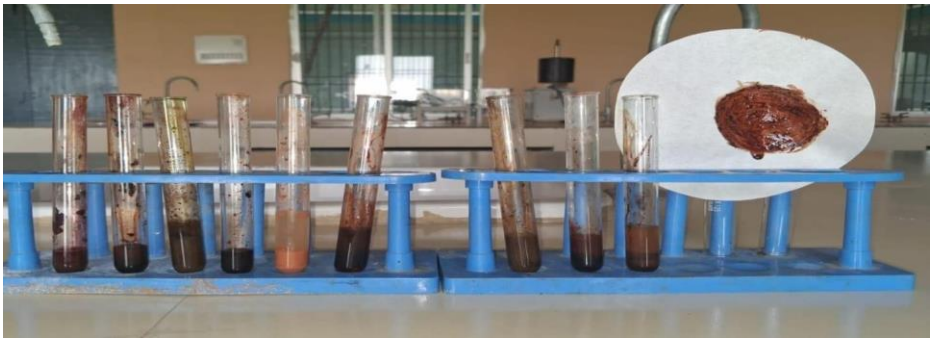

Figure 3: Phytochemical screening of Cinnamon zeylancium.

NEUROPROTECTIVEACTIVITY

Lipid peroxidation assay

ABSORBANCEVALUES (532nm)

Sample	Concentration (µg/Ml)	Absorbance	%Inhibition
Induced control	-	0.850	0
Cinnamon	25	0.620	27.06
Cinnamon	250	0.480	43.53
Cinnamon	500	0.330	6 .8
Cinnamon	000	0.250	70.59
Ascorbic acid	25	0.700	7.65
Ascorbic acid	250	0.600	29.4
Ascorbic acid	500	0.500	4. 8
Ascorbic acid	000	0.4 0	5 .76

Formula

$$\% \text{ Inhibition} = \frac{\text{Acontrol} - \text{Asample}}{\text{Acontrol}} \times 100$$

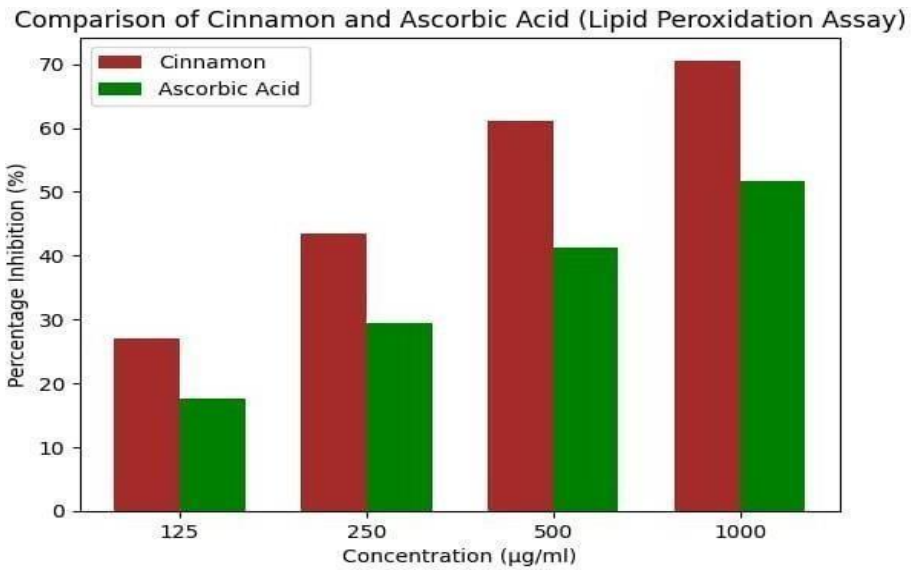

Figure 4: Concentration v/s %inhibition.

Preliminary phytochemical screening confirmed the presence of flavonoids, phenols, tan- nins, and essential oils in cinnamon extract. The antioxidant assay demonstrated concen- tration-dependent inhibition of lipid peroxidation. An increase in concentration resulted in significant reduction in absorbance values, indicating enhanced free radical

scavenging activity. The activity of cinnamon extract was found to be comparable to ascorbic acid at higher concentrations. The antioxidant property may be attributed to polyphenoliccom- pounds and cinnamaldehyde present in cinnamon. These compounds are known to reduce oxidative stress, inhibit protein aggregation, and modulate inflammatory pathwaysimpli- catedin Alzheimer' sdisease. Although the results are promising, the study is limited to in vitro analysis, and further in vivo and clinical investigations are necessary.

CONCLUSION

The present study demonstrates that cinnamon possesses significant antioxidant activity, which may contribute to its neuroprotective potential in Alzheimer'sdisease. By reducing oxidative stress and lipid peroxidation, cinnamon may help protect neuronal cells from degeneration. These findings support the potential use of cinnamon as a complementary therapeutic agent. Further pharmacological and clinical studies are recommended.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

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