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ATTENUATION OF MONOSODIUM GLUTAMATE INDUCED NEUROTOXICITY BY HYDROALCOHOLIC EXTRACT OF GLYCYRRHIZA GLABRA ROOTS IN ALBINO RATS

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ABSTRACT

The flavor enhancer monosodium glutamate (MSG) is a sodium salt of non-essential aminoacid glutamic acid. Because of flavor enhancing properties glutamate is deliberately added in food as purified monosodium salt. Many studies have reported that excess consumption of MSG produces neurotoxicity. The present study was designed on attenuation of MSG induced neurotoxicity by hydroalcohholic extract of Glycyrrhiza glabra (HAEGG) roots in albino rats. The rats were randomly divided into six groups. Group one was administered with 10ml/kg of distilled water p.o. and considered as negative control. Group two was administered with MSG, 2g/kg p.o.is considered as positive control. Group three was administered with MSG with Vitamin C, 100mg/kg p.o. and considered as standard. Group four, five and six were administered with MSG and 300, 400 and 600mg/kg of HAEGG p.o. respectively. The neurobehavioural study was performed by conducting locomotor activity using actophotometer, Memory impairment in light and dark chamber and anxiolytic activity in light and dark chamber. The rats treated with MSG showed a significant ($p<0.01$) decrease in locomotor activity as compared to vehicle treated group but after treatment with HAEGG the locomotor activity was increased dose dependently and significantly ($P<0.01$) as compared to MSG treated group. The values are also comparable with standard group. In light and dark model of memory retention test it has been observed that in case of MSG treated rat there was a significant ($p<0.01$) decrease in memory impairment was observed after 24 hrs, where as in

case of HAEGG treated rats it shows a significant ($p<0.01$) increase in memory retention observed at a dose of 400 and 600 mg/kg which was comparable with standard. In case of anxiolytic activity the dark chamber latency was significantly ($p<0.5$) increased as compared to vehicle treated group, whereas HAEGG shows a significant ($p<0.01$) decrease in dark chamber latency observed at 600mg/kg and was comparable with standard drug. From this study it was concluded that HAEGG attenuates the MSG induced neurotoxicity.

KEYWORDS: Locomotor activity using actophotometer, memory impairment and anxiolytic activity in light and dark chamber.

INTRODUCTION

Monosodium glutamate (MSG) is a food additive with a wide use in modern nutrition. It is found in naturally in tamato, cheese and other foods. Glutamate is one of the most common amino acids found in nature. It is the main component of many proteins and peptides, and is present in most tissues. These are growing no. of clinicians and basic scientists who are convinced that a group of compound called excitotoxins play a critical role in the devlopment of several neurological disorders including migraines, seizeres, infections, abnormal neuronal development, certain endocrine disorders, neuropsychiatric disorders, learning disorders in children, AIDS dementia, episodic violence and especially the neurodegenerative diseases, such as ALS, Parkinson's disease, Alzheimer's diseases, Huntington's diseases. Human life is absolutely dependent on food. Without it we would not have the necessary ingredients to function as complex organisms. Human society has been always fascinated with nutrition and, because of that, has produced a fascinating nutritional history replete with interesting, visionary, and eccentric characters. Glycyrrhiza glabra is known as in India Mulethi. Licorice is the root of Glycyrrhiza glabra from which a sweet flavor can be extracted. It is consists of dried peeled or unpeeled root and stolen of glycyrrhiza glabra family Leguminose. Active constituent is triterpenoid, saponins known as glycyrrhizin (glycyrrhizic acid) which is a potassium and calcium salt of glycyrrhizinic acid. It is used as expectorant, demulcent, anti-ulcer and Addison's diseases.

AIM AND OBJECTIVE

AIM

The study was aimed to evaluate the neuroprotective effect of hydro alcoholic extract of Glycyrrhiza glabra roots (HAEGG) in albino wistar rat.

OBJECTIVE

- Collection and authentification of plant.
- Extraction of dried plant materials with hydroalcohol (30:70%v/v ethanol and water)
- Carrying out the toxicological studies of plant under consideration.
- Carrying out the extensive ph. cological studies on the extract of selected plant for their neuroprotective activity.
- Detailed histopathological investigation that proves the neurotoxic and potency of plant taken under consideration.

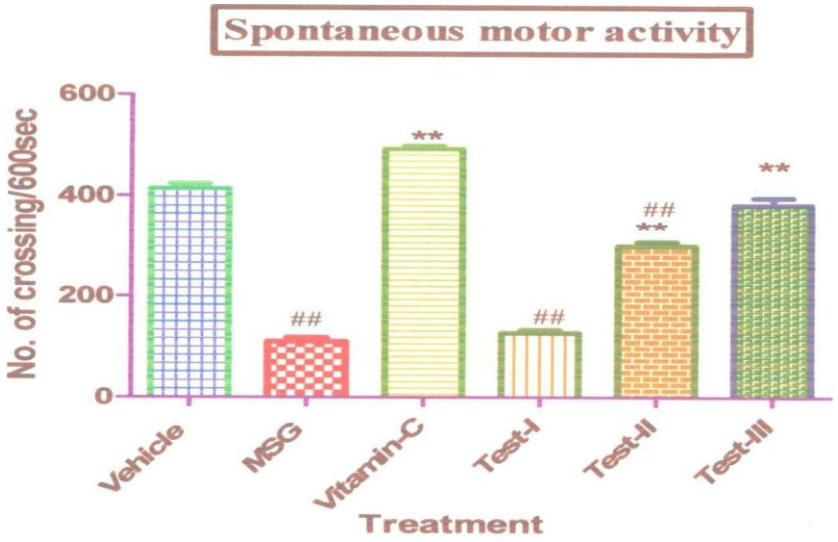
MATERIALS AND METHODS

The present study was designed on attenuation of MSG induced neurotoxicity by hydroalcohholic extract of Glycyrrhiza glabra (HAEGG) roots in albino rats. The rats were randomly divided into six groups. Group one was administered with 10ml/kg of distilled water p.o. and considered as negative control. Group two was administered with MSG, 2g/kg p.o.is considered as positive control. Group three was administered with MSG with Vitamin C, 100mg/kg p.o. and considered as standard. Group four, five and six were administered with MSG and 300, 400 and 600mg/kg of HAEGG p.o. respectively. The neurobehavioural study was performed by conducting locomotor activity using actophotometer, Memory impairrment in light and dark chamber and anxiolytic activity in light and dark chamber.

RESULTS AND DISCUSSION

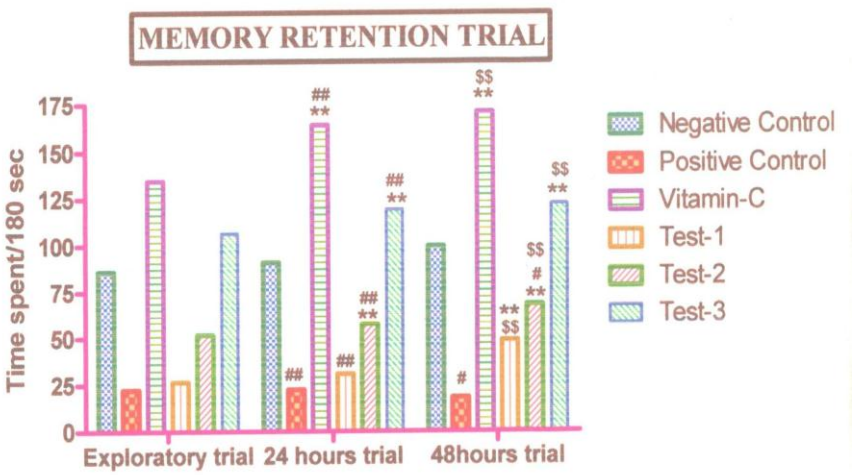
Effect on HAEGG on spontaneous motor behavior

Groups	Drug(mg/kg)	Mean ± SEM
Negative control	Vehicle(10ml/kg) (p.o)	414.16±9.7
Positive control	MSG treated(2g/kg) (p.o)	110.5±7.53$^{\#\#}$
Standard	Vitamin-C(100mg/kg) (p.o)	441.33±6.87**
TEST-II	HAEGG(200mg/kg) (P.O)	127.83±5.23$^{\#\#}$
TEST-II	HAEGG(400mg/kg) (p.o)	299.83±8.62**
TEST-III	HAEGG(600mg/kg) (p.o)	383.33±14.04**



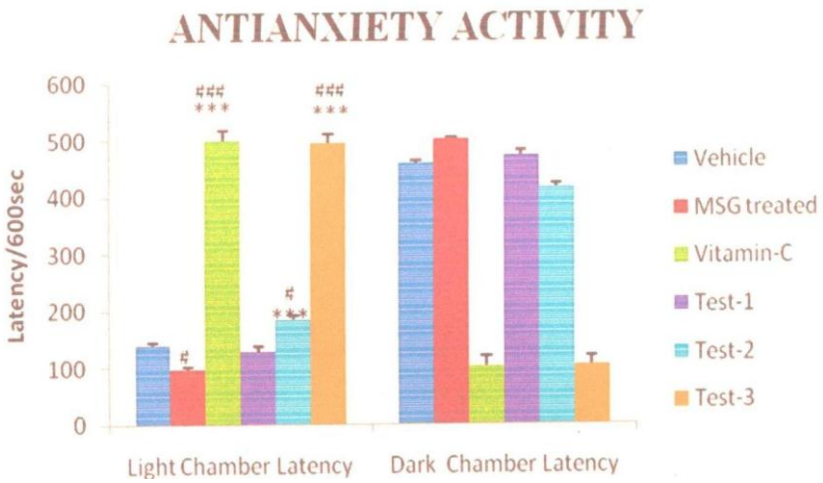
Effect of HAEGG on memory retention behavior.

Groups	Drug(mg/kg)	Exploratory trail	24hr trail	48hr trail
Negative control	Vehicle(10ml/kg) (p.o)	86.16±5.65	91.166±2.58	99.166±3.13
Positive control	MSG treated(2g/kg) (p.o)	22.33±4.24	22.333±4.24##	48.166±2.73#
Standard	Vitamin-C(100mg/kg) (p.o)	134±2.87	164±1.12	170.833±2.37**
Test-I	HAEGG(400mg/kg) (p.o)	26.5±5.98	30.83±3.29	48.66±5.78
Test –II	HAEGG(400mg/kg) (p.o)	51.66±4.55	57.33±2.67**	63.83±2.46**
TEST-III	HAEGG(600mg/kg) (p.o)	106.33±6.11	119.166±4.42**	122.33±4.04**



Effect on HAEGG on anxiety behavior.

Groups	Drug(mg/kg)	Light chamber latency	Dark chamber latency
Negative control	Vehicle(10ml/kg)(p.o)	140.5±4.08	459.5±3.09
Positive control	MSG treated(2g/kg)(p.o)	98±2.73	501±4.11#
Standard	Vitamin-C(100mg/kg)(p.o)	499.33±17.71	100.67±17.71***
Test-I	HAEGG(400mg/kg)(p.o)	127.66±9.34	472.34±8.57



CONCLUSION

HAEGG established effective neuroprotective property by showing significant protection against oxidative stress. The data obtained reveals the ability of HAEGG to curb the toxic effect induced by consumption of MSG.

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