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Maknoon Saira Siddika
Department of Pharmacy, BGC Trust University, Bangladesh

Bashutosh Nath
Department of Pharmacy, BGC Trust University, Bangladesh

Correspondence:
Maknoon Saira Siddika
Department of Pharmacy, BGC Trust University, Bangladesh

Evaluation of neuropharmacological activities of methanolic extract of *Cucumis sativus*

Maknoon Saira Siddika and Bashutosh Nath

Abstract
The present study was aimed to evaluate neuropharmacological activities of the methanolic extract of *Cucumis sativus* Linn (Cucurbitaceae). The effect of ***Cucumis sativus*** methanolic extracts effect on CNS in mice, a number of methods namely thiopental sodium-induced hypnosis, open field and hole cross were adopted. The most important step in evaluating drug action on the CNS is to observe the behavior of the test animals. Substances that have CNS depressant activity either decrease the time for onset of sleep or prolong the duration of sleep or both. Another important step in evaluating drug action on CNS is to observe its effect on locomotors activity of the animal. Methanolic extract of *Cucumis sativus* has significant CNS depressant activity on experimental animal models. The obtained results provide a support for the use of this plant in traditional medicine.

Keywords: *Cucumis sativus*, Thiopental Sodium-Induced Hypnosis, Open Field, Hole Cross.

1. Introduction
Traditional medicine (also known as indigenous or folk medicine) comprises medical knowledge systems that developed over generations within various societies before the era of modern medicine. The World Health Organization (WHO) defines traditional medicine as: "the health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral-based medicines, spiritual therapies, manual techniques and exercises, applied singularly or in combination to treat, diagnose and prevent illnesses or maintain well-being" (World Health Organization . 2008-12-01)
The cucumber (*Cucumis sativus*) is a widely cultivated plant in the gourd family Cucurbitaceae, which includes squash, and in the same genus as the muskmelon. The plant is a creeping vine which bears cylindrical edible fruit. There are three main varieties of cucumber: "slicing", "pickling", and "burpless" 5. Within these varieties, several different cultivars have emerged. The cucumber is originally from India, but is now grown on most continents. Many different varieties are traded on the global market.
The cucumber is a creeping vine that roots in the ground and grows up trellises or other supporting frames, wrapping around ribbing with thin, spiraling tendrils. The plant has large leaves that form a canopy over the fruit. The fruit of the cucumber is roughly cylindrical, elongated with tapered ends, and may be as large as 60 centimeters (24 in) long and 10 centimeters (3.9 in) in diameter. Having an enclosed seed and developing from a flower, botanically speaking, cucumbers are classified as fruits.

2. Method and Materials
2.1 Reagent and apparatus
- Open field apparatus
- Hole cross apparatus
- Thiopental sodium
- Mice
- Water
- Isotonic solution
- Tween 80
- Diazepam

2.2 Method: The tests are

- Thiopental sodium induced sleeping time
- Hole cross test
- Open field test

Fig 2.1: Albino mice

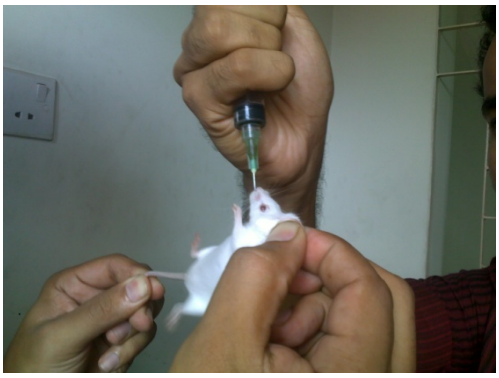

Fig 2.2: Feeding of Albino mice

2.2.1 Hole cross test

The method was carried out as described by Takagi. A wood partition was fixed in the middle of a cage having a size of 30 × 20 × 14 cm. A hole of 3 cm diameter was made at a height of 7.5 cm in the centre of the cage. The animals were divided into control, positive control, and test groups containing five mice each. The test groups received extracts at the doses of 100, 200, 300 mg/kg body weight orally whereas the vehicle control and positive control groups received vehicle (1% Tween 80 in water) and the standard drug diazepam (1 mg/kg b.w.), respectively. The number of passage of a mouse through the hole from one chamber to other was counted for a period of 3 min at 0, 30, 60, 90 and 120 min after oral administration of the test drugs and the standard

Fig 2.3: Hole cross test

2.2.2 Open field test

In open field test, the animals were divided into control, positive control, and test groups containing five mice each. The test groups received extracts 100, 200, 300 mg/kg body weight orally whereas the control group received vehicle (1% Tween 80 in water). Like hole cross test, animals in positive control group received diazepam (1 mg/kg b.w.). The floor of an open field of half square meter was divided into a series of squares each alternatively colored black and white. The apparatus had a wall of 40 cm height. The number of squares visited by the animals was counted for 3 min at 0, 30, 60, 90, and 120 min after oral administration of the test drugs and the standard.

Fig 2.4: Open field method

2.2.3 Thiopental sodium induced sleeping time

The animals were randomly divided into three groups consisting of five mice each. The test groups received at the doses of 100, 200, 300 mg/kg body weight while positive control group was treated with diazepam (1 mg/kg) and control group with vehicle (1% Tween 80 in water). Thirty minutes later, thiopental sodium (at 40 mg/kg b.w. dose) was administered to each mice to induce sleep. The animals were observed for the latent period (time between thiopental administration and loss of righting reflex) and duration of sleep i.e. time between the loss and recovery of righting reflex.

2.3 Statistical Analysis

The data are expressed as mean ± SEM for each treatment group. The data obtained from each response were subjected to Student's t-test to determine a significant difference between the control group and experimental groups.

3. Result and Discussion

3.1 Hole Cross Test

Our extract showed significant decrease of movement from its initial value at 0 to 120 min which was comparable with that of the group treated with diazepam.

Effect of *Cucumis sativus* methanol extract on Hole Cross test in mice:

Table 3.1.1: Hole Cross test for 100 mg dose

Hole Cross For 100 mg dose			
Minutes	**Control**	**positive**	***Cucumis sativus***
0	17.5±0.57	13.1±3.09	13.5±1.369
30	8.9±2.329	6.4±1.51	8.7±0.79
60	4.9±0.65	4.2±1.483	4.7±0.5
90	3.1±0.5	3.9±1.083	5.8±1.036
120	5.2±1	3.9±1.917	5.4±1.781

Values are expressed as mean ±S.E.M

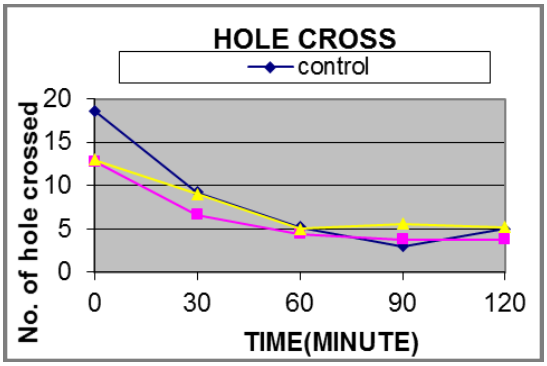

Fig 3.1.1: Graphical representation of data of *Cucumis sativus* in case of Hole cross

Table 3.1.2: Hole Cross test for 200 mg dose

HOLE CROSS			
For 200mg dose			
Minutes	**Control**	**Positive**	***Cucumis sativus***
0	17.5±0.57	13.1±3.09	15±1.557
30	8.9±2.329	6.4±1.51	8.7±1.68
60	4.9±0.65	4.2±1.483	5.6±0.961
90	3.1±0.5	3.9±1.083	4.5±1.746
120	5.2±1	3.9±1.917	4.6±1.68

Values are expressed as mean ±S.E.M

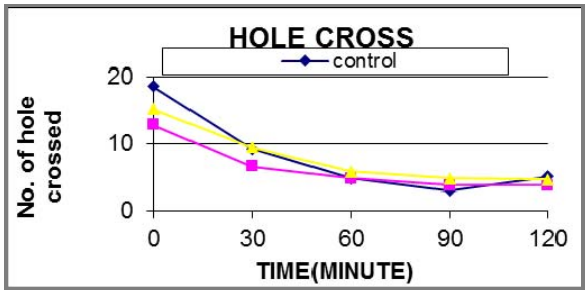

Fig 3.1.2: Graphical representation of data of *Cucumis sativus* in case of Hole cross

Table 3.1.3: Hole Cross test for 300 mg dose

HOLE CROSS			
For 300 mg dose			
Minutes	**control**	**Positive**	***Cucumis sativus***
0	17.5±0.57	13.1±3.09	13.9±2.252
30	8.9±2.329	6.4±1.51	8.3±2.15
60	4.9±0.65	4.2±1.483	5.8±2.329
90	3.1±0.5	3.9±1.083	4.8±1.746
120	5.2±1	3.9±1.917	4.6±1.68

Values are expressed as mean ±S.E.M

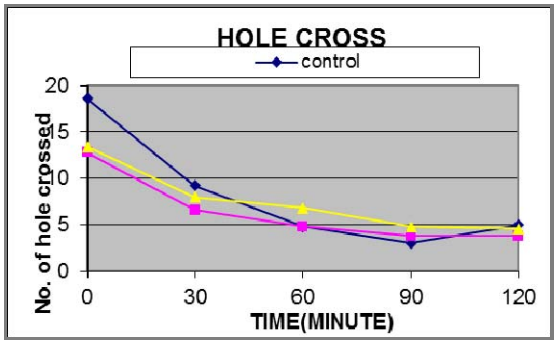

Fig 3.1.3: Graphical representation of data of *Cucumis sativus* in case of Hole cross

3.2 Open Field Test

In the open field test, the number of squares traveled by the mice was suppressed significantly from its initial value at 0 to 120 minutes. The locomotor activity decreased and the results was statistically significant.

Effect of *Cucumis sativus* methanol extract on Open Field test in mice

Table 3.2.1: Open Field test for 100mg dose

OPEN FIELD			
For 100 mg dose			
Minutes	**control**	**Positive**	***Cucumis sativus***
0	103.5±16.537	96.5±6.758	97.3±13.682
30	91.2±3.305	57.4±6.824	72.8±6.721
60	74.7±4.144	53.9±13.788	60.7±5.707
90	45.6±2.885	22.1±1.903	41.9±7.684
120	30.9±3.921	16.8±2.408	38.5±11.343

Values are expressed as mean ±S.E.M

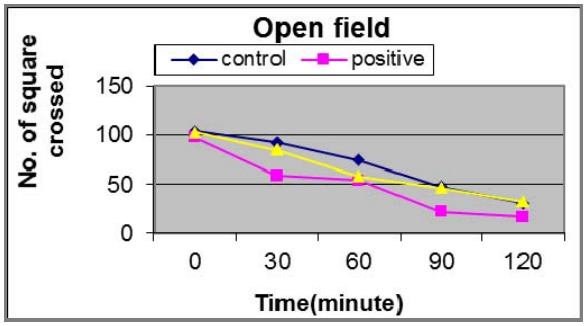

Fig 3.2.1: Graphical representation of data of *Cucumis sativus* in case of Open Field

Table 3.2.2: Open Field test for 200 mg dose

OPEN FIELD			
For 200 mg dose			
Minutes	**control**	**positive**	***Cucumis sativus***
0	103.5±16.537	96.5±6.758	101.8±6.158
30	91.2±3.305	57.4±6.824	83.8±5.729
60	74.7±4.144	53.9±13.788	57.7±5.92
90	45.6±2.885	22.1±1.903	46.2±6.637
120	30.9±3.921	16.8±2.408	31.9±6.097

Values are expressed as mean ±S.E.M

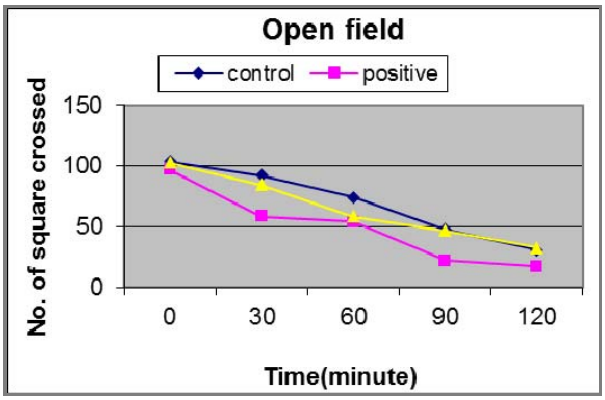

Fig 3.2.2: Graphical representation of data of *Cucumis sativus* in case of Open Field

Table 3.2.3: Open Field test for 300 mg dose

OPEN FIELD			
For 300 mg dose			
Minutes	**control**	**Positive**	***Cucumis sativus***
0	103.5±16.537	96.5±6.758	96.8±9.956
30	91.2±3.305	57.4±6.824	76.3±7.737
60	74.7±4.144	53.9±13.788	57.5±7.737
90	45.6±2.885	22.1±1.903	42.9±8.466
120	30.9±3.921	16.8±2.408	31.7±6.097

Values are expressed as mean ±S.E.M

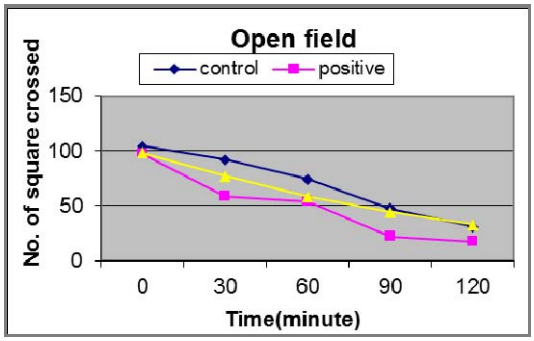

Fig 3.2.3: Graphical representation of data of *Cucumis sativus* in case of open field

3.3 Effect of the *Cucumis sativus* methanol extract on Thiopental sodium induced sleeping time determination in mice

Table 3.3.1: Thiopental sodium induced sleeping time

For 100 mg dose

Groups	**Duration of sleep**
Control	40.5±3.327912
Positive	147.2±1.083974
Test	104.3±0.961769

Values are expressed as mean ±S.E.M

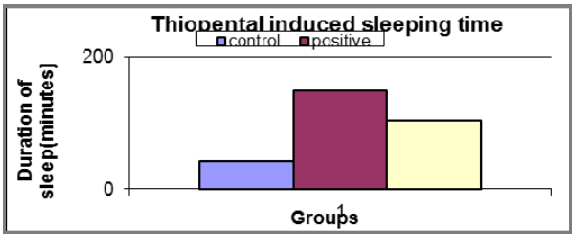

Fig 3.3.1: Graphical representation of data of Cucumis sativus in case of thiopental induced sleeping time.

Table 3.3.2: Thiopental sodium induced sleeping time

For 200 mg dose

GROUPS	**Duration of sleep**
Control	40.5±3.327972
Positive	147.2±1.083974
Test	108.9±0.961769

Values are expressed as mean ±S.E.M

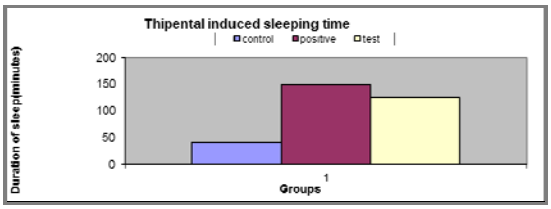

Fig 3.3.2: Graphical representation of data of Cucumis sativus in case of thiopental induced sleeping time.

Table 3.3.3: Thiopental sodium induced sleeping time

For 300 mg dose

GROUPS	**Duration of sleep**
Control	40.5±3.327912
Positive	147.2±1.083974
Test	126.8±1.516575

Values are expressed as mean ±S.E.M

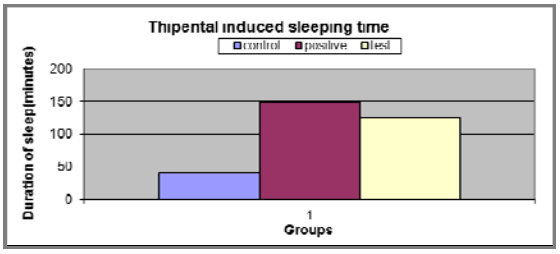

Fig 3.3.3: Graphical representation of data of Cucumis sativus in case of thiopental induced sleepingtime.

4. Conclusion

We know that substances that have CNS depressant activity can decreased the Locomotor activity and exploratory behavior of mice in hole cross test and open field test. In case of the extract of *Cucumis sativus* observation data show significant decreased locomotor activity of mice, which are the evident of depressant activity of this extract. So, this extract show significant CNS depressant activity on mice.

We know that substances that have CNS depressant activity either decrease the time for onset of sleep or prolong the duration of sleep or both. In case of the extract of *Cucumis sativus* the time for onset of sleep of mice is decreased & time of duration of sleep is increased (Table-14). So, by comparing with the data of positive group it will be suggested that extract of *Cucumis sativus* possesses significant CNS depressant activity on experimental animal model.

To obtain meaningful results regarding the effect of ***Cucumis sativus*** methanolic extracts effect on CNS in mice, a number of methods namely thiopental sodium-induced hypnosis, open field and hole cross were adopted. The most important step in evaluating drug action on the CNS is to observe the behavior of the test animals. Substances that have CNS depressant activity either decrease the time for onset of sleep or prolong the duration of sleep or both. Another important step in evaluating drug action on CNS is to observe its effect on locomotors activity of the animal. Decrease in locomotors activity of mice may be closely related to sedation resulting from depression of the central nervous system. The rate of locomotors activity of albino mice, after applying ***Cucumis sativus*** methanolic extracts, is significantly decreased.

Finally, overall results obtained from this study suggested the methanolic extract of ***Cucumis sativus*** has significant CNS depressant activity on experimental animal models.

5. References

1. Jachak SM, Saklani A. Challenges and opportunities in drug discoveries from plants. Curr Sci 2007; 92(9):1251-1257.
2. Barrett B, Kiefer D and Rabago D. Assessing the risks and benefits of herbal medicine: an overview of scientific evidence. AlternTher Health Med1999; 5:40-49.
3. Matu EN, Staden JV. Antibacterial and anti-inflammatory activities of some plants used for medicinal purposes in

Kenya. J Ethnopharmacol 2003; 87:35-41.
4. Butler MS. The role of natural product chemistry in drug discovery. J Nat Prod 2004; 67:2141-2153.
5. Geysen HM, Schoenen F, Wagner D and Wagner R. Combinatorial compound libraries for drug discovery: An ongoing challenge. Nat Rev Drug Discov 2003; 2:222-230.
6. Lombardino JG and Lowe III JA. The role of the medicinal chemist in drug discovery Then and now. Nat Rev Drug Discov 2004; 3:853-862.
7. Newman DJ, Cragg GM and Snader KM. Natural products as sources of new drugs over the period 1981–2002. J Nat Prod 2003; 66:1022-1037.
8. Gupta BD, Dandiya PC, Gupta ML. A psychopharmacological analysis of behaviour in rat. Jpn J Pharmacol 1971; 21:293.
9. Takagi K, Watanabe M, Saito H. Studies on tha spontaneous movement of animals by the hole cross test: Effect of 2-dimethylaminoethane. Its acylates on the central nervous system Jpn J Pharmacol 1971; 21:797.