

## Neurological assessment of antidepressant effect of seeds of *Anethum graveolens* on albino mice

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### ABSTRACT

**Ethnopharmacological relevance:** seeds of *Anethum graveolens* have been used in the Indian traditional medicine to relieve stress and other neurological disease conditions.

**Aim of the study:** The present study was undertaken to evaluate the antidepressant effects of seeds of *Anethum graveolens* Ethanolic Extract (AGEE) in mice.

**Materials and methods:** seeds of *Anethum graveolens* Ethanolic extract was screened for antidepressant effect by using forced swim test at doses of 100 and 200 mg/kg. Distilled water and Imipramine were employed as negative and positive control groups, respectively.

**Results:** antidepressant effect assessment of seeds of *Anethum graveolens* Ethanolic Extract (AGEE) 200 mg/kg shows significantly decrease in immobility time (24.44 %) as compared to standard (46.67 %) treatment group.

**Conclusion:** The results of this study established a support for the traditional usage of seeds of *Anethum graveolens* as antidepressant medicinal plant

### INTRODUCTION

*Anethum graveolens* L. is a member of umbelliferae family. Many properties of dill such as antibacterial, [1] antioxidant, [2] antihypercholesterolemic, [3] and cancer chemo-preventive effects, [4] have been reported. In folk medicine, it is commonly used to improve gastric irritation, indigestion, stomachache, insomnia, and colic. [5] Dill decreases sexual potency and spermatogenesis in males. [6-8] Depression and anxiety are the most frequent mental disorders. More than 20% of the adult populations suffer from these conditions at some time during their life. The World Health Organization predicts that depression will become the second leading cause of premature death or disability worldwide by the year 2020. Approximately two-thirds of the anxious or depressed patients respond to the currently available treatments but the magnitude of improvement is still disappointing. Then, the medical need for newer, better-tolerated and more efficacious treatments remains high. [9] present study was conducted to evaluate traditional claim of plants as used in depression.

### MATERIAL AND METHOD

#### Experimental Animals

Swiss albino mice of male sex weighing 22–28 g were used. Animals were maintained under standard conditions in an

animal house approved by Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA). Institutional Animal Ethics Committee approved the experimental protocol. The animals were given standard diet. The animals had free access of standard diet and water and housed in a spacious cage for one week. Mice were housed in cages of 5 at  $22 \pm 1^\circ\text{C}$  in a 12-h light/dark cycle. Tap water and food pellets were available as libitum. Groups of 6–11 mice were randomly assigned to different treatment groups and were tested in a counter balancing order. Animals were naive to experiment conditions. All experiments were carried out during night cycle of light and the experiments were carried out according to the National Research Council Guide for the Care and Use of Laboratory Animals [10]. All experiments were conducted in accordance with international standards of animal welfare recommended by the Society for Neuroscience [11]. The experimental protocol was approved by the Bioethical Committee on Animal Research. The minimum number of animals and duration of observations required to obtain consistent data were employed.

#### Drugs and Chemicals

The positive controls were: Imipramine (Depsonil Tablet, Nicholas Piramal, India) was used as standard drug for

antidepressant effect and purchased from respective source. Ethanol (Hi Media, India) propylene glycol (Hi Media, India) was purchased from the respective sources and was of analytical grade.

### Treatment

The ethanol extract of *Anethum graveolens* was freshly dissolved in distilled water to be acutely administered to the rats. Doses of the extract and the time intervals were determined in preliminary tests. Imipramine (10 mg/kg) was dissolved in distilled water. Negative control groups received only distilled water. All administrations were performed intraperitoneally (i.p.) in a dose volume of 1 ml/kg body weight. Thirty minutes after i.p. treatment, the animals were submitted to a battery of behavioral tests.

### Source of dill Seeds

seeds of *Anethum graveolens* (dill) were collected from farm house. The identity of the seed was confirmed by the Institutional Botanist. A voucher specimen was kept in laboratory for future reference.

### Preparation of Aqueous Extract

Dried dill seeds were homogenized to a fine powder. Hundred grams of powdered coriander was infused in 500 ml cold ethanol for 24 h, brought to the boil, then removed from the heat source and allowed to infuse for 15 min. The extract was filtered, concentrated over the water bath and brought to dryness under vacuum. The yield of the extract was 8.7% (w/w).

### Acute toxicity study

Acute toxicity study was performed using the limit test dose of 2000 mg/kg as described by Organization for Economic Cooperation and Development guideline and Interagency Research Animal Committee recommendation [11]. Six female mice were dosed sequentially and followed for any signs of toxicity and/ or death within 24 h and then for 14 days thereafter.

### Forced Swim Test

The FST is the most widely used pharmacological model for assessing antidepressant activity [12]. The studies were carried out on mice according to the method proposed by [13]. The apparatus consisted of a glass cylinder (25 cm high × 12 cm diameter) filled with water (24 ± 1°C) up to 15 cm. Each animal was subjected to a pre-test session (15min) in the vessel 24 h before the swimming test which lasted 5 min. All test sessions were videotaped, and analyzed after the experiment; the immobility time (seconds) for each animal was registered. Mice were considered as immobile

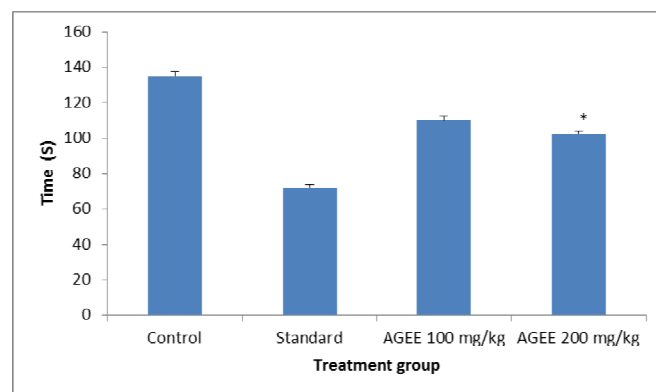
when they made no further attempts to escape, excepting the movements necessary to keep their heads above water. A decrease in the duration of immobility time in the test group compared to the control group indicates an antidepressant effect of the substance tested. Each experimental group consisted of 10–12 animals [14].

Table 1: Forced swimming test in mice

Group	Dose (mg/kg)	Immobility time (S)	Percentage Decrease in time
Control (distilled water)	-	135	-
Standard (Imipramine)	10	72	46.67
Test 1 AGEE	100	110	18.51
Test 2 AGEE	200	102	24.44*

(AGEE: *Anethum graveolens* ethanol extract)

Figure 1: Forced swimming test in mice



## RESULTS

### Acute toxicity test

At a single oral dose of 2000 mg/kg, seeds of *Anethum graveolens* Ethanol Extract showed no signs of toxicity or death in mice within the first 24 h and during the 14 days observation period.

### Forced swim test

The effects of AGEE on immobility time are shown in table 1 and figure 1. AGEE 200 mg/kg elicited significant reduction in immobility time as compared to the control.

antidepressant activity assessment of seeds of *Anethum graveolens* Ethanolic Extract (AGEE) 200 mg/kg by using forced swim test model shows significantly decrease in immobility time (24.44 %) as compared to standard (46.67 %) treatment group. The effect of treatment with AGEE on the immobility time was dependent of the dose.

## DISCUSSION

Antidepressant disorders comprise a major public health problem are the most prevalent psychiatric disorders worldwide. Because of the fact that the synthetic drugs are endowed with a plethora of problems; these search for therapeutic alternatives has been conducted largely by means of the study of medicinal plants. In this context, there has been a resurgence of interesting medicine from natural sources with the hope that drugs of plant origin will have significantly lesser side effects than that observed with synthetic drugs while having comparable efficacy. In the present study, the antidepressant effects of seeds of *Anethum graveolens* Ethanolic extract were evaluated using forced swim test on mice models, in which AGEE 200 mg/kg elicited significant reduction in immobility time as compared to the control.

## CONCLUSION

The present study investigated the putative behavioral effects of the seeds of *Anethum graveolens* Ethanolic extract. Thus, doses of 200 mg/kg of the extract produced a significant decrease in immobility time. The results of this study established a support for the traditional usage of seeds of *Anethum graveolens* as antidepressant medicinal plant.

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