

Neurological Assessment of Seeds of *Coriandrum sativum* by Using Antidepressant and Anxiolytic like Activity on Albino Mice

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Abstract: Seeds of *Coriandrum sativum* have been used in the Indian traditional medicine to relieve stress and other neurological disease conditions. The present study was under taken to evaluate the antidepressant and anxiolytic effects of seeds of *Coriandrum sativum* Ethanolic Extract (CSEE) in mice. Seeds of *Coriandrum sativum* ethanolic extract were screened for antidepressant effect by using forced swim test and anxiolytic effect by using locomotor activity at doses of 100 and 200 mg/kg. Distilled water and diazepam were employed as negative and positive control groups, respectively. Antidepressant activity assessment of seeds of *Coriandrum sativum* ethanolic extract (CSEE) 200 mg/kg shows significantly decrease in immobility time (70.96%) as compared to standard (58.70%) treatment group. While anxiolytic like activity assessment of seeds of *Coriandrum sativum* ethanolic extract (CSEE) 200 mg/kg shows significantly decrease in locomotion (59.64%) as compared to standard (33.92%) treatment group. The results of this study established a support for the traditional usage of seeds of *Coriandrum sativum* as antidepressant and anxiolytic medicinal plant.

INTRODUCTION

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. [1] The World Health Organization [2] 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. Anxiety is a highly prevalent psychological and physiological state characterized by cognitive, somatic, emotional and behavioral components and affecting one eighth of the total population of the world and became a very important area of research interest in psychopharmacology. [3, 4] Synthetic anxiolytic drugs are available for treating anxiety, but they are burdened with adverse effects and constraints on resources and time often render therapies such as psychologic interventions impracticable. Thus, an effective medication with few adverse effects would be a welcome addition to the therapeutic repertoire. Currently, the most widely prescribed medications for anxiety disorders are the benzodiazepines. However, the clinical uses of benzodiazepines are limited by their side effects such as psychomotor impairment, potentiation of other central depressant drugs and dependence liability. Therefore, the development of new medications possessing anxiolytic effect without the complications of benzodiazepines would be of great importance in the treatment of anxiety-related disorders. [5] People from different regions of the world have used herbal medicines to alleviate affective disorders for many years. In addition, the search for novel pharmacotherapy from medicinal plants for psychiatric

illnesses has progressed significantly in the past decade. [6] An increasing number of herbal products have been introduced into psychiatric practice, as alternative or complementary medicine and also there are a large number of herbal medicines whose therapeutic potential has been assessed in a variety of animal models. [6] In fact, these models have contributed to the screening of new psychopharmacological tools and to the understanding of their biological activity. [1] There is a traditional claim for the use of *Coriandrum sativum* for anxiety and a published research report on anxiolytic effect of *Coriandrum sativum*. [5] Additionally, some of the phytochemicals that have been reported to present in the extracts of *Coriandrum sativum* were demonstrated to elicit such pharmacological activities in different literatures.

MATERIALS AND METHODS

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±1°C in a 12-h light/dark cycle. Tap water and food pellets were available as *ad 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. [7] All experiments were conducted in accordance with international standards of animal welfare recommended by the Society for Neuroscience. [8] 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.

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Table 1: Forced Swimming Test in Mice

Groups	Dose (mg/kg)	Immobility Time (S)	Percentage Decrease in Time
Control (distilled water)	-	155	-
Standard (Imipramine)	10	91	58.70
Test 1 (CSEE)	100	125	80.64
Test 2 (CSEE)	200	110	70.96

Table 2: Locomotor Activity in Mice

Groups	Dose(mg/kg)	Locomotor Activity Count	Percentage Decrease in Locomotion
Control(distilled water)	-	280	-
Standard(Diazepam)	03	95	33.92
Test 1 (CSEE)	100	210	75.00
Test 2 (CSEE)	200	167	59.64

Drugs and Chemicals

The positive controls were: Diazepam (Calmpose Tablet, manufactured by Solrex Pharmaceuticals for Ranbaxy, Baddi, Himachal Pradesh, India) for anxiolytic activity and Imipramine (Depsonil Tablet, Abbott Healthcare, Solan, Himachal Pradesh, India) was used as standard drug for antidepressant effect and procured from respective source. Ethanol (Hi Media, Mumbai, India) propylene glycol (Hi Media, Mumbai, India) was purchased from the respective sources and was of analytical grade.

Treatment

The extract of *Coriandrum sativum* 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. Diazepam (3 mg/kg) was dissolved in 40% propylene glycol. 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 Coriander Seeds

Dried seeds of coriander were purchased from local market in Shaqra (Saudi Arabia). 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 coriander 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 7.9% (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.

[9] 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. [10] The studies were carried out on mice according to the method proposed. [11] 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 (15 min) 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. [12]

Locomotor Activity

Locomotor activity was recorded individually for each animal in Opto-Varimex cages (Columbus Instruments, USA) linked on-line to a compatible IBM-PC. The behavior of the rats was analyzed using Auto-Track software (Columbus Instruments, Columbus, USA). Each cage (43 cm × 44 cm × 25 cm) was equipped with a 15 × 15 array of infrared emitters located 3 cm from the floor surface. The number of light beams interrupted by an animal was recorded at 5 min intervals and was presented as the distance traveled in cm.

Statistical Analysis

The statistical significance was assessed using one way analysis of variance (ANOVA) followed by Dunnett comparison test. The values are expressed as mean ±SEM and p<0.05 was considered significant.

RESULTS

Acute Toxicity Test

At a single oral dose of 2000 mg/kg, seeds of *Coriandrum sativum* ethanol extract showed no signs of toxicity or

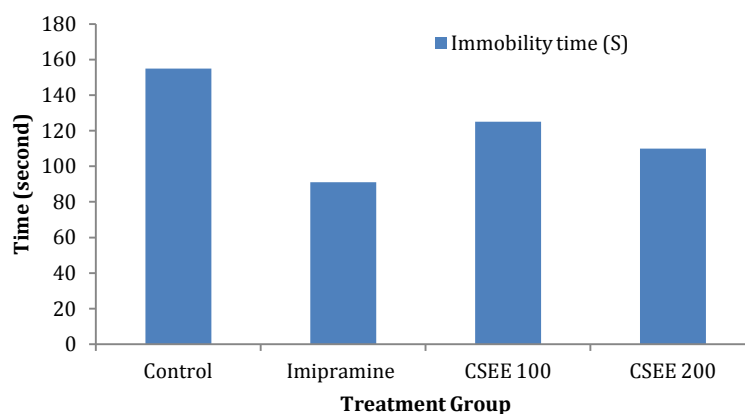


Figure 1: Forced swimming test in mice

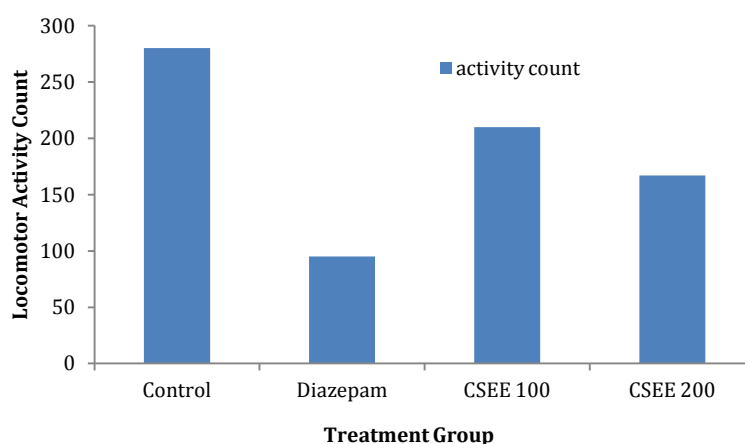


Figure 2: Locomotor activity in mice

death in mice within the first 24 h and during the 14 days observation period.

Forced Swim Test

The effects of CSEE on immobility time are shown in Table 1 and Figure 1. CSEE 200 mg/kg elicited significant reduction in immobility time as compared to the control. antidepressant activity assessment of seeds of *Coriandrum sativum* Ethanolic Extract (CSEE) 200 mg/kg by using forced swim test model shows significantly decrease in immobility time (70.96%) as compared to standard (58.70%) treatment group. The effect of treatment with CSEE on the immobility time was dependent of the dose.

Locomotor Activity

The effects of CSEE on locomotor activity count are shown in Table 2 and Figure 2. CSEE 200 mg/kg elicited significant reduction in locomotor activity count as compared to the control. Anxiolytic like activity assessment of seeds of *Coriandrum sativum* Ethanolic Extract (CSEE) 200 mg/kg by using actophotometer shows significantly decrease in locomotion (59.64%) as compared to standard (33.92%) The effect of treatment with CSEE on the locomotor activity count was dependent of the dose.

DISCUSSION

Antidepressant and Anxiety 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 arch 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. [6] In the present study, the antidepressant and anxiolytic effects of seeds of *Coriandrum sativum* ethanolic extract were evaluated using forced swim test and locomotor activity respectively on mice models, in which CSEE 200 mg/kg elicited significant reduction in immobility time and locomotor activity count as compared to the control. In our previous study it has been reported that seeds of *Coriandrum sativum* evaluated for anxiolytic like activity and analgesic activity by using elevated plus maze and hot plate method on mice, which showed significant effects. [5]

CONCLUSION

The present study investigated the putative behavioral effects of the seeds of *Coriandrum sativum* ethanolic extract. The extract was able to induce motor depressant effects after the i. p. Injection. Thus, doses of 100 mg/kg and 200 mg/kg of the extract produced a significant decrease in immobility time and locomotor activity. The results of this study established a support for the

traditional usage of seeds of *Coriandrum sativum* as antidepressant and anxiolytic medicinal plant.

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