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ANXIOLYTIC POTENTIAL OF VOLATILE OIL OBTAINED FROM *OCIMUM GRATISSIMUM*

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Abstract

In the present study the volatile oil of *Ocimum gratissimum* Linn. was investigated for its anxiolytic activity. Oral administration of Volatile oil from *O. gratissimum* exhibited dose dependent anxiolytic activity in elevated plus-maze model of anxiety. The volatile oil at a dose level of 400 and 800mg/kg exhibited a significant increase in time spent by mice in open arm of EPM model.

Keywords: Anxiety, Elevated Plus-Maze, *O. gratissimum*,

Introduction

Anxiety disorders are the most common mental illness in the world and became a very important area of research interest in psychopharmacology. Benzodiazepines are among the first line of drugs that have been extensively used for the last 45 years to treat several

forms of anxiety ^[1]. Although benzodiazepines have well-known benefits, their side effects are prominent, including sedation, muscle relaxation, anterograde amnesia and physical dependence ^[2]. It is because of these adverse effects that many pharmaceutical companies are conducting studies to find an alternative medicine or plant-derived medications with more specific anxiolytic effects. Some of these plants that have been tested and shown to ‘calm down’, tranquilize and raise mood include *Valeriana officinalis* ^[3-5], *Matricaria recutita* ^[6], *Passiflora caerulea* ^[7], *Salvia guaranitica* ^[8], *Tilia tomentosa* ^[9], *Tilia europaea* ^[10], *Stachys lavandulifolia* ^[11], *Echium amoenum* ^[12] and *Salvia reuterana* ^[13] Several *Ocimum* species belonging to family Lamiaceae are used to treat central nervous system (CNS) disorders in various parts of world. Its depressive ^[14] and insect control ^[15] activity has been reported. Published data from ethnopharmacological sources indicate the use of *Ocimum basilicum* as a sedative in Spain ^[16]. *Ocimum gratissimum* Linn has been used to cure CNS disorders since time immemorial. Despite the worldwide use of *O. gratissimum*, the pharmacological work on this plant in field of anxiolytic effect of volatile oil had not done.

Materials and Methods

Plant material

Plants of *O. gratissimum* were collected from the cultivated source from the nursery of National Institute of Pharmaceutical Education and Research, Mohali, Punjab, India in the month of April. The material was authenticated by Dr. H.B Singh, Head of Raw Materials Herbarium & Museum, National Institute of Science Communication and Information Resources (Consult no. 912/96) and a voucher specimen was deposited at Department of Pharmaceutical Sciences and Drug Research, Punjabi University, Patiala, Punjab, India for further references.

Preparation of extract

Essential oil was isolated from the fresh aerial parts of *O. gratissimum* Linn. by hydro-distillation using Clevenger apparatus, and condensing oil was collected in vials. Four sets of doses viz. 100, 200, 400 and 800 mg/kg of volatile oil were prepared by using suspending agent in the vehicle (1% v/v of tween 80 in normal saline). Diazepam 2 mg/kg suspended in the vehicle was used as a standard anxiolytic drug.

Animals

Swiss albino mice of either sex (20 – 25 gm) were procured from College of Veterinary Science, Izatnagar, Bareilly, Uttar Pradesh, India and kept at 25 ± 2 °C and relative humidity 42 - 54%, light and dark cycles of 10 and 14 h respectively for one week before and during the experiments in laboratory. The animals were allowed to standard diet and water *ad libitum*. The experiment was approved from Institutional Animal Ethical Committee (IAEC) and experiments were carried out in accordance with the ethical committee guidelines laid down by the local committee regarding the care and use of animals for experimental procedures.

Pharmacological evaluation

Animals were divided into six groups of six mice each. Mice of group I served as control and received (1% v/v tween 80 in normal saline) and mice of group II, received diazepam (2 mg/kg) as standard drug. Groups III, IV, V and VI administered 100, 200, 400 and 800mg/kg orally volatile oil. (Fig:1)

Anti-anxiety activity

Anti-anxiety activity was studied by elevated plus-maze test. The plus-maze apparatus consisting of two open arms (16x5 cm) and two closed arms (16 x 5 x 12 cm) having an open roof with the plus-maze elevated (25cm) from the floor was used to observe anxiolytic behaviour in animals ^[17]. The animals were fasted 18 hrs prior to the experiment and volatile oil was administered orally using an orogastric cannula. The dose administration schedule was so adjusted that each mouse was having its turn on the elevated plus maze (EPM) apparatus 45 minutes after the administration of the dose. Each mouse was placed at the center of the EPM with its head facing the open arms and during the 5 minutes of experiment the behaviour of the mouse was recorded for preference of the mouse for its first entry into the open or closed arms, the no of entries into the open arm and average time spent by the mouse in the open arm (total duration in arms/no of entries). During the entire experiment, the animals were allowed to socialize and every precaution was taken to ensure that no external stimuli could invoke anxiety in the animals ^[18, 19].

Statistical analysis

Results are expressed as mean S.E.M. \pm statistical difference. The data was analyzed by one way ANOVA and *post hoc* Tukey's multiple range test and results were considered significant when $p < 0.05$.

Results

The *O. gratissimum* at the dose levels of 400 and 800 mg/kg, significantly ($P < 0.05$) increased the time spent in the open arms relative to the control. There was no significant effect of *O. gratissimum* at 100 and 200 mg/kg hence further experiments were terminated with these doses.

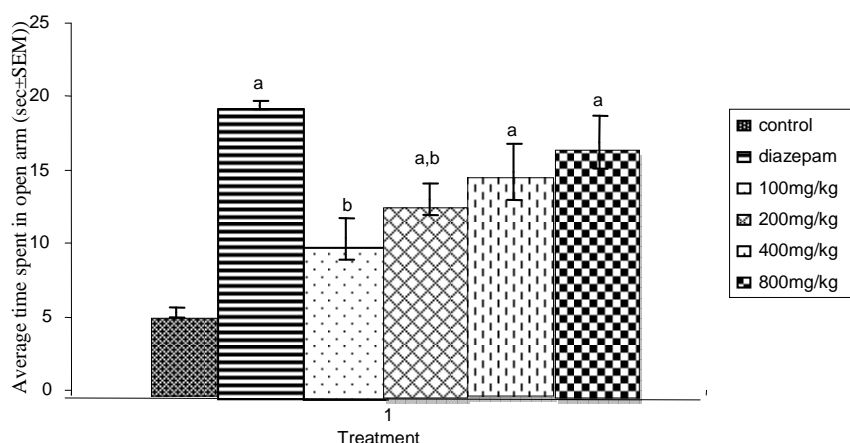


Figure 1: Effect of Volatile Oil of *O. gratissimum* Linn. On Time Spent in Open Arm

Value are mean \pm S.E.M. for six mice

^a $p < 0.05$ compared to Control

^b $p < 0.05$ compared to Diazepam (Standard Drug)

Discussion

The elevated plus-maze is currently one of the most widely used models of animal anxiety [20, 21]. All doses of volatile oil increased the time spent in open sided arms of the plus-maze. Treatment with volatile oil at a dose of 400 and 800 mg/kg showed a significant increase in time spent by mice in open arm of EPM. Other doses 100 and 200 mg/kg of volatile oil

also showed antianxiety activity but it was not significant. However, further investigations are required to find their mechanism of action.

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