



Research Article

Anti-depressant activity of some aroma oils on mice

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(Received: 16 May, 2012; Accepted: 3 June, 2012; Published: 30 June, 2012)

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ABSTRACT

Depression is one of the major CNS disorder in modern life and it affects around 5 % world population. With respect of competitive life style prevalence of depression and depression leads suicide is increasing day by day. Different therapeutic approaches are uses to treat depression. Aromatherapy is getting popularity as alternative therapy for treatment and management of CNS disorders. This present study was taken to evaluate the affect of Sandalwood Oil, Eucalyptus Oil, Lemon Oil , Jasmine Oil, and agarwood on depression. Activity on depression was studied in mice using Forced swim Test (FST) and Tail Suspension Test (TST). Duration of immobility was noted as index of depressive activity. All the oils except Eucalyptus oil decreased duration of immobility and Jasmine oil was statistically significant. Eucalyptus oil produced significant increased of duration of immobility. These finding suggests that Essentials oils can be used to treat the CNS related disorders and gives pharmacological evidence of aromatherapy.

KEY WORDS: Depression, Forced swim Test (FST) and Tail Suspension Test (TST), Essential oil, Aromatherapy.

INTRODUCTION

Depression is an affective disorder characterized by change in mood, lack of interest in the surroundings, psychomotor retardation and melancholia. The prevalence of depression in general population is estimated to be around 5%. At present 121 million people are estimated to suffer from depression. Suicide is one of the most common outcomes of depression^[1, 2]. To date, the efficacy of the drugs for depression is very limited so the need for newer, better-tolerated and more efficacious treatments is remaining high. Recently, the use of alternative therapy compared to novel pharmacotherapy gaining more popularity for treatment of psychiatric illnesses and behavioral illness.

Aromatherapy is gaining popularity in a log phase and is currently used worldwide in the management of chronic pain, depression, anxiety, some cognitive disorders, insomnia and stress-related disorders. Although essential oils have been used reputedly effectively for centuries as a traditional medicine, there is very little verified science behind this use. Therefore, the pharmacology of the essential oils and their chemical constituents remains largely undiscovered till date.

MATERIAL AND METHODS

Essential oils and animals:

Essential oils of sandalwood oil (*Santalum album*), eucalyptus oil (*Eucalyptus globules*), lemon oil (*Citrus limonum*), jasmine oil (*Jasminum sambac*) and agar wood oil (*Aquilaria agallocha*) were used in this study. All the oils were purchased and their qualitative tests were carried out. Mice of either sex weighing 20-25 gm of body weight were used in experiment. Animals were obtained from Anurag Pharmacy College, Kodad. Animals were kept under standard conditions at 23-25°C 12 hr light/dark cycle and given standard pellet diet and water.

Experimental design:

For all experiments the animals were randomly divided into six groups of six animals each. Prior to experiment, treatment groups are divided as follows-

- Group I: Control
- Group II: Treated With Sandalwood Oil.
- Group III: Treated With Eucalyptus Oil
- Group IV: Treated With Lemon Oil
- Group V: Treated With Jasmine Oil.
- Group VI: Treated With Agar wood Oil

All the animals were treated with essential oils as inhalation way. Animals are kept in inhalational

chamber for 30 min. and after 15 min of treatment the evaluation of activities were performed.

Method of inhalation

The animals are placed in a closed chamber of 1 cubic feet. Four pieces of cotton plugs are placed at the four corners of the closed chamber. 1 ml each of essential oils was spilled on to cotton plugs and kept the oils for inhalational for 30 min. A small amount of sodium bicarbonate is placed in the closed chamber in order to absorb the carbon dioxide released by the animals. A provision is made in the chamber for the entry of oxygen.^[3,4,5]

Test for CNS depressant or Stimulant activity

Forced swim test (FST)

The procedure used was based on that described by Porsolt² and modified to increase sensitivity by increasing water depth.^[138] Behavioral studies were carried out in the afternoon under low illumination. Mice were placed individually in Plexiglas cylinders 46 cm in height with a 21 cm internal diameter that were filled with water (25°C) to a depth of 15 cm. This depth was sufficient to keep adult mice from supporting themselves by placing their paws or tails on the base of the cylinder. Water was changed between each swim session to prevent possible effects of an alarm substance released by mice during the swim session. Animals were observed for duration of 6 minutes. The duration of immobility was recorded during the last 4 minutes of the observation period because each animal showed vigorous movement during initial 2 min period. The duration of the mouse was considered immobile when it floated motionlessly or made only those moments necessary to keep its head above the water surface. The water was changed after each test^[6]. Before treatment Animals were individually trained in 15min sessions and for 30 min all the animals are kept in inhalational chamber with respective drug and after 15 min each animal was placed on forced to swim in similar environment for a period of 6 min and duration of immobility time for each animal were recorded^[7].

Tail suspension test (TST)

Tail suspension test is behaviour despair model of depression, employed in rodents to predict antidepressant potential by decreasing immobility period produced by several different classes of antidepressant drugs^[8,9]. It has been reported that tail suspension test is less stressful and has higher pharmacological sensitivity than forced swim test, the other commonly employed model to study antidepressant activity. Mice were suspended on the edge of the table, 50 cm above the floor, with

the help of adhesive tape placed approximately 1 cm from the tip of the tail. The duration of immobility was observed for a period of 6 minutes. The duration of immobility was recorded during the last 4 minutes of the observation period. Mice were considered to be immobile only when they hung passively and were completely motionless. The animal was considered immobile when it did not show any movement of the body except for those required for respiration and hanged passively. Before treatment Animals were individually trained in 15min sessions and for 30 min all the animals are kept in inhalational chamber with respective drug and after 15 min each animal was placed on tail suspension test in similar environment for a period of 6 min and duration of immobility time for each animal were recorded.

Statistical Analysis

The statistical analysis was carried by one way ANOVA followed by Dunnet's multiple "t" test. P values < 0.05 (95% confidence limit) was considered statistically significant, using software Graph Pad Prism5.

RESULTS

Effect of essential oils on Forced Swim test (TST)

The results for the effect of aromas of selected essential oils on Forced swim test are given in Table-1 and illustrated in Fig. 1

The treatment with sandalwood oil, lemon oil, Jasmine and Agarwood oil (Gr-II, Gr-IV, Gr-V and Gr-VI) showed decreased in duration of immobility and Jasmine oil was significant ($p < 0.05$). Where eucalyptus oil treated (Gr-III) animals showed significant ($p < 0.001$) decreased in duration of immobility.

Effect of essential oils on Tail Suspension test (TST)

The results for CNS depressant or Stimulant activity on Tail Suspension test of selected essential oils are given in Table-2 and illustrated in Fig-2

The treatment with sandalwood oil, lemon oil, Jasmine and Agarwood oil (Gr-II, Gr-IV, Gr-V and Gr-VI) showed decreased in duration of immobility and Jasmine oil was significant ($p < 0.05$). Where eucalyptus oil treated (Gr-III) animals showed significant ($p < 0.001$) decreased in duration of immobility.

DISCUSSION

The CNS depressant and antidepressant activities were evaluated using Forced Swim and Tail

Suspension test. Duration of immobility is taken as anti-depressant activity and found Sandalwood oil, Lemon oil, Jasmine oil and Agarwood oil decreased the duration of immobility which indicates about their antidepressant activity. Moreover, Eucalyptus oil increased duration of immobility in both tests

CONCLUSION

From this works it becomes clear that aromas of essential oils have various pharmacological

activities and give valuable assets for using in aromatherapy. Further studies like Molecular Docking for active aroma components of each essential oils against different receptors like GABA, NMDA, Cholinergic and adrenergic receptors and different channels; neuro-chemical, and biochemical estimation of various transmitter are need to know the exact pharmacological mechanism of these oils.

Table-1: Effect of Essential oils on Forced Swim Test (FST)

Groups	Treatment	Duration of immobility (Sec); (Mean \pm SEM)
I	Control	80.00 \pm 4.49
II	Sandal wood oil	72.33 \pm 5.09 ns
III	Eucalyptus oil	139.00 \pm 7.81 ***
IV	Lemon oil	66.50 \pm 5.06 ns
V	Jasmine oil	56.83 \pm 5.60 *
VI	Agar wood oil	68.87 \pm 5.57 ns

(Values are in Mean \pm S.E.M (n=6); ^{ns} -Non Significant, *p<0.05, **p<0.01, ***p<0.001 when compared with Control using One way ANOVA followed by Dunnet's "t" test.)

Table-2: Effect of Essential oils on Tail Suspension Test (TST)

Groups	Treatment	Duration of immobility (Sec); (Mean \pm SEM)
I	Control	118.2 \pm 4.93
II	Sandal wood oil	106.0 \pm 5.75 ns
III	Eucalyptus oil	211.5 \pm 8.96 ***
IV	Lemon oil	96.33 \pm 8.79 ns
V	Jasmine oil	86.30 \pm 8.31 *
VI	Agar wood oil	90.83 \pm 7.51 ns

(Values are in Mean \pm S.E.M (n=6); ^{ns} -Non Significant, *p<0.05, **p<0.01, ***p<0.001 when compared with Control using One way ANOVA followed by Dunnet's "t" test.)

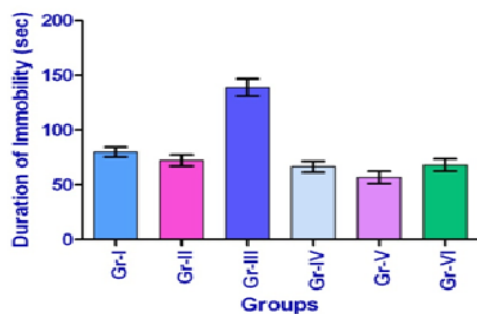


Fig-1: Effect of Essential oils on Forced Swim Test (FST)

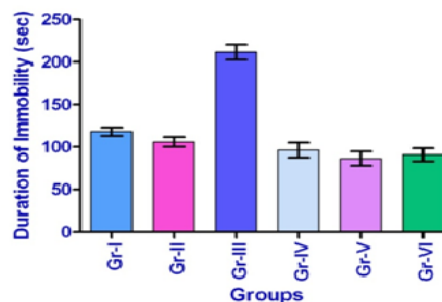


Fig-2: Effect of Essential oils on Tail Suspension

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