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## Antidepressant Activity of Cardamom oil by Marble Burying test in rats

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### ABSTRACT

The study was designed to investigate the antidepressant effect of cardamom oil (50mg/kg) against experimentally induced depression by marble burying test in rats. The marble Burying test consists of a Polypropylene rat cage (42cmx26cmx15cm) with a stainless steel lid. The floor of the cage was covered with 2cm layer of sawdust and 20 marbles were distributed throughout the cage. Control rats were kept in the marble containing cage one by one for a period of 30 minutes, after which they were removed and the marble burying response (a response to depression) was quantified by the number of marbles that were buried more than two third with sawdust. The same procedure is repeated with test (Cardamom oil 50mg/kg) and standard (amitriptyline 15mg/kg) after one hour of administration of cardamom oil and amitriptyline. It was observed that number of marbles buried with test extract treated rats was found to be  $4\pm 0.577$  and the number of marbles buried with control treated rats was found to be  $11\pm 2.646$ . Hence numbers of marbles buried by the test treated rats are less than the control treated rats. Hence by the decrease in number of marbles buried by cardamom oil treated rats when subjected to depression clearly indicates the presence of mood elevating components in cardamom oil. Preliminary phytochemical screening of cardamom oil indicates the presences of steroids, oil, fats and carbohydrates. Hence the above active constituents in the cardamom oil may be responsible for antidepressant activity.

**Key words:** Antidepressant activity, marble burying, cardamom oil, amitriptyline.

### INTRODUCTION

Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, decreased energy, feelings of guilt or low self-worth, disturbed sleep or appetite, and poor concentration<sup>1</sup>. Depression has a significant impact on an individual's ability to perform life activities<sup>2</sup>. People who were born in the later part of the 20th century seemed to have higher rates of depression and suicide than those of the previous generation, in part, because of high substance abuse and the rising demands in the standards of living<sup>3,4</sup>. Anti-depressant drugs which are used in the Allopathic system of medicine for the treatment of depression have side effects<sup>5</sup>. Nature always stands as a golden mark to exemplify the outstanding phenomena of symbiosis<sup>6</sup>. One of the advantages of herbal medicines is their complex composition. Their components have multiple activities that result in a greater total activity<sup>7</sup> Cardamom oil is particularly helpful for the digestive system. It works as a laxative and soothes colic, wind, dyspepsia and nausea - even nausea in pregnancy. It warms the stomach and helps with heartburn. When feeling weak and mentally fatigued, cardamom oil can help with its refreshing and uplifting effect<sup>8</sup>. However there are no in vivo studies till now to establish the mood elevating potential of cardamom oil. Hence the present study was designed to evaluate antidepressant activity of cardamom oil by using marble burying test in rats.

## MATERIALS AND METHODS

For the present study, the cardamom oil was purchased from DF Pharmacy limited at FP No.17&16/5, meldi estates at gota, Ahmedabad, Gujarat, India. The stock solution of cardamom oil was prepared by using 2% acacia solution and is used for as a suspension for phytochemical screening and invivo studies. Standard drug amitriptyline was collected from Microlabs ,bangalore and is suspended in 2% acacia solution.



Figure 1: Cardamom oil (DF Pharmacy Ltd. Gujrat, India)

### PRELIMINARY PHYTOCHEMICAL SCREENING<sup>9</sup>

Preliminary phytochemical tests were performed for the cardamom oil to detect the presence of phytochemicals by following the standard methods described in the practical pharmacognosy of kokate and khandelwal. The results have been tabulated in table I.

### Experimental Animals

Albino rats (150-360 gm) were used for the present research. They were procured from sainath agencies, musheerabad. After randomization into various groups and before initiation of experiment, the rats were acclimatized for a period of 15 days. Animals were housed in polypropylene cages and maintained under standard environmental conditions such as temperature ( $26 \pm 2^\circ\text{C}$ ), relative humidity (45-55%) and 12hr dark/light cycle. The animals were fed with rodent pellet diet (Golden Mohur Lipton India Ltd.) and water *ad libitum*. The study protocol was approved from the institutional animal ethics committee (IAEC) before commencement of experiment (1292/ac/09/CPCSEA).



Figure 2: Antidepressant activity of cardamom oil by using Marble burying test in rats

### Determination of acute toxicity

Doses of cardamom oil (50 mg/kg) and amitriptyline (15 mg/kg) was selected for the present antidepressant study in accordance with the literature findings<sup>10, 11</sup>.

**Evaluation of antidepressant activity of cardamom oil by using marble burying test in rats:**

Stock solutions of amitriptyline (15mg/kg) and cardamom oil (50mg/kg) were prepared in 2% acacia suspension. The control group rats were placed in the marbles containing cage for a period of 30 minutes and number of marbles buried was recorded. Repeat the same procedure for test group and standard group rats after 1hr of administration of cardamom oil (50mg/kg) and amitriptyline (15mg/kg) and number of marbles buried was recorded.

**Statistical Analysis**

The values are represented as mean  $\pm$  S.E.M, and statistical significance between treated and control groups was analyzed using One way ANOVA, Followed by Dunnett's test where  $P < 0.001$ ,  $P < 0.01$  and  $P < 0.05$  was considered statistically significant.

**RESULTS AND DISCUSSION**

The marble burying test is a useful model of neophobia<sup>12</sup>, anxiety and obsessive compulsive Behaviour. This behavior belongs is probably a type of defensive burying typical of rodents<sup>13</sup>. In the marble burying test in rats it was observed that the number of marbles buried with cardamom oil (50mg/kg) treated rats ( $4 \pm 0.577$ ) is less than the number of marbles buried observed with control treated (distilled water, p.o.) rats ( $11 \pm 2.646$ ). This reduction in marble burying shows that in cardamom oil treated rats there is a inhibition of depression. However number of marbles buried with standard (amitriptyline 15 mg/kg) treated rats was found to be  $2 \pm 0.577$  indicating that cardamom oil possesses lesser antidepressant effect than standard amitriptyline. It is evident from the literature that carbohydrates possesses significant antidepressant activity<sup>14</sup>. Hence carbohydrates present in cardamom oil may be responsible for their mood elevating potential. Further it is required to isolate the active constituents from the cardamom oil and to study individual active ingredients thoroughly.

**Table I: Preliminary Phytochemical screening of Cardamom oil**

Phytoconstituents	Cardamom oil
Flavonoids	-
steroids	+
carbohydrates	+
fats	+
oil	+
Glycosides	-

- Absent, + Present

Tables II, III & IV representing antidepressant activity of cardamom oil by using marbles buring test in albino rats

**Table II: Control: (Distilled water p.o)**

S.NO	Body Weight(gms)	No. of marbles buried after 30 minutes interval
1(head)	150	06
2(body)	170	12
3(blank)	160	15
		Average = $11 \pm 2.646$

**Table III: Test (cardamom oil 50 mg/kg)**

Sl.no	Body weight (gms)	Vol. of drug administered (ml)	No. of marbles buried after 30 minutes interval
1(head)	225	1.12	04
2(body)	250	1.25	05
3(blank)	225	1.12	03
			Average = $4 \pm 0.577^{**}$

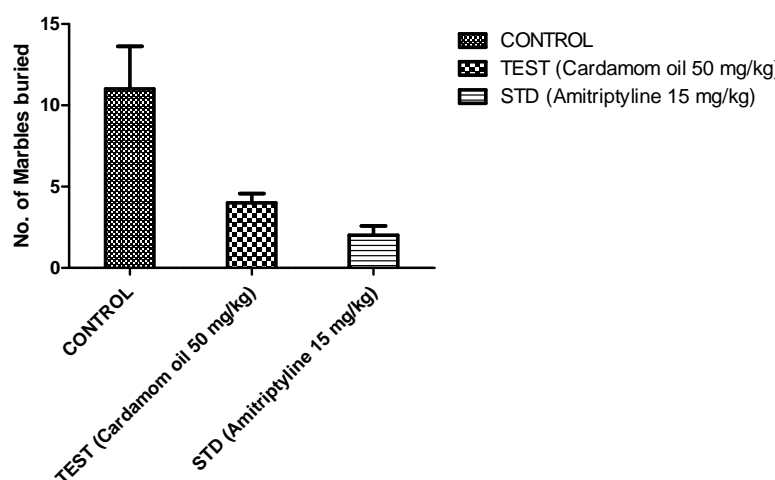
$***P < 0.001$ ,  $**P < 0.01$  and  $*P < 0.05$  was considered statistically significant.

**Table IV: Standard Group :( Amitriptyline 15mg/Kg)**

S.no	Body weights(gms)	Vol. Of drug to be administered (ml)	No. of marbles burried after 30 minutes interval
1	170	0.85	02
2	300	1.5	03
3	360	1.8	01
			Average = $2 \pm 0.577^{***}$

$***P < 0.001$ ,  $**P < 0.01$  and  $*P < 0.05$  was considered statistically significant.

Figure 3: Graphical representation of number of marbles buried by Control, test and standard in marble burying test in rats



### CONCLUSION

Based on the investigations of the present study, it is concluded that cardamom oil (50 mg/kg) has significant mood elevating potential. Cardamom oil at dose 50 mg/kg has significantly reduced the number of marbles buried when compared to control treated rats indicating the inhibition of depression in test rats. The precise mechanism behind antidepressant potential of cardamom oil is not understood. However it can be hypothesized that cardamom oil may increase the monoamine levels at the synapse of the brain neurons either by inhibiting MAO or by inhibiting the reuptake of monoamines. Further studies are required to isolate and explore the active constituents of cardamom oil and to investigate the exact antidepressant mechanism of cardamom oil.

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