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# Sedating property of Ethanolic root extract of *Carpolobia lutea* in swiss white mice

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## ABSTRACT

*Carpolobia lutea* (*C. lutea*) is widely used as an alternative medication for varying health disorders. The present study investigated the effect of the ethanolic root extract of this plant, *C. lutea* on locomotor and exploratory behavior in male Swiss white mice using the open field maze, and light-dark transition box. 30 Male Swiss white mice made up of 10 per group were used for the study. Group 1 was the control group, and was administered 0.9% normal saline. Groups 2 and 3 were administered 200mg/kg and 400mg/kg ethanolic root extract of *C. lutea* respectively. Administration was via oral gavage, 5 minutes before introduction into the experimental mazes. The number of line crosses, frequency of rearing, walling activity, and central square entries following drug administration, was dose dependently decreased ($p < 0.001$) compared with the untreated group. There was also a corresponding increased ($p < 0.001$) frequency, and duration of freezing behaviour in the extract treated groups. These indices imply that root extract of *Carpolobia lutea* reduces locomotor and exploratory behaviour; a possibility that *C. lutea* possesses a sedating property, thus reducing the activity of the amygdala with a consequent calming effect.

**Keywords:** *Carpolobia lutea*, Sedation, Open field maze, Light-dark transition box.

## INTRODUCTION

Despite the success of Western medication, whole plants and plant parts are in everyday use to combat various health conditions. *Carpolobia lutea* is one of the tropical plants with proven medicinal properties [1]. Commonly known as 'cattle tree', it is called 'Agba', 'Nyayanga' and 'Egbo Oshushun' by the Ibos, Ibibios and Yoruba, respectively. It is reputable for its anti-inflammatory, anti-arthritic and anti-microbial activity [2, 3, 4, 5].

It is also reported to possess anti-plasmodia, anti-diarrheal, and anti-ulcer activity [6, 7]. Jackson *et al*, [8] also established that *C. lutea* has an analgesic activity. It is employed in folklore medicine for the management of mental health challenges [9]. And work from our laboratory has also shown that its root extract improves memory, but increases anxiety [10, 11]. However, its effect on exploratory and locomotor behaviour which is overtly increased in mania has not been investigated thus, the bane of the research.

## MATERIALS AND METHODS

### Preparation of plant extract

Botanical identification of *Carpolobia lutea* was at the herbarium unit of the department of Botany, University of Calabar, with a batch number UCB-BT08. Its roots were harvested from Bendi in Cross River state, Nigeria. They were washed, chopped into bits and oven-dried before grounded into coarse powder. 400g of the powder was percolated in 1250ml of ethanol (BDH Ltd Poole, England) over night. Standard procedures were followed to produce a crude extract of 4.3%.

The dry crude was reconstituted to a stock of 500mg/ml in 0.9% saline from which various dose concentrations were obtained.

### Experimental Animals

30 male Swiss white mice (15g-33g) were used for the study after approval by the University of Calabar College of Medicine Ethical Committee. The animals were kept in cages under experimentally controlled conditions during the experimental period. The rats had access to feed (Vital Feeds Nig Ltd) and tap water *ad libitum.*

**Experimental Procedure**: **Measurement of Locomotor and exploratory behavior**

The open field maze and Light-Dark transition box were used to investigate locomotor and exploratory behaviour following standard procedures of Walsh and Cummins, 1976. The experimental groups were administered 200mg/kg and 400mg/kg of the extract representing the low and high dose groups. The control group was given 0.9% normal saline. Administration was via oral gavage, and was done 5 minutes before testing on the open field maze and light-dark transition box.

Mice were carried to the test room in their home cages and tested one at a time for five minutes each. Using a plastic container, the mice were scooped up and introduced into the test apparatus for exploration. After the five minutes exploration, the mice were taken by the base of their tails back into their cages. nd returned to their home cages. The mazes were cleaned with methylated spirit between trials to avoid olfactory cues.

Behaviours scored (Brown *et al.*, 1999) include:

1. Line crosses. Frequency with which the mice cross one of the grid lines with all four paws.
2. Centre square entries. Frequency with which the mice cross one of the red lines with all the four paws into the central square.
3. Rearing. Frequency with which the mice stand on their hind legs on the maze without aid of a wall.
4. Walling. Frequency with which the mice stand on their hind legs against a wall of the open field.
5. Freezing. duration and frequency with which a mouse is completely stationary.

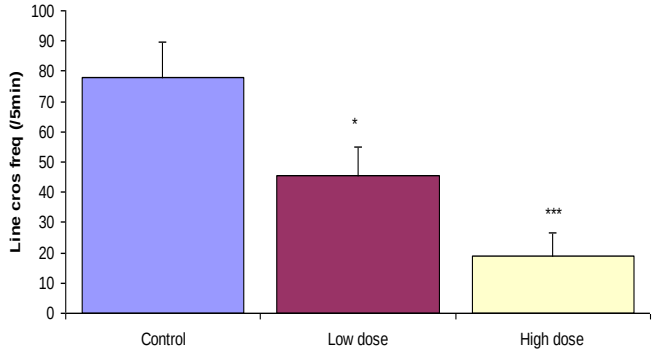
**Data Analysis**

ANOVA (Analysis of variance) was used to analyze the data. Result is presented as mean ± standard error of the mean (SEM), and P<0.05 is considered significant.

## RESULTS

**Frequency of lines crosses in the open field maze**

The line crosses among the control, low dose and high dose groups were 248 ± 2.03, 200.3 ± 1.80, and 141.9 ± 5.33 respectively. The line crosses was dose-dependently decreased (p<0.001) in the extract treated groups when compared with the control. This is presented in figure 1.

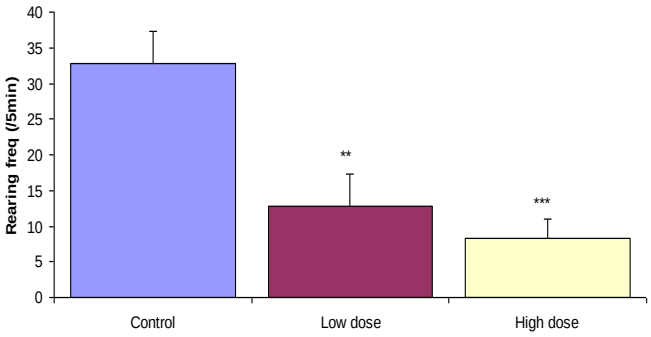



* - p< 0.05 vs control; *** - p < 0.001 vs control

**Figure 1:** Comparison of lines crosses in the open field maze

**Frequency of rearing in the light-dark transition box**

Rearing in the control, low dose, and high dose groups was 30.8 ± 0.49, 21.1 ± 0.57 and 14.9 ± 0.60 respectively. There was a dose-dependent decreased (p<0.001) rearing activity in extract treated groups compared with the control. This is presented in figure 2.

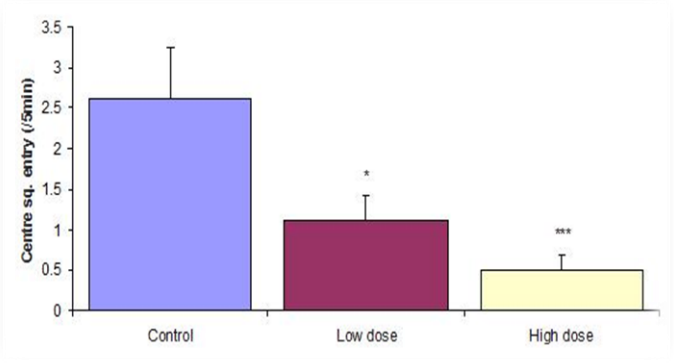



** - p < 0.01 vs control; *** - p < 0.001 vs control

**Figure 2:** Comparison of frequency of rearing in the light-dark transition box

**Frequency of centre square entries in the open field maze**

The frequency of centre square entries in the control, low dose and high dose groups was 18.6 ± 1.15, 12.5 ± 0.81, and 3.2 ± 0.51 respectively. The result showed a dose-dependent decreased (p<0.001) centre square entry of extract treated mice compared with the control. This is presented in figure 3.

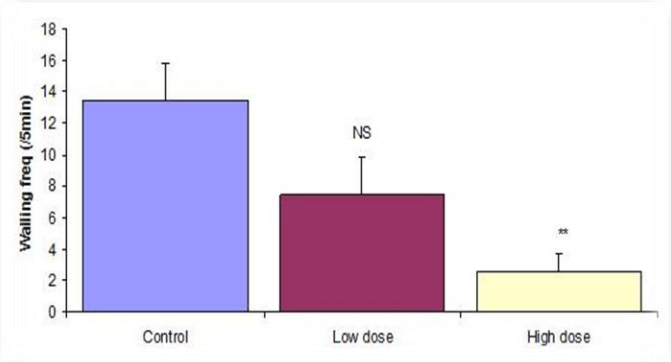



* - p< 0.05 vs control; *** - p < 0.001 vs control

**Figure 3:** Comparison of frequency of centre square entries in the open field maze

**Frequency of walling in the open field maze**

The frequency of walling in the control, low dose and high dose groups was 28.8 ± 1.21, 24.1 ± 1.80, and 15.3 ± 0.62 respectively. The result showed a dose-dependent significant (p<0.001) decreased frequency of walling in the extract treated groups when compared with the control. The result is presented in figure 4.

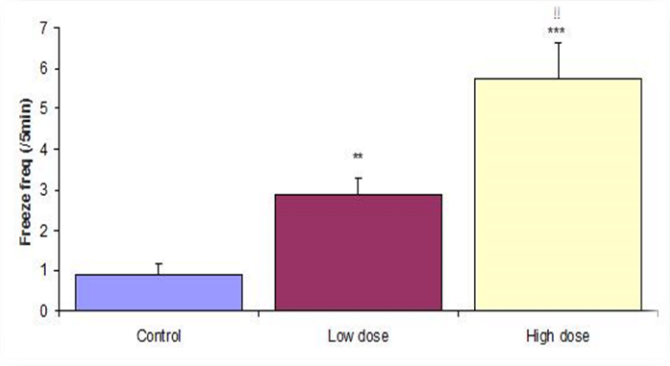



** - p < 0.01 vs control

**Figure 4:** Comparison of frequency of walling in the open field maze

**Frequency of freezing in the open field**

The frequency of freezing in the control, low dose and high dose groups was 0.51 ± 0.12, 2.91 ± 0.27 and 5.7 ± 0.22 respectively. There was a dose-dependent significant ($p<0.001$) increase in frequency of freezing in the extract treated group compared with the control. This is presented in figure 5.




** - p < 0.01 vs control; *** - p < 0.001 vs control; !!! - p < 0.001 vs low dose

**Figure 5:** Comparison of frequency of freezing in the open field

## DISCUSSION

This research focused on the effect of ethanolic root extract of *Carpolobia lutea* on locomotor and exploratory behaviour in Swiss white mice. The open field maze, and Light-Dark transition box was used to assess locomotor and exploration.

Indices such as rearing and frequency of line crosses are used as a measure for locomotor behaviour, and frequency of walling, number of centre square entries and centre square duration on the other hand, are measures tests of exploration. A high frequency and duration of these indices indicates high locomotor and exploratory behaviour [12, 13]. On the contrary, a high frequency, and duration of freezing activity indicates less exploration behaviour [14].

The number of line crosses, frequency of rearing, walling activity, and central square entries following drug administration, was dose dependently decreased. There was also a corresponding increased frequency, and duration of freezing behaviour in the extract treated groups. These indices imply that root extract of *Carpolobia lutea* reduces locomotor and exploratory behaviour; a possibility that *C. lutea* possesses a sedating property, thus reducing the activity of the amygdala with a consequent calming effect.

## CONCLUSION

Results from this study suggest that *Carpolobia lutea* at the experimented dose has a sedating effect, thus causes a decrease in locomotion and exploration of the experimental animals. If these results are extrapolated to man, *C. lutea* could be useful in the management of overtly increased locomotor and exploratory behaviour amongst maniacs.

## REFERENCES

1. Nwidu l, Nwafor P. Gastroprotective effects of leaf extracts of *Carpolobia lutea* (polygalaceae) G. Don. in rats. African Journal of Biotechnology 2009; 8(1):012-019.
2. Iwu MM, Anyawu MN. Phytotherapeutic profile of Nigerian herbs: Anti-inflammatory and anti-arthritic agents. Journal of ethnopharmacology 1982; 6(3):263-74.
3. Ajibesin KK. Chemical and antimicrobial studies of the constituents of selected medicinal plants of Akwa Ibom State. University of Uyo. A Ph.D Thesis of the Faculty of Pharmacy, 2005; 79-83.
4. Philip AI, Jones OM, Herbert, AO. Phytochemical and antimicrobial screening of three Nigerian medicinal plants used to treat infectious diseases traditionally. Journal of Pharmacy and Bioresources 2005; 2(2):116-119.
5. Ettebong E, Nwafor P. In vitro antimicrobial activities of extracts of *Carpolobia lutea* root. Pakistan Journal of Pharmaceutical Sciences 2009; 22:335-338.
6. Joanne B, Habib G, Marie-Caroline J, Mitchel F, Fernand G, Patrick D. In vitro antiplasmodial activities of plants used in Benin in traditional medicine to treat malaria. Journal of Ethnopharmacology 2009; 122:439-444.
7. Nwafor, Bassey. Anti-ulcer activity of the root extract of *Carpolobia lutea* in rats. African Journal of Biotechnology 2010; 9(1):8-15.
8. Jackson C, Mbagwu H, Jackson J, Ekpe G, Etienam F. Analgesic activities of ethanolic extract of the root of *Carpolobia lutea*. African Journal of Pharmacy and Pharmacology 2011; 5(3):367-370.
9. Burkill HM. Useful plant of West Tropical Africa (Families E-J), Royal Botanical Gardens Kew. 1994; 11:90-94.
10. Beshel JA, Nneli RO, Beshel FN, Mfem CC, Nku CO. Ethanolic Root Extract of *Carpolobia lutea* improves Memory. Research and Reviews: Journal of Medical and Health Sciences 2014; 3(2):86-90.
11. Beshel JA, Nneli RO, Bisong SA, Beshel FN, Mfem CC. Acute Administration of Ethanolic Root Extract of *Carpolobia lutea* (Cattle stick) increases Anxiety. Research and Reviews: Journal of Medical and Health Sciences 2014; 3(2):42-47.
12. Walsh RN, Cummins RA. The open field test: a critical review. Psychology Bulletin 1976; 83:482-504.
13. Kim S, Lee S, Ryu S, Suk J, Park C. Comparative analysis of anxiety-related behaviours in four inbred mice. Behavioural Procedure 2002; 60:181-190.
14. Brown R, Corey S, Moore A. Differences in measures of exploration and fear in MHC-congenic C57BL/6J and B6-H-2K mice. Behaviour Genetics 1999; 26:263-271.

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