Anxiolytic, antidepressant and anti-inflammatory activities of water-soluble extract of beehive in Swiss albino mice

Abu Montakim Tareq[1], A.S.M. Ali Reza[1,*], Talha Bin Emran[2,*]

[1] Department of Pharmacy, International Islamic University Chittagong, Kumira, Chittagong-4318, Bangladesh; [2] Department of Pharmacy, BGC Trust University Bangladesh, Chittagong-4381, Bangladesh;

*Correspondence: alirezaru@gmail.com (A.S.M.A.R.); talhabmb@bgctub.ac.bd (T.B.E.);

ABSTRACT

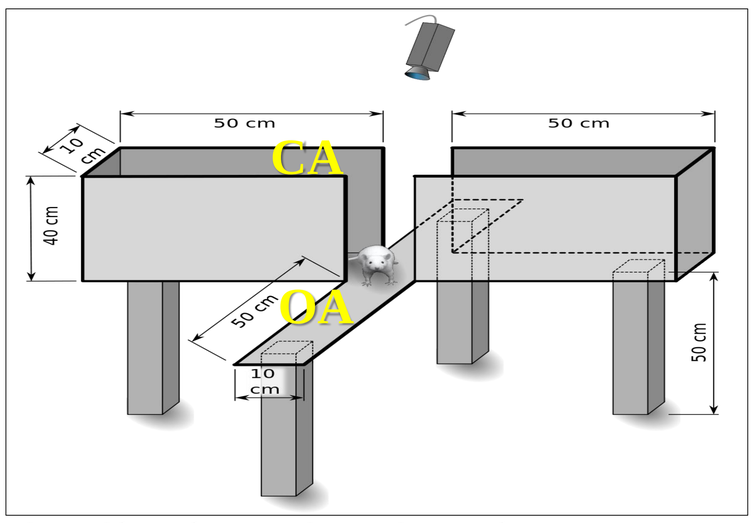
Water-soluble extract of beehive (WSE-BH) is a gummy semisolid bioactive content of *Apis cerana indica* beehive. The current experiment aimed to determine the anxiolytic, antidepressant, and anti-inflammatory activities of WSE-BH, which extracted using distilled water. Anxiolytic and antidepressant activities examined using elevated plus maze (EPM), hole-board test (HBT), and forced swimming test (FST), tail suspensions test (TST), respectively in Swiss albino mice (27-32 g) of both sexes. Histamine-induced paw edema used for its anti-inflammatory activity of WSE-BH during acute inflammation induced in mice. The oral administration of WSE-BH (50 & 150 mg/kg) showed significant anxiolytic activities through time spent (30.80 and 38.19 %) and entry (47.16 and 53.89 %) in the open arm of EPM. In HBT, only 150 mg/kg exhibited a significant mean number of head dipping (7.53 times/min; $P < 0.01$) vs. diazepam (12.87 times/min; $P < 0.0001$). In FST and TST, both 50 and 150 mg/kg exhibited a significant ($P < 0.0001$) reduction in immobility comparable to imipramine hydrochloride. WSE-BH produced a significant inhibition of histamine-induced paw edema starting at 60 min time point, with a maximal percentage of inhibition (80.12%) achieved with a dose of 150 mg/kg at 180 min time point. The current results suggested that WSE-BH has promising anxiolytic, antidepressant, and anti-inflammatory activities.

Keywords: *Apis cerana indica* beehive; anxiolytic; antidepressant.

1. MATERIALS & METHODS

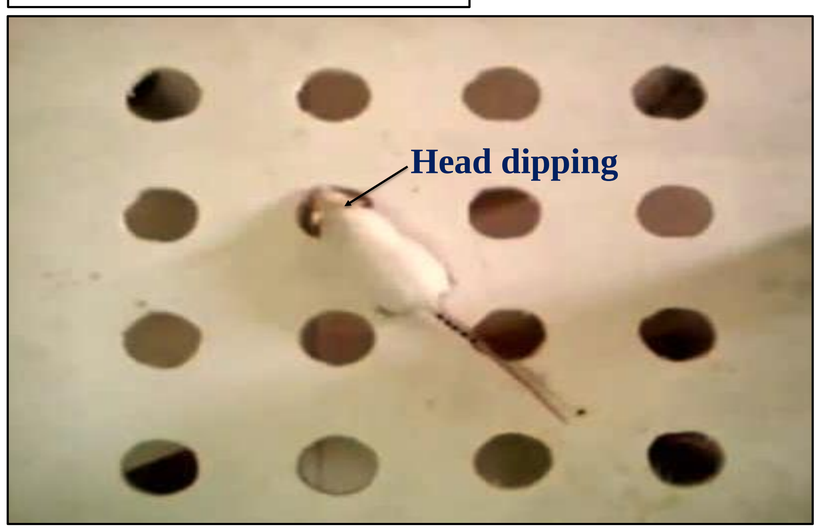
1.1. Anxiolytic activity

1.1.1. Elevated plus maze (EPM)



CA= Closed Arm; OA = Opened Arm

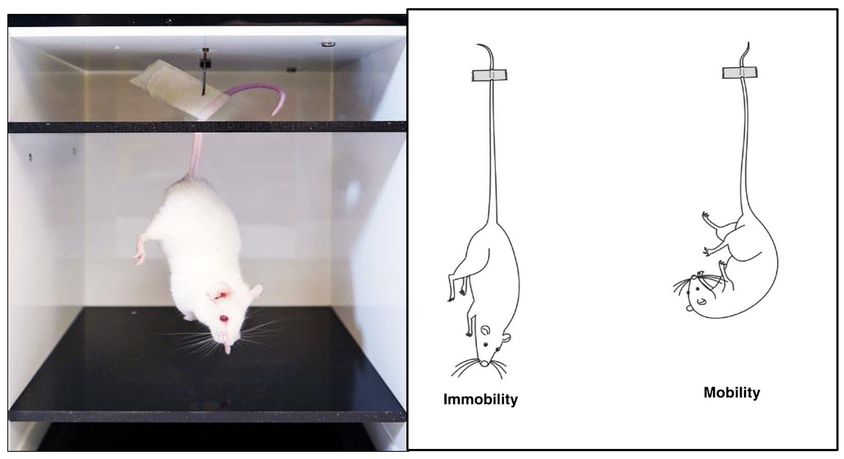
1.1.2. Hole board test (HBT)



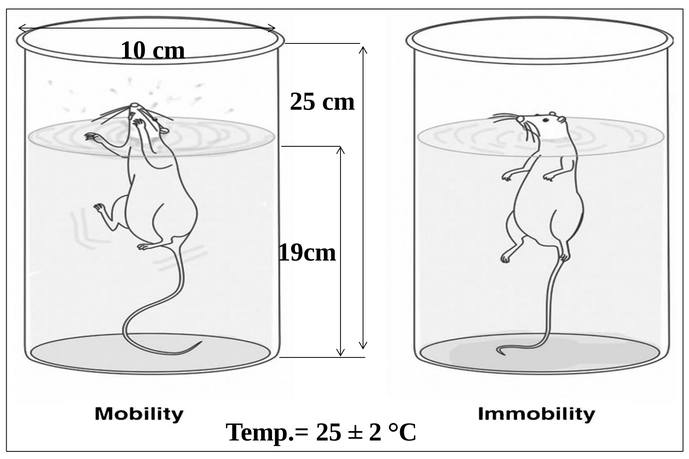
WSE-BH = 50 & 150 mg/kg b.w., Diazepam = 1 mg/kg b.w. & Control (10 mL/kg), Time = 5 min/trial

1.2. Antidepressant activity

1.2.1. Tail suspension test (TST)



1.2.2. Forced swimming test (FST)



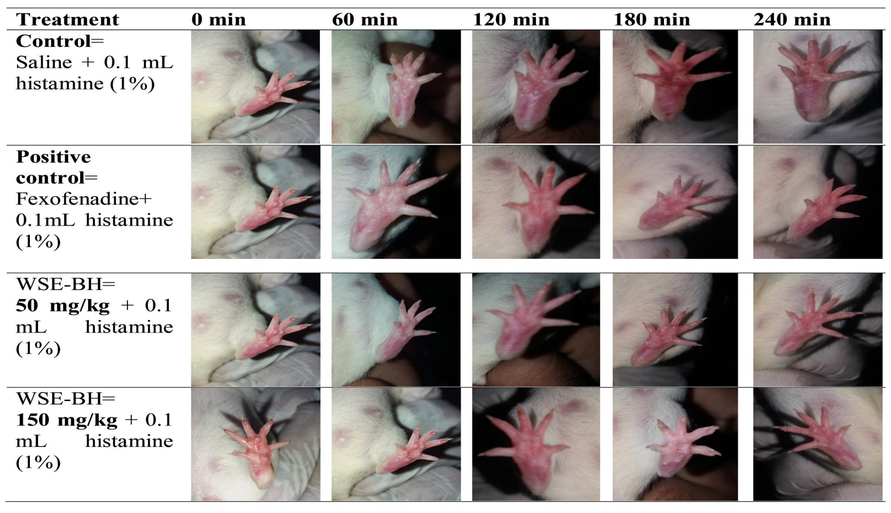
WSE-BH = 50 & 150 mg/kg b.w., Imipramine = 20 mg/kg b.w. & Control (10 mL/kg),Time = 6 min/trial

1.3. Anti-inflammatory activity

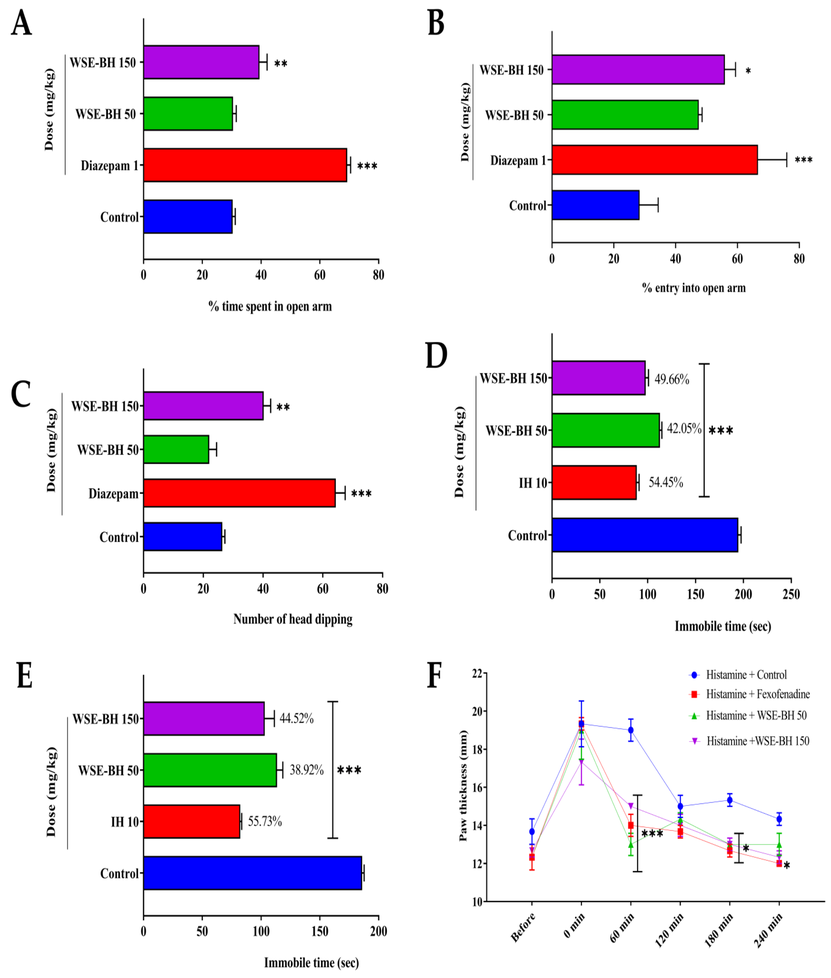
1.3.1. Histamine-induced paw edema

- Treatment with WSE-BH & control
- 5 days
- Induced 0.1 mL histamine (1%) in Sub-plantar region of hind paw
- Measure paw thickness in 0, 60, 120,180 and 240 min.

Positive control fexofenadine - administered 60 min before histamine injection & measure the paw thickness.



2. RESULTS



Treatment of Swiss albino mice with WSE-BH (50 and 150 mg/kg) showed significant anxiolytic, antidepressant and anti-inflammatory effects in comparison to control whereas the diazepam, imipramine hydrochloride and fexofenadine used as positive control.

- **(A & B) - EPM test - % time spent & entry in open arm**
- **(C)- HBT- Number of head dipping**
- **(D & E)- FST & TST**
- **(F)- Histamine induced paw edema**

Values are expressed as mean ± SEM. [a]$P < 0.05$, [b]$P < 0.01$ and [c]$P < 0.001$ compared to the control (n=5).

3. CONCLUSION

- **The WSE-BH exhibited a significant anxiolytic and anti-inflammatory effects.**
- **A similar result observed by the WSE-BH and imipramine whereas the 150 mg/kg showed the maximum inhibition.**
- **The active compounds might be responsible for the pharmacological effects which required further study to evaluate the mechanism of WSE-BH.**

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