



Evaluation of Antidepressant- Like Activity of Aqueous Extract of *Musa Sapeintum* (Flowers) in Mice.

KEYWORDS

Musa sapientum linn, antidepressant activity, FST, AEMS, Imipramine

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ABSTRACT

Bananas and plantains (*Musa* spp.) are grown extensively throughout the tropical and subtropical regions of the world. 'Bananas' refers to all the members of the genus *Musa*. By literature survey different parts of *Musa sapientum* have been studied for hypoglycaemic activity, hypolipidemic, anti hypertensive, wound healing, diuretic, anti ulcerogenic activities. The banana peel extract and banana fruit were found to have anti depressant activities. But there is no sufficient evidence in literature for anti depressant activity of banana flowers. As it is well known by some experts that banana flowers contain magnesium and it reduces anxiety and boost the mood, so it is said to be natural antidepressant without any side effects. Hence the present investigation was undertaken to study the anti-depressant activity of aqueous extract of *Musa sapientum* (AEMS) flower using FORCED SWIMMING TEST (FST) as an experimental animal model method.

INTRODUCTION

Depression is a significant public health problem that can occur to anyone and are likely to occur on adults in between the age of 20-50 years old with no relations to race, education status, civil status or income (WHO, 2010; Khandel wal et al., 2001).¹ According to WHO, depression affects about 121 million people worldwide and is among the leading cause of disability worldwide as measured by Years Lived with Disability (YLDs). In year 2000, depression is the fourth leading contributor to the global burden of disease. It is predicted that by the year 2020, depression is projected to reach second place of the Disability Adjusted Life Years (DALYs) ranking calculated for all ages and both sexes, diagnosed and treated in primary care, the treatment with medication and brief structured psychotherapy is effective for 60-80% of those affected by depression. However fewer than 25% of the affected people have access to the effective treatments (WHO, 2010). Several classes of antidepressants are being used to treat depressions which have side effects such as blurred vision, restlessness, nervousness, sexual problems, agitation and suicidal thoughts (Department of Health and Ageing, 2003; Kahn et al., 2001; NIMH, 2008).² To reduce the impact of depression, there is an urge to provide a cost effective treatment to the public. With increased incidence of depression, natural herbs that have antidepressant effects have gained more attention recently as alternative treatment for depression. *Musa sapientum* (musaceae) is extensively cultivated throughout India, as one of most popular fruit crop. The banana flower is large and maroon coloured cone shaped flower with cream coloured florets layered inside, and it hangs from the bottom of the bunch of bananas. Banana flowers are rich in vitamins like C and E, flavonoids, pro-

tein, minerals like potassium, calcium, iron, copper, phosphorous, magnesium and dietary fibre³. It is free from sodium. This flower has been used as a traditional medicine to treat bronchitis, constipation, menstrual cramps⁴ and ulcer problems. It boosts mood and reduces anxiety because the banana flowers are rich in magnesium. The journal phytotherapy research study shows, the oral intake of banana flower extract for 30 days may significantly reduce the blood sugar levels in diabetic patients^{5,6} and increase the haemoglobin levels. Banana flower has an antioxidant, anti microbial⁷ and hypoglycemic activities. The food science and biotechnology recommended the use of banana flower extracts to make health supplements due to its medicinal properties. But there is no evidence in literature for anti depressant activity of Banana flowers. Hence the present study was undertaken to study the anti depressant activity of flowers of *Musa sapientum* using forced swimming test.

MATERIALS AND METHODS

- PLANT MATERIAL:
- *Musa sapientum* flowers were obtained from Divili, East Godavari Dist, AP. The plant was identified and authenticated by the department of Botany research Office, MSN Degree College, Andhra University.
- ANIMALS: 36 Swiss albino mice of either sex (30-40gms) were obtained from the central animal house, Department of pharmacology, Alluri Sita Ramaraju Academy of Medical Sciences, Eluru. The Animals were maintained under controlled room temperature (25±2°C) and 12:12 h light-dark cycle is during the experiments. They were feed with balanced rodent pellet diet and water *ad libitum* throughout the ex-

perimental period. Before conducting the experiment, ethical clearance was obtained from Institutional animal ethical committee and was executed according to the guidelines of committee of purpose of control and supervision of the experiments on animals (CPSEA) India.

- DRUGS Imipramine hydrochloride tablets were used in this study. All drugs were dissolved in distilled water and administered orally.
- EXPERIMENTAL METHOD

FORCED SWIMMING TEST

The animals were divided into six groups, each group comprised of six mice. The banana flower extract and imipramine was dissolved in normal saline. On the test day, the mice was forced to swim individually in a glass jar (25×12×25 cm³) containing fresh water of 15 cm height and maintained at 29°C (± 2°C) after 60 min of the administration of last dose (Bergner et al., 2010; Cryan et al., 2005) ⁸After an initial 2 min period of vigorous activity, each animal assumed a typical immobile posture. A mouse was considered to be immobile when it remained floating in the water without struggling, making only minimum movements of its limbs necessary to keep its head above water. The total duration of immobility was recorded during the next 4 min of a total 6 min test. The changes in immobility duration were studied and compared after administering drugs in separate groups of animals. The water was changed to fresh water after each session to eliminate excrement, urine and fur. Each animal was used only once (Velraj et al., 2009; Kalra et al., 2008).⁹

Data analysis:

The datas obtained were analyzed by One way analysis of variance (ANOVA) and followed by Dunnett’s multiple comparison tests. The levels of statistical significance ranged from p<0.05 to p<0.001. All the result obtained are expressed as mean± SEM.

RESULTS:

TABLE SHOWING EFFECT OF AEMS ON DURATION OF IMMOBILITY TIME IN THE FST.

GROUPS(N=6)	TREATMENT	FST(DURATION OF IMMOBILITY) IN SEC
FST 1	Normal Saline	226±2.5
FST 2	IMIPRAMINE	28.5±1.1 **
FST 3	AEMS(150mg/kg)	191.1±1.8**
FST 4	AEMS(200mg/kg)	165±7.7**
FST 5	AEMS(250mg/kg)	80.6±6.2**
FST 6	AEMS(300mg/kg)	77.3±0.6**

Test solutions were administered orally 60min prior to the test. Values represented mean±SEM (n=6), **p<0.0001 vs control (group1).

CHART - 1

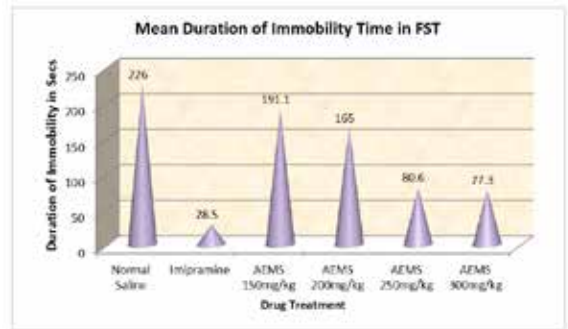
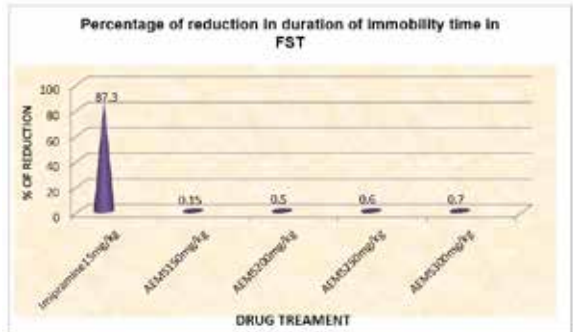


CHART - 2



The anti-depressant effects of Aqueous extract of Musa sapeintum flowers (150mg/kg, 200mg/kg, 250mg/kg and 300mg/kg) and imipramine were studied by observing the changes in the duration of immobility in experimental animal model i.e FST. In FST, Musa sapeintum (at all four doses) p.o showed significant reduction (p<0.0001 which is highly significant) in the immobility period when compared with that of control group animals that received only normal saline. But when test drug extract was compared with standard drug imipramine the percentage of reduction in the duration of immobility time is highest with imipramine only. Results with all the three doses of AEMS were not statistically comparable with standard drug.

DISCUSSION

Mood disorders are one of the most common mental illnesses with a life time risk of 10% in the general population. Stressful lifestyle facilitates the evolution of depressive disorder as the stress influences the function of CNS by altering a number of neurotransmitters, endocrine and neuroendocrine systems (Gopalakrishna et al., 2010).¹⁰ The most lethal complication of depression is the suicidal behaviour (Khandelwal et al., 2001; Sudhakar et al., 2010)¹¹. Despite the widely use of synthetic drugs to treat depression, these drugs often associated with adverse effects and limitations. The search for a natural product with fast onset of action, wide safety margin and less side effects has come to attention. The effective components of herbs that have antidepressant-like effect includes flavonoid, oligosaccharide, polysaccharide, alkaloid, organic acid (Velraj et al., 2009). Earlier reports on the chemical constituents of banana fruit and banana peel and their pharmacology suggest that these parts of banana plant containing the neurotransmitters norepinephrine, serotonin and dopamine possess activity against depression. Some earlier reports also suggest that plants rich in flavanoids as present in Hypericum perforatum also possess anti depressant activity. Banana flowers containing high level of magnesium and flavanoids are believed to reduce anxiety and boost the mood. They

are natural anti depressants without any side effects. So the present study was designed to elucidate the effect of banana flower extract in treating depression in mice.

The FST model of depression is widely used to screen new anti depressant drugs. These test is quite sensitive and relatively specific to all major classes of antidepressant drugs including tricyclic antidepressant, serotonin specific reuptake inhibitors, monoamine oxidase inhibitors and atypical. In the present study, *Musa sapientum* (150mg/kg, 200mg/kg, 250mg/kg and 300mg/kg) produced significant dose dependent anti-depressant effect in behavioural despair tests when compared to control group animals that received only normal saline but the percentage of reduction in the duration of immobility time was not comparable to imipramine.

CONCLUSION

From this preclinical study, we can conclude that the aqueous extract of *Musa sapientum* flowers showed a significant depressant activity in FST when compared with control. This effect however may be due to the presence of flavanoids in the banana flowers. But the result was not comparable with the standard drug. Further research is required to gain closer insights to conclude its anti-depressant action.

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