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Research Article

**EVALUATION OF ANTI-DEPRESSANT ACTIVITY OF
EMBLICA OFFICINALIS IN RATS USING ETHANOLIC
EXTRACTION METHOD*****Gade Kavitha¹, Vaddeboina Sowmya¹, V. Sony², R. Thanesh², Papagatla Poli Reddy³, and
Dr. K.N. Venkateswara Rao⁴**¹Associate processor, Department of Pharmacology, Nalanda College of Pharmacy,
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Cherlapally(V), Nalgonda(D), Telangana(S), India, 508001.⁴Professor & Principal, Nalanda College of Pharmacy, Cherlapally(V), Nalgonda(D),
Telangana(S), India, 508001.**Abstract:**

The present study was carried out to investigate the phytochemical constituents & anti-depressant activity of *Embllica officinalis* fruit in forced swim test(FST). *Embllica officinalis* (EO) contains tannic acid, flavonoid & vitamin-C (Ascorbic acid) as its main ingredient and its compounds has been shown to have non-selective mono-amine oxidase activity. Adult rats weighing 250gms were used in the study. Standard drug amitriptyline (10mg/kg) and test drug (EO) were suspended in 1% gum acacia. The amitriptyline (10mg/kg) and EO (20mg/kg, 40mg/kg) were administered 60 min prior to study. In our study both amitriptyline and EO significantly reduced the time period of immobility in both experimental models as compared to animals in control group. The anti-depressant activity of EO comparable to that of standard drug amitriptyline. The results of the present study indicate the potential for use of EO as an adjuvant in the treatment of depression.

Keywords: Forced swim test, *Embllica officinalis*, Depression, amitriptyline, immobility.**Corresponding author:****Gade Kavitha,**

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INTRODUCTION:

Depression (major depressive disorder) is a frequent mental disorder, characterised by the presence of sadness, loss of interest or pleasure, feelings of guilty or lack of self-esteem, sleep or appetite disorders, feeling tired and lack of concentration.

TYPES OF DEPRESSION:

Depression includes 7 types-

1. Major depressive disorder (MDD)
Major depressive disorder is characterized by loss of interest, presence of sadness, fatigue it is acute depression .
2. Persistent depressive disorder (PDD)
Persistent depressive disorder has symptoms that last 2 years or more. Other names for this condition include dysthymia and dysthymic disorder. It is a chronic stage of depression.
3. Postpartum depression:
Postpartum depression refers to depression that develops within the first year of giving birth.
4. Bipolar depression:

Bipolar disorder is a mood disorder characterized by periods of abnormally elevated mood known as mania. These periods of A major can be mild (hypomania) The vast majority of those with bipolar illness also have episodes of major depression.

5. Seasonal affective depression (SAD):
Depression can occur in a seasonal pattern, most affected in winter season and can in summer season.
6. Premenstrual dysphoric depression (PDD)
PMDD is a condition a woman has severe depression symptoms, irritability and tension before menstruation. Occurs due to blood drainage, inability to concentrate, feeling guilty.
7. Situational depression:
Situational depression, or adjustment disorder, occurs in some people who experience a traumatic or life-altering event. Mostly diagnosed in children & adolescents.



Plant: *Emblica officinalis*

Family: Phyllanthaceae

Uses: anti-oxidant, anti-cancer, cardio-protective agent, hepato- protective agent, anti-microbial, anti-pyretic, analgesic.

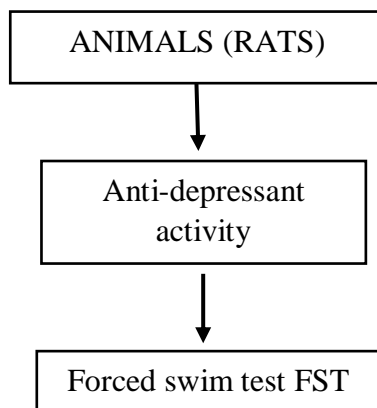
Figure-1 AMLA

Emblica officinalis (EO) Gaertn, commonly known as Amla. All parts of the plant are used for medicinal purpose. The fresh or the dry fruit used in traditional medicines for the treatment of diarrhoea, jaundice and inflammations. The pulp of the fruit is smeared on the head for head ache and dizziness, the aqueous extract of EO has shown significant anticataleptic and antioxidant activity in mice. EO fruits mainly contains tannins and vitamin C like substances in abundance and their chemical constituents include gallic acid,

ellagic acid, emblicanin A, emblicanin B, Punigluconin and some 10-12 flavonoids. The aqueous extract of the EO fruits contain 30.0% tannins and 10.0% Gallic acid. EO fruit is an important constituent of “Triphala”, an Ayurvedic formulation known for its rejuvenating properties. Based on previous studies shows that significant involvement of a central action, we have investigated the anti-depressant activity of EO fruit ethanolic extract (EO) using behavioural models for screening anti-depressants; Forced swimming test (FST).

MATERIALS AND METHODS:**MATERIALS:****Table-1:** material for anti-depressant activity

S.NO	MATERIALS
1	Gum acacia
2	Amitriptyline
3	Lead acetate
4	Mayers reagent
5	Bromine water
6	H ₂ SO ₄ & Alpha naphthol

SCHEME OF WORK:**Figure-2:** Scheme of work**EXPERIMENTAL ANIMALS:**

Adult rats of either sex weighing about 250grms were used for the study. Animals were housed the animals were housed at 26±2 °C with 12:12 h light and dark cycle. They had free access to food and water. Experiment was carried out according to the guidelines recommended by Committee For The Control and Supervision Of Experiments on Animals (CCSEA), Government of India.

Drugs and chemicals:

The standard antidepressant Amitriptyline was obtained from our institutional pharmacy. The test drug *Emblica officinalis* fruit was extracted by using 95% ethanol as solvent at 35 °c for 48 hours through Soxhlet apparatus. Phytochemical screening assessed by their respective chemical tests, positive results for flavonoids, tannins, vitamin-C, alkaloids, polyphenols. Extract were dissolved/suspended in 1% gum acacia.



Figure-3: extraction of *Emblica officinalis* fruit



Figure-4: chemical test

Table-2: chemical test of EO

Test	result
Flavonoids	+
Tannins	+
Alkaloids	+
carbohydrates	-
Polyphenols	+

EXPERIMENTAL DESIGN:

Animals were divided into 4 groups (n=4); each group contains 2 animals. EO extract dissolved in 1% gum acacia and administered orally, at dose range about 20-50mg/kg. Test drug/ vehicle can administered to animals 60 min prior

Group-1: Control administered water (10ml/kg) orally.

Group-2: Receive standard drug (amitriptyline) 10ml/kg orally.

Group-3: Receive test drug EO fruit extract low dose 20mg/kg orally.

Group-4: Receive test drug EO fruit extract high dose 40mg/kg orally.

The antidepressant activity of the test drug was evaluated using the following experimental models of depression FST:

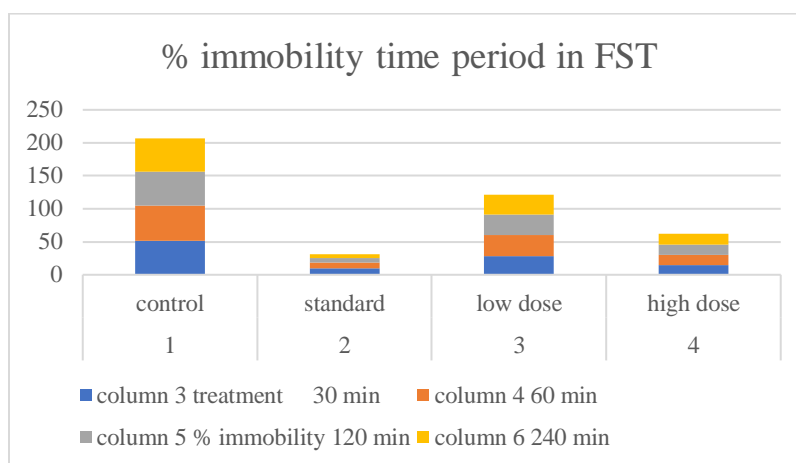
Forced Swim Test (FST): This method was described by Porsolt, et. al. We placed each animal individually in open container, (diameter 30cm & height 230cm) filled with water up to half of container and observed for duration of 15 minutes for first study. After 24 hours again rats were placed in container for 5 minutes, the duration of immobility was recorded during the last 3 minutes of the observation period. The rat was considered immobile when it floated motionlessly or made only those moments necessary to keep its head above the water surface.



Figure-5: forced swim test

RESULTS:**Table-3:** % immobility time of EO in FST

column 1 s.no	column 2 treatment	column 3 30 min	column 4 60 min	column 5 120 min	column 6 240 min
1	control	51.8	52.8	51.6	50.6
2	standard	9.8	8.6	6.9	5.8
3	low dose	28.3	32.3	30.9	29.7
4	high dose	14.4	15.3	15.8	16.4



- The study found that ethanolic extract of *Emblca officinalis* fruit exhibited significant antidepressant like effect in rats compared to control group
- The extract demonstrated dose- dependent improvements in behavioural test such as forced swim test indicating enhanced mood & reduced depressive –like behaviours
- The antidepressant –like effect were pronounced at higher dose of the extract, suggesting a dose- dependent relationship & reduced oxidative stress in brain, contributing to observed behavioural improvements
- Rats treated with ethanolic extract of *Emblca officinalis* fruit exhibited significantly increased mobility in the forced swim test indicating an antidepressant –like effect.

DISCUSSION:

Emblica officinalis (EO) fruit is an important constituent of “Triphala”, an Ayurvedic formulation known for its rejuvenating properties.

We have evaluated the anti-depressant activity of EO in rats through FST by placing in water containing cylinder where rats were inescapable. The ethanolic extract of *Emblica officinalis* fruit demonstrate significant antidepressant like activity in rat models. Extract likely modulator neurotransmitter systems, & reduce oxidative stress, controlling to the observed antidepressant effects. The antidepressant activity of the extract was comparable to (or) exceeded that of the positive control drugs tested. The results of this study provide compelling evidence that the ethanolic extract of *Emblica officinalis* fruit possess potent antidepressant like properties in rodent models. The extract was able to significantly improve behavioural measures of depression and anxiety suggesting its potential as a natural therapeutic option.

CONCLUSION:

Depression the most common condition in primary care. But is often unrecognized and untreated depression having a high rate of morbidity & mortality when left untreated. In conclusion, the study demonstrated the promising antidepressant – like effect of ethanolic extract of *Emblica officinalis* fruit in rats. The extract exhibited significant improvement in forced swim test indicating its potential as a natural therapeutic option for depression. the antidepressant activity may be attributed to the presence of tannic acid, gallic acid, polyphenols, flavonoids and ascorbic acid in the extract. Tannic acid has been shown to be a non-selective inhibitor of monoamine oxidase, thereby increasing the levels of monoaminergic neurotransmitters in the brain. Future research should investigate the underlying mechanisms of action & explore the extracts efficacy in clinical settings. Additionally evaluate the long-term safety and tolerability of the extract. Exploring the synergistic effects of *Emblica officinalis* with existing antidepressant medications could also be a valuable avenue for future investigation.

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CONFLICTS OF INTEREST

None to declare for all authors

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