Scholars Academic Journal of Pharmacy (SAJP)
Abbreviated Key Title: Sch. Acad. J. Pharm.
©Scholars Academic and Scientific Publisher
A Unit of Scholars Academic and Scientific Society, India
www.saspublisher.com

ISSN 2347-9531 (Print)
ISSN 2320-4206 (Online)

Pharmacology

Pharmacological Evaluation of Leaf Extract of *Terminalia bellerica* with *Moringa oleifera* for its Synergistic action on Anti-Anxiety Activity in Rats

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Original Research Article

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Article History
Received: 10.05.2018
Accepted: 17.05.2018
Published:30.05.2018

DOI:
10.21276/sajp.2018.7.5.2

Abstract: To evaluate the pharmacological action of leaf extract of *Terminalia bellerica* with *Moringa oleifera* for its synergistic action on anti-anxiety activity in rats. The pharmacological evaluation of standardized aqueous extract of the leaves of *Terminalia bellerica* with *Moringa oleifera* was carried by using the following Stimuli model: Anti-anxiety activity by Elevated plus Maze. The parameters of various activities to assess anti-anxiety were evaluated and found That, The combination of extracts possess a better response then alone. The aqueous leaf extract of the combination of *Terminalia Bellerica* with *Moringa oleifera* has shown significant anti-anxiety activity when compared with standard and extract alone.

Keywords: *Moringa oleifera*, *Terminalia bellerica*, Elevated plus maze, Anti-anxiety activity.

INTRODUCTION

Anxiety disorders are among the most common psychiatric disorders that affect all age groups of the general population[1]. It characterized as concern or fear about some defined or undefined future threat and emotional behavior, unpleasant mood, uneasiness and discomfort associated with disability in both educational and professional life. Anxiety exhibited negative impact on quality of life and increases suicidal behavior in individuals[2] Major drug classes for the treatment of anxiety disorders are benzodiazepines and selective serotonin-reuptake inhibitors (SSRIs). However, these compounds have a number of undesirable effects such as insomnia, muscle relaxation and hepatotoxicity.

These considerations implicate the search for new anxiolytic compounds that have a fast onset of action present with less side effects and a wider safety margin. Medicinal plants are a good source to find new remedies for these disorders.

Terminalia bellerica also referred to as, Beleric Myrobalan belonging to family Combretaceae. *Terminalia bellerica* is used in traditional medicine due to the wide spectrum of pharmacological activities associated with the biologically active chemicals present in this plant. The phytoconstituents isolated from various parts of the plant include alkaloid, coumarin, flavones, steroids (β- Sitosterol), lignans (termilignan, thannilignan), tannins (gallic acid, ellagic acid), glycosides (fructose, sucrose,galactose), terpenoid (belleric acid and chebulagic acid), saponin (bellericoside and bellericanin). *Terminalia bellerica* is one such plant showing multifarious medicinal properties viz. analgesic activity, antibiofilm activity, anticancer activity, antidepressant activity, antidiabetic activity, antidiarrhoeal activity, antiulcer activity, immunomodulatory activity, antispasmodic and bronchodialatory activity, antifertility activity, antihypertensive activity, antifungal, antimicrobial activity, anti-inflammatory activity, antioxidant activity[3].

Moringa oleifera Lam, popularly called "the miracle tree", is a monogeneric plant of the family *Moringaceae*. *Moringa oleifera* is rich in minerals, carbohydrates, proteins, fats, moisture, crude fiber, and ash contents *M. oleifera* leaves have been used by local traditional healer in treatment of various ailments such as diabetes, gastric discomfort, stomach ulcer, diarrhea, and dysentery and skin infections. The leaves have also been found to possess antitumor, antipyretic, antiepileptic, anti-inflammatory, anti-ulcer, anti-hypertensive and anti-oxidant properties. Phytochemical analysis of Moringa oleifera showed the presence of flavonoid, anthraquinone, alkaloids, saponins, steroids, terpenoids, cardiac glycoside, anthocyanintannins and carotenoid in aqueous extract[4].

MATERIALS AND METHODS

Collection of leaves

The leaves of *Terminalia bellirica* were collected from Chalapathi Institute of Pharmaceutical Sciences and authenticated by DR. P. Satyanarayana Raju, Dept. of botany & microbiology, Acharya Nagarjuna University, Guntur.

Preparation of plant extract:

Fresh leaves of *terminalia bellerica* were washed and shade dried at room temperature for 10-15 days and powdered with the help of a mechanical grinder and 30gm of leaves powder was extracted separately with 250ml of distilled water to obtain aqueous extract with the help of Soxhlet apparatus. The extract was collected in Petri dishes and evaporated till dry at 40ºC in an incubator. Then the extract was sealed with aluminum foil and stored at 4ºC for further experimental work.

Experimental animals

Sprague-dawely rats are weighing about 160g were obtained from animal house, Chalapathi Institute of Pharmaceutical Sciences, Guntur. The experimental protocol was approved by the Institutional Animal Ethics Committee. The animals were housed in large spacious cages and were fed with standard pellet diet and water ad libitum. The animals were maintained under their respective controlled temperature conditions for 30 days before experiment. The animals were allowed to acclimatize to laboratory conditions for 48 h before the start of the experiment.

Experimental Design

Sprague-dawely rats either both sex were divided into four groups containing five animals in each.

- Group-1- Control group (0.9% Normal saline 5ml/kg orally)
- Group-2 –Aqueous leaf extract of *terminalia bellerica* (100mg/kg orally)
- Group-3 –Aqueous leaf extract of *terminalia bellerica* and *Moringa oleifera* (100mg/kg orally)
- Group-4-Standard group (Diazepam 2ml/kg i.p)

After 5mins of the administration of test compounds, the animals were taken for the following tests for screening its anxiolytic activity

Screening for Anti-anxiety activity

***Elevated plus maze** [5]*

To measure the level of anxiety in rodents, elevated plus maze was used. Three potential anxiogenic factors are open space, height, and novelty. The cross-shaped maze consists of 4 arms that are interconnected by a central platform. Two opposing arms are surrounded by side and end-walls (closed arms), whereas the remaining 2 arms are unprotected (open arms). The set-up consists of a maze of 2 open arms (16 cm × 5 cm), crossed with walls (12 cm high) and central platform (5 cm × 5 cm). The maze is suspended 25 cm above the room floor. The animal was placed on the central platform, facing one of the open arms, and observed for 5 minutes (300 seconds). During the 5-min test period, the time spent in open and enclosed arms were recorded.

RESULTS

Table-1: Observation of Anti-Anxiety activity of control group

Animals	5mins	15mins	30mins	60mins	120mins
1	24	29	32	56	50
2	31	33	38	37	41
3	22	27	25	29	32
4	19	27	24	28	33
5	30	28	37	25	29

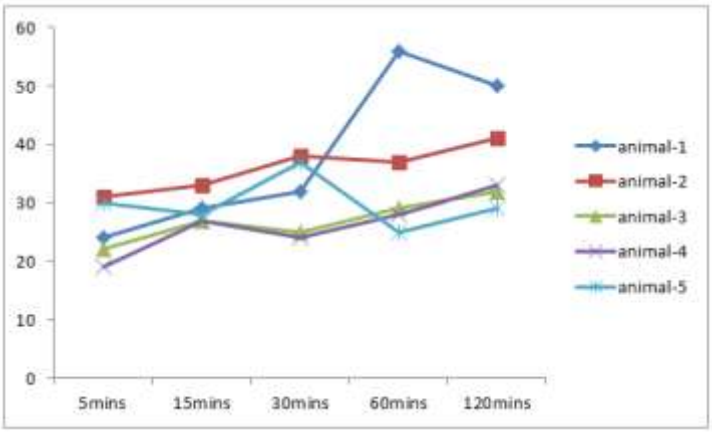

Fig-1: Anti-Anxiety activity of Control group

Table-2: Observation of Anti Anxiety activity of Test-I

Animals	5mins	15mins	30mins	60mins	120mins
1	27	36	45	73	64
2	29	36	39	58	54
3	34	39	46	51	48
4	21	24	23	58	49
5	31	37	44	62	53

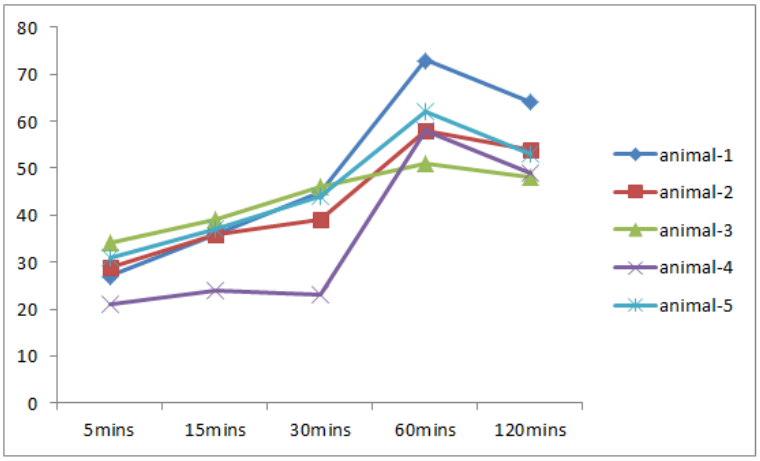

Fig-2: Anti Anxiety Activity of Test-I

Table-3: Observation of Anti Anxiety activity of Test-II

Animals	5mins	15mins	30mins	60mins	120mins
1	29	35	41	73	75
2	33	54	66	82	80
3	44	59	76	93	83
4	52	61	84	97	86
5	50	64	69	78	71

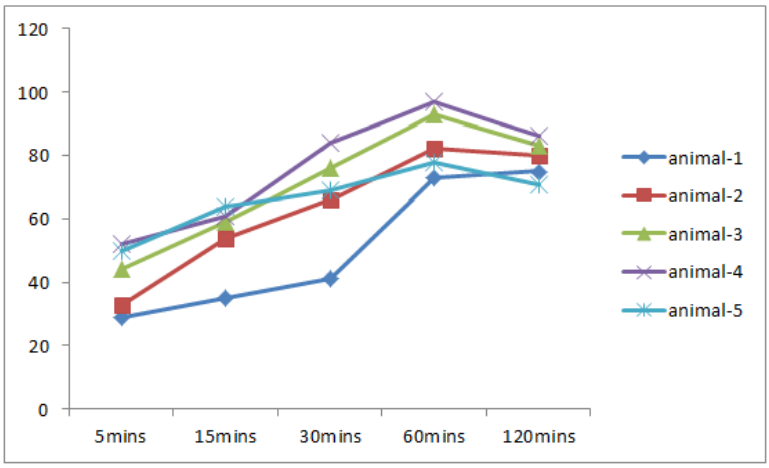

Fig-3: Anti Anxiety Activity of Test-II

Table-4: Observation of anti-Anxiety activity of Standard group

Animals	5mins	15mins	30mins	60mins	120mins
1	22	27	39	44	52
2	29	36	41	45	49
3	45	52	56	63	67
4	54	63	68	71	67
5	50	63	65	74	68

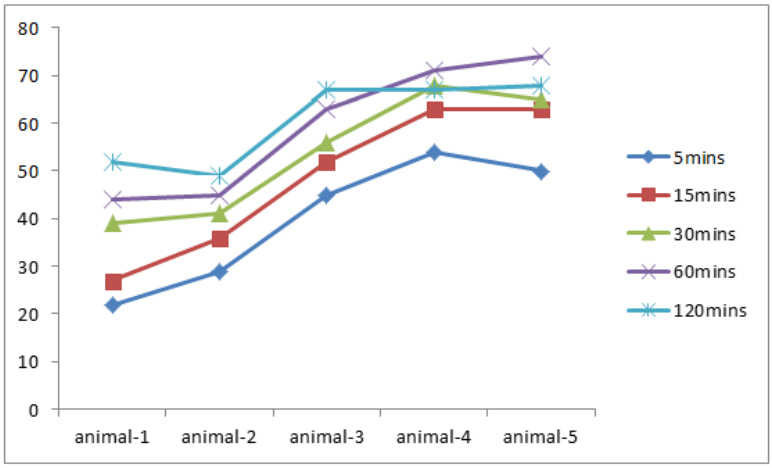

Fig-4: Anti Anxiety Activity of Standard group

Table-5: Mean Observation of Anti-Anxiety activity

S.No	Treatment groups	5mins	15mins	30mins	60mins	120mins
1	Control group	25.2±2.31	28.8±1.11	31.2±2.92	35±5.61	37±3.80
2	Test-I	28.4±2.18	34.4±2.65	39.4±4.27	60.4±3.61	5±2.83
3	Test-II	35.6±5.62	54.6±5.16	67.2±7.24	84.6±4.52	79±2.70
4	Standard group	40±6.18	48.2±7.24	53.8±5.97	59.4±6.34	60.6±4.15

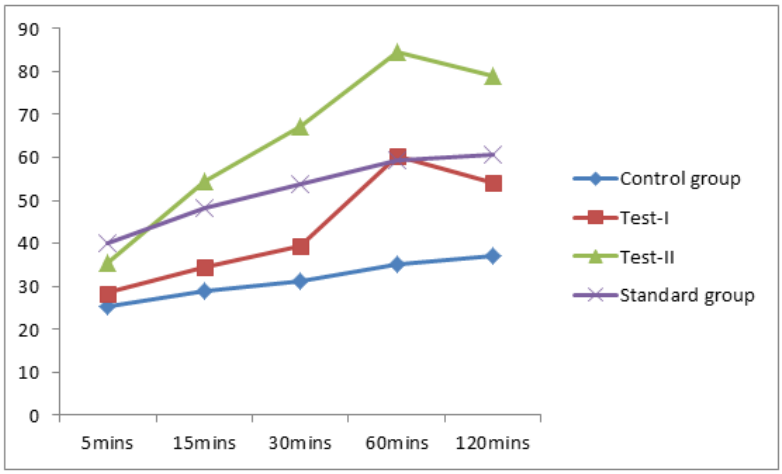

Fig-5: Mean observation of Anti-Anxiety activity

CONCLUSION

The aqueous Leaf extract of the combination of *Terminalia Bellerica* with *Moringa Oleifera* has shown significant Anti-Anxiety activity when compared with standard and extract alone.

REFERENCES

1. Doukkali Z, Taghzouti K, Kamal R, Jemeli ME, Bouidida EH. Anti-Anxiety Effects of Mercurialis annua Aqueous Extract in the Elevated Plus Maze Test. Pharmaceutical Bioprocessing. 2016 Jan 1;4(4):56-61.
2. Elayaraja A, Rahaman SA, Kumar P, Kumar P. Anti-anxiety activity of hydro alcoholic extract of Scoparia dulcis Linn. assessed using different experimental anxiety models In rodents. International Journal of Pharmacological Research. 2015;5(3):62-7.

3. Kadian R, Parle M, Yadav M. Therapeutic potential and phytopharmacology of terminalia bellerica. World journal of pharmacy and pharmaceutical sciences. 2014 Jul 25;3(10):804-19.
4. Ezeigbo OR, Barrah CS, Ezeigbo IC. Phytochemical Analysis and Antidiabetic Effect of Aqueous and Ethanolic Extracts of Moringa Oleifera Leaves in Alloxan-Induced Diabetic Wistar Albino Rats Using Insulin as Reference Drug. International Journal of Diabetes Research. 2016;5(3):48-53.
5. Bhat SK, Joy AE. Antianxiety effect of ethanolic extract of leaves of Moringa oleifera in Swiss albino mice. Archives of Medicine and Health Sciences. 2014 Jan 1;2(1):5.