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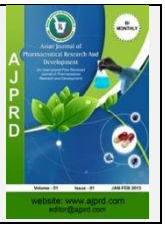

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Research Article

# Evaluation of Antidepressant Activity of Tricholepis Angustifolia in Experimental Animal

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## A B S T R A C T

Artificial sweeteners are substances that mimic the taste of sugar but offer negligible or zero calories. Their discovery dates back to the 19th century with saccharin. With the rise in lifestyle diseases like obesity, diabetes etc, their role as sugar alternatives has become increasingly significant. Therefore, food industries use various artificial sweeteners that are used in weight loss, diet planning with no calories or low calorie contents instead of high calorie sugar. These sweeteners are used instead of sucrose to sweeten the product. In recent years, these are used in over 6000 or more products. United States Food and Drug Administration (US FDA) has approved aspartame, acesulfame-K, neotame, sodium cyclamate etc for use as per acceptable daily intake (ADI) value. This paper aims to provide a comprehensive overview about the introduction, structure, possible health benefits and concerns of artificial sweeteners.

**Keywords:** Artificial sweetener, low calorie sweetener, saccharin, aspartame, acesulfame-K, sucralose, sodium cyclamate, D-tagatose, trehalose, stevia.

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## INTRODUCTION

Anxiety is a common emotion encountered in our day to day encounters, presenting as a response to a negative situation [1]. It is advantageous during physically or emotionally taxing situations where it may boost an individual's performance. But when anxiety becomes disproportionate and excessive to the situation, it interferes with performance and constitutes a psychiatric disorder which usually presents in a chronic state [2, 3]. Anxiety disorder is increasingly recognized as a highly prevalent and chronic disorder with onset during the teenage years with an incidence of 18.1% and a lifetime prevalence of 28.8% [3]. In 2007, the prevalence rate of anxiety in India was found to be 18.5 per 1000 population [4]. Benzodiazepines (BZDs), such as Diazepam, have been the most widely used anxiolytic drugs for many years [5]. Even though they are considered to be safe during short term therapy, the long term use of BZDs has been associated with adverse effects such as impaired motor coordination, drowsiness, withdrawal effects and dependence [6]. Another roadblock encountered in treating anxiety disorders with pharmacotherapy is the non-responder rate which has been reported to be as high as 40 % [7]. Since thousands of years, a large number of people across the world use herbal medications as remedies for various diseases [8].

Translation of these medications into allopathic practice will be beneficial in terms of developing adjuvants or even main therapy for various conditions such as anxiety disorders. Tricholepis Angustifolia; an annual herb, is native to the Mediterranean region but also extensively grown in India [9]. The Sanskrit names of Tricholepis Angustifolia seeds have been employed to treat local swelling and pains, headache caused by pitta, lymphadenopathy, stomatitis, conjunctivitis and as a diuretic, anti dyspeptic, appetizer, digestive, astringent and also for treating cough (kaphagana). It is also used in Ayurveda as a Central Nervous System (CNS) tonic to treat vertigo, syncope and memory loss [10,11].

Emamghoreshi et al showed positive results with regards to seeds of Tricholepis Angustifolia exhibiting antidepressant effects in an acute setting [12]. Hence the present study was conducted to evaluate the antidepressant potential of

Ethanolic Extrat of Tricholepis Angustifolia on chronic administration.

## MATERIALS AND METHODS

The experimental protocol was approved by the Institutional Animal Ethics Committee (IAEC) of Vidyabharati College of Pharmacy,Amravati Animals Inbred Male Albino Rat (Swiss strain), around 3 months of age, weighing between 125-250 grams were used for the study. The animals were obtained from the Animal House at our institution. The animals were housed at 24 ± 2oC with 12:12 hour light and dark cycle. They had free access to food and water ad libitum. The animals were acclimatized for a period of 7 days before the study. The study was conducted in accordance with the CPCSEA guidelines. Sample Size, Grouping and Dose of the Drugs Animals were divided in to 5 groups (Control, Standard & Test drugs) containing 6 animals making a total number of 30 animals (Table 1).

**Table 1:** Drugs/dose of the drugs, groups and number of mice in each group

| Drugs / Dose | Group | Number of Mice (n=6) |
|---|---|---|
| Control–Normal Saline (0.1ml/10gm) | I | 6 |
| Standard – Diazepam (1.0 mg/kg) | II | 6 |
| EETA (200 mg/kg) | III | 6 |
| EETA (400 mg/kg) | IV | 6 |
| EETA (600 mg/kg) | V | 6 |

### Drugs and Chemicals

**Figure 1:** It shows Tricholepis Angustifolia flower used for the study

The standard antidepressant drug, Diazepam was obtained from S.H. Pharmacy Amravati. The test drug used was EETA. Control used was Normal Saline (Vehicle). The dried seeds were purchased from Shri Sivaji Botanical Garden, Amravati and their authenticity was verified by the Department of Botany, Vidyabharati Mahavidyalaya, Amravati

### Preparation of extract

EETA was prepared at the Department of Pharmacognosy, VIdyabharati College of Pharmacy Amravati. Dried bramhadandi roots were homogenized to a fine powder. Hundred grams of powdered were infused in 500 ml cold distilled water for 24 hours, brought to the boil, then removed from the heat source and allowed to infuse for 15 minutes. The extract was then filtered, concentrated over the water bath and brought to dryness under vacuum.12 Upon extraction, 250 grams of dried roots of bramhadandi yielded 4 grams of aqueous extract which was viscous in consistency and brown in colour. The concentrations required of the coriander extract were prepared by serial dilution from a stock solution of 50 mg/ml of the extract in saline. All solutions were prepared freshly on test days and administered intraperitoneally (i.p.) in a volume of 0.1ml/10 g body weight of mice.

### Apparatus

Elevated plus maze test (EPMT): The EPMT apparatus consists of four arms elevated 30 cm above the floor, with each arm positioned at 90° relative to the adjacent arms. Two of the arms are enclosed with high walls (30 × 7 × 20 cm), and the other arms are connected via a central area (7 × 7 cm) to form a plus sign [12]. Behavioural assessment: For chronic study the animals received drugs or vehicle once a day for 10 days. 45 minutes after the last dose on the 10th day of drug or vehicle administration, each animal was placed in the central arm of the Elevated plus maze, facing one of the closed arms. All required parameters, i.e. the time spent in the open and closed arms (in seconds), number of rears in the open arm and the number of open and total arm entries were observed in each arm for a five-minute period Statistical Analysis.

All data calculated were expressed as Mean ± SEM for each group. The data were analyzed by one-way ANOVA and Post-hoc comparisons were performed by applying Dunnett's multiple comparison test. P <0.05 was considered statistically significant.

## RESULTS

The results given in table 2 and 3 indicate that AECSS in the dose of 50 mg/kg (Group IV) significantly increased the time spent in the open arms (in seconds), number of rears in the open arms, number of open arm entries and percentile ratio of open arm to total arm entries, when compared to the vehicle treated group (Group I)

**Table 2:** Effect of chronic administration of EETA on mice behaviour in elevated plus maze.

| Drugs/Groups | Time spent in open arms (in sec) | Time spent in closed arms (in sec) | Number of rears in open arms |
|---|---|---|---|
| Normal Saline(0.1ml/10gm) | 23.17 ± 2.02 | 276.83 ± 2.02 | 1.17 ± 0.47 |
| Diazepam (1.0 mg/kg) | 91.17 ± 2.75** | 208.83 ± 2.75** | 6.67 ± 0.88** |
| EETA (200 mg/kg) | 68.00 ± 10.55** | 232.00 ± 10.55** | 5.00 ± 0.57** |
| EETA (400 mg/kg) | 118.33 ± 6.07** | 181.67 ± 6.07** | 6.00 ± 0.73** |
| EETA (600 mg/kg) | 45.83 ± 2.63* | 254.17 ± 2.63* | 0.67 ± 0.33 |

n=6. The observation are mean ± SEM. *p < 0.05, ** p < 0.01, as compared to control (ANOVA followed by Dunnett's multiple comparison test) EETA- Ethanolic Extract of Tricholepis Angustifolia

**Table 3:** Effect of chronic administration of EETA on mice behaviour in elevated plus maze

| Drugs/Groups | Number of Open Arm Entries | Number of Total Arm Entries | Percentage Ratio of Open/Total Arms |
|---|---|---|---|
| Normal Saline(0.1ml/10gm | 1.83 ± 0.40 | 6.83 ± 0.40 | 27.36 ± 6.21 |
| Diazepam (1.0 mg/kg) | 6.00 ± 0.51** | 13.67 ± 1.08** | 46.23 ± 7.13* |
| EETA (200 mg/kg) | 3.00 ± 0.68 | 9.17 ± 1.57 | 50.40 ± 1.82 |
| EETA (400 mg/kg) | 6.50 ± 0.50** | 13.00 ± 1.15** | 45.69 ± 5.23** |
| EETA (600 mg/kg) | 2.17 ± 0.30 | 3.83 ± 1.01 | 40.16 ± 2.76* |

n=6. The observation are mean ± SEM. *p < 0.05, ** p< 0.01, as compared to control (ANOVA followed by Dunnett's multiple comparison test)

EETA- Ethanolic Extract of Tricholepis Angustifolia

## DISCUSSION

With a considerable populace under its umbrella, depression is a mental disorder that has received substantial focus over the past few decades in terms of research [13]. The current armamentarium of medications used to treat anxiety is spearheaded by the Benzodiazepine class of drugs [6]. The adverse effects associated with BZDs have galvanized the search for medications that possess more desirable safety profiles. The herbal drugs employed in traditional medicine for treating neurological disorders are an unexplored avenue which needs to be researched for demonstrating drugs with antidepressant potential [14]. In the present study using the EPMT, it was observed that EETA at a dose of 400 mg/kg (Group IV) showed a statistically significant increase in parameters such as time spent in the open arms (in seconds), number of rears in the open arms, number of open arm entries and percentile ratio of open arm to total arm entries when compared to the control group (Group I). However, at a dose of 200 mg/kg (Group III), EETA increased the time spent in the open arms and the number of rears in the open arms. This is clearly indicative of the antidepressant potential of the test drug.

The seeds of Tricholepis Angustifolia have shown therapeutic potential as a diuretic [15], antidiabetic [16] and anthelminthic [17]. In CNS studies, the seeds have also shown positive results when screened for their antioxidant [17,18], anticonvulsant [19] and sedative hypnotic [20] properties. Linalool (67.7%) and flavinoids (16.6%) are major phytochemical constituents of tricholepis angustifolia roots [21]. Linalool has shown to possess anxiolytic property [22,23]. The mechanism of anxiolytic action displayed by tricholepis angustifolia may be attributed to the flavinoids, which have structural similarity to Diazepam (that acts via Gamma amino butyric acid [GABAA] receptor complex) [24].

## CONCLUSION

The present study shows that chronic administration of EETA has antidepressant activity when demonstrated in the Elevated plus maze test. However, further research needs to be conducted to identify the exact mechanism of antidepressants involved and to determine the use of tricholepis angustifolia seeds as an adjuvant to BZDs for treatment in humans.

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