



## EVALUATION OF ANXIOLYTIC ACTIVITY OF *COMMIPHORA WIGHTII* ON EXPERIMENTAL ANIMAL MODEL

Sridhar VR<sup>1</sup>, Arun Seetharaman<sup>1</sup> Jayakumar P<sup>2</sup>, Jaikumar S<sup>3\*</sup>

<sup>1</sup>Department of Psychiatry, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry, India.

<sup>2</sup>Department of Pediatric Surgery, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry, India.

<sup>3</sup>Department of Pharmacology, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry, India.

### ABSTRACT

Anxiety is an emotional state, unpleasant in nature, associated with uneasiness, discomfort and concern or fear about some defined or undefined future threat. Traditionally many herbal drugs were used to manage anxiety because of its fewer side effects. *Commiphora Wightii* is a well known antihyperlipidemic, has long history in treating various diseases. The current study was conducted to evaluate the antianxiety activity of ethanolic extract of oleogum resin of *Commiphora Wightii* on elevated plus maze using mice. Diazepam (0.5mg/kg) was used as reference control and two doses (200 & 400 mg/kg) of ethanolic extract of oleogum resin of *Commiphora Wightii* were evaluated for its antianxiety activity. All the test drugs were administered orally by suspending in 0.1% Carboxy methyl Cellulose solution. Number of entries in open and closed arm, time spends in open and closed arm for 5 minutes were observed after test drug administration and compared with control group. Both the doses of *Commiphora wightii* oleogum resin extract significantly ( $P < 0.001$ ) increased the time spend by the animals in open arm compared to control animals. Both the doses of *Commiphora wightii* oleogum resin extract significantly ( $P < 0.001$ ) decreased the time spend by the mice in closed arm as compared to control. From the result, it was concluded that, ethanolic extract of oleogum resin of *Commiphora Wightii* exhibited antianxiety activity in mice.

**Key words:** *Commiphora Wightii*, Diazepam, Elevated Plus Maze, Antianxiety Activity.

### INTRODUCTION

Guggulu is an oleo-gum resin which exudes out as a result of injury from the bark of *Commiphora wightii* (Arnott) Bhandari (Syn. *Commiphora mukul* (Hook. Ex Stocks) Engl; *Balsamodendron mukul* (Hook. Ex Stocks); Family, Burseraceae). It has been used in the *Ayurveda* since time immemorial for the treatment of variety of disorders (Anonymous, 2007). In Indian traditional system of medicine, guggulu has been used for thousands of years in the treatment of arthritis, inflammation, gout, rheumatism, obesity, and disorders of lipids metabolism (Urizar and Moore, 2003). Guggulu has been used to treat obesity, osteoarthritis, rheumatoid arthritis, gout, facial paralysis, sciatica, constipation, haemorrhoids, liver

disorders, inflammation, cyst, cervical lymphadenitis, coronary thrombosis, anaemia, diabetes, urinary calculus, increased frequency and turbidity of urine, and skin diseases (Dev, 1987; Anurekha and Gupta, 2006). Guggulu reported to have hypolipidemic activity (Satyavati, 1988), Fibrinolytic activity (Mester et al., 1979), Thyroid stimulating activity (Tripathi et al., 1984), Antiinflammatory and antiarthritic activity (Francis et al., 2004), antioxidant activity (Panda and Kar, 1999), antiatherosclerotic activity (Wang et al., 2004), cardioprotective activity (Chander et al., 2003), Cytotoxic activity (Chaudhary, 2012), Antifertility activity (Ammam, 1978), Antihyperglycemic activity (Bellamkonda et al., 2011), antimicrobial activity (Sharma et al., 2010). Most of the traditional and folk lore use of *Commiphora wightii* has been established, but the plant has never been subjected to CNS related activities. The current study is

Corresponding Author

S. Jaikumar

Email: sengt@rediffmail.com

focused to establish the anti-anxiety activity of *Commiphora wightii* on experimental animal model. The word anxiety is derived from the Latin “anxietas” (to choke, throttle, trouble, and upset) and encompasses behavioral, affective and cognitive responses to the perception of danger.

Anxiety is a state of excessive fear, which is characterized by motor tension, sympathetic hyperactivity, apprehension and vigilance syndromes. Benzodiazepines are the major class of compounds used in anxiety, even though its unwanted side effects that they produce such as sedation, muscle relaxation, ataxia, amnesia, and tolerance (Lader and Morton, 1991). Various types of herbal medicines have been used as anxiolytic drugs in different parts of the world. Self-administration of herbal medicines is among the most popular of the alternative therapies for anxiety. Plants have long been used to treat central nervous system example, plants that “calm down”, tranquilize, and raise mood, (CNS) disorders. Folk medicines have particular values, for such as *Passiflora coerulea*, *Valeriana officinalis*, *Matricaria recutita*, *Jatropa ciliata*, *Salvia guaranitica*, *Tilia tormentosa*, and *Tilia europeae* (Poonam and Shradha, 2011).

## MATERIALS & METHODS

### Preparation of Oleogum Resin Extract

The resin from *Commiphora mukul* was collected by etching the bark during the month of December. The resin is then dried, ground and subjected to exhaustive extraction with ethyl acetate. The collected extracts are treated with an amount of charcoal equivalent to 5% of the starting weight of the resin. After charcoal elimination, the colourless solution is concentrated to obtain a thick paste, which is recovered with ethanol, and, after filtrating the insoluble matter, concentrated till complete solvent removal.

### Animals

Healthy male Swiss albino mice weighing between 20 – 25 gm were used for this study. The animals were obtained from animal house, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry, India. On arrival, the animals were placed at random and allocated to treatment groups in polypropylene cages with paddy husk as bedding. Animals were housed at a temperature of  $24 \pm 2^\circ\text{C}$  and relative humidity of 30 – 70 %. A 12:12 light: day cycle was followed. All animals were allowed to free access to water and fed with standard commercial pelleted rat chaw (M/s. Hindustan Lever Ltd, Mumbai). All the experimental procedures and protocols used in this study were reviewed by the Institutional Animal Ethics

Committee (932/a/06/CPCSEA) and were in accordance with the Institutional ethical guidelines.

### Anti-anxiety Activity

The animals were divided in to four groups of 6 animals each. Group I served as normal control, received 10ml/kg of 0.1% Carboxy Methyl Cellulose (CMC) solution, group II served as reference control, received Diazepam (0.5 mg/kg) and group III and IV received 200 and 400 mg/kg of oleogum resin extract of *Commiphora wightii* respectively. All the test drugs were administered orally by suspending in 0.1 % CMC. The test drugs were administered 30 minutes before, placing in the mice in Elevated Plus maze.

The plus maze apparatus consisted of two open arms, measuring  $16 \times 5$  cm, and two closed arms, measuring  $16 \times 5 \times 12$  cm, connected to a central platform ( $5 \times 5$  cm). The apparatus was thoroughly cleaned using 5% ethanol before placing each mouse in the cage. The maze was elevated to a height of 25 cm above the floor. Each mouse was placed individually at the center of elevated plus maze with its head facing toward an open arm and observed for 5 min to record the number of entries into open arm, closed arm and time spent in each arm (Kulkarni, 1999).

### STATISTICAL ANALYSIS

The results were expressed as Mean  $\pm$  SEM. Data were analyzed by analysis of variance (ANOVA) followed by Dunnet's *t* test using Graph Pad Instat Demo version.  $P < 0.05$  was considered as significant.

### RESULTS

The result of anti-anxiety activity of *Commiphora wightii* oleogum resin extract in mice using Elevated Plus Maze was shown on table 1. Diazepam, a known antianxiety agent was used as reference control significantly ( $P < 0.001$ ) enhanced the time spend by the mice in open arm compared to control group. It also significantly ( $P < 0.001$ ) decreased the time spend by the mice in closed arm as compared to control. In diazepam treated animals, the number of entries in open arm was increased and the number of entries in closed arm was reduced compared to control animals. Both the doses of *Commiphora wightii* oleogum resin extract significantly ( $P < 0.001$ ) increased the time spend by the animals in open arm compared to control animals. Both the doses of *Commiphora wightii* oleogum resin extract significantly ( $P < 0.001$ ) decreased the time spend by the mice in closed arm as compared to control. The anti-anxiety effect produced by *Commiphora wightii* oleogum resin extract was equipotent as that of standard drug Diazepam.

**Table 1. The anti-anxiety effect of *Commiphora wightii* oleogum resin extract in mice using Elevated Plus maze.**

S.No	Drug Treatment	Open Arm		Closed Arm	
		No of Entry	Time Spend (Sec)	No of Entry	Time Spend (Sec)
1	0.1% CMC	5.22±0.17	55.57±3.82	10.51±0.94	210.42±7.96
2	Diazepam (0.5mg/kg)	8.32±0.73	258.56±11.50***	2.09±0.12	18.95±0.12***
3	<i>Commiphora wightii</i> (200mg/kg)	7.77±0.47	142.77±4.65***	6.31±0.51	102.32±9.18***
4	<i>Commiphora wightii</i> (400mg/kg)	8.18±0.66	215.84±10.44***	4.52±0.21	45.67±2.25***

**CONCLUSION**

From the result it was concluded that, ethanolic extract of oleogum resin of *Commiphora wightii*, exhibited antianxiety activity in mice using elevated plus maze.

**ACKNOWLEDGEMENT:** None

**CONFLICT OF INTEREST:**

The authors declare that they have no conflict of interest.

**REFERENCES**

- Amma MKP, Malhotra N, Suri RK, Arya OP, Dani HM and Sareen K, Effect of Oleoresin of Gum Guggul (*Commiphora Mukul*) on the Reproductive Organs of Female Rat. *Indian Journal of Experimental Biology*, 16(9), 1978, 1021–1023.
- Anonymous, The Ayurvedic Pharmacopoeia of India (Formulations), Department of Indian Systems of Medicine and Homeopathy, Ministry of Health and Family Welfare, Government of India, NewDelhi, India, 1st edition, 2007.
- Anurekha J and Gupta VB, Chemistry and Pharmacological Profile of Guggulu—A Review. *Indian Journal of Traditional Knowledge*, 5, 2006, 478–483.
- Bellamkonda R, Rasineni K, Singareddy SR et al., Antihyperglycemic and Antioxidant Activities of Alcoholic Extract of *Commiphora mukul* Gum Resin in Streptozotocin Induced Diabetic Rats. *Pathophysiology*, 18( 4), 2011, 255–261.
- Chander R, Rizvi F, Khanna AK and Pratap R, Cardioprotective Activity of Synthetic Guggulsterone (*E* And Zisomers) in Isoproterenol Induced Myocardial Ischemia in Rats: A Comparative Study. *Indian Journal of Clinical Biochemistry*, 18(2), 2003, 71–79.
- Chaudhary G, Pharmacological Properties of *Commiphora wightii* Arn. Bhandari—An Overview. *International Journal of Pharmacy and Pharmaceutical Sciences*, 4(3), 2012, 73–75.
- Dev S, A Modern Look at an Age Old Ayurvedic Drug Guggulu. *Science Age*, 5, 1987, 13–18.
- Francis JA, Raja SN and Nair MG, Bioactive Terpenoids and Guggulsteroids from *Commiphora mukul* Gum Resin of Potential Anti-Inflammatory Interest. *Chemistry and Biodiversity*, 1(11), 2004, 1842–1853.
- Kulkarni SK, Handbook of Experimental Pharmacology. Vallabh Prakashan, Delhi, 3<sup>rd</sup> ed, 1999, 135-137.
- Lader M and Morton S. Benzodiazepine Problems. *British Journal of Addiction*, 83, 1991, 823-828.
- Mester L, Mester M and Nityanand S, Inhibition of Platelet Aggregation by ‘Guggulu’ Steroids. *Planta Medica*, 37(4), 1979, 367–369.
- Panda S and Kar A, Gugulu (*Commiphora mukul*) Induces Triiodothyronine Production: Possible Involvement of Lipid Peroxidation. *Life Sciences*, 65(12), 1999, 137–141.
- Poonam M and Shradha B, Anti-anxiety activity of *Coriandrum sativum* Assessed Using Different Experimental Anxiety Models. *Indian Journal of Pharmacology*, 43(5), 2011, 574 – 577.
- Satyavati GV, Gum Guggul (*Commiphora mukul*)—The Success Story of an Ancient Insight Leading to A Modern Discovery. *Indian Journal of Medical Research*, 87(4), 1988, 327–335.
- Sharma A, Kumar Patel V, Rawat S, Ramteke P and Verma R, Identification of the Antibacterial Component of Some Indian Medicinal Plants Against *Klebsiella pneumonia*. *International Journal of Pharmacy and Pharmaceutical Sciences*, 2(3), 2010, 123–127.
- Tripathi YB, Malhotra OP and Tripathi SN, Thyroid Stimulating Action of Z-Guggulsterone Obtained from *Commiphora mukul*. *Planta Medica*, 50(1), 1984, 78–80.
- Urizar NL and Moore DD, Gugulipid: A Natural Cholesterol Lowering Agent. *Annual Review of Nutrition*, 23, 2003, 303–313.
- Wang X, Greilberger J, Ledinski G, Kager G, Paigen B and Jurgens G, The Hypolipidemic Natural Product *Commiphora Mukul* and Its Component Guggulsterone Inhibit Oxidative Modification of LDL. *Atherosclerosis*, 172(2), 2004, 239–246.