

## Neuropharmacological and Neurochemical Evaluation of Methanolic Extract of *Elaeocarpus sphaericus* (Gaertn.) Stem Bark by Using Multiple Behaviour Models of Mice

**Authors :** Jaspreet Kaur, Parminder Nain, Vipin Saini, Sumitra Dahiya

**Abstract :** *Elaeocarpus sphaericus* has been traditionally used in the Indian traditional medicine system for the treatment of stress, anxiety, depression, palpitation, epilepsy, migraine and lack of concentration. The study was investigated to evaluate the neurological potential such as anxiolytic, muscle relaxant and sedative activity of methanolic extract of *Elaeocarpus sphaericus* stem bark (MEESSB) in mice. Preliminary phytochemical screening and acute oral toxicity of MEESSB was carried out by using standard methods. The anxiety was induced by employing Elevated Plus-Maze (EPM), Light and Dark Test (LDT), Open Field Test (OFT) and Social Interaction test (SIT). The motor coordination and sedative effect was also observed by using actophotometer, rota-rod apparatus and ketamine-induced sleeping time, respectively. Animals were treated with different doses of MEESSB (i.e.100, 200, 400 and 800 mg/kg orally) and diazepam (2 mg/kg i.p) for 21 days. Brain neurotransmitters like dopamine, serotonin and nor-epinephrine level were estimated by validated methods. Preliminary phytochemical analysis of the extract revealed the presence of tannins, phytosterols, steroids and alkaloids. In the acute toxicity studies, MEESSB was found to be non-toxic and with no mortality. In anxiolytic studies, the different doses of MEESSB showed a significant ( $p < 0.05$ ) effect on EPM and LDT. In OFT and SIT, a significant ( $p < 0.05$ ) increase in ambulation, rearing and social interaction time was observed. In the case of motor coordination activity, the MEESSB does not cause any significant effect on the latency to fall off from the rotarod bar as compared to the control group. Moreover, no significant effects on ketamine-induced sleep latency and total sleeping time induced by ketamine were observed. Results of neurotransmitter estimation revealed the increased concentration of dopamine, whereas the level of serotonin and nor-epinephrine was found to be decreased in the mice brain, with MEESSB at dose 800 mg/kg only. The study has validated the folkloric use of the plant as an anxiolytic in Indian traditional medicine while also suggesting potential usefulness in the treatment of stress and anxiety without causing sedation.

**Keywords :** anxiolytic, behavior experiments, brain neurotransmitters, *elaecarpus sphaericus*

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