

Elucidation of Mechanism of Action of Antidepressant-Like Effect of Valeriana wallichii Maaliol Chemotype in Mice

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Abstract : Valeriana wallichii DC, an ayurvedic traditional medicine, popularly named as Indian valerian exist as three chemotypes. GC-MS analysis of V. wallichii essential oil in present study showed maaliol as the major constituent followed by the presence of β -gurjunene, acoradiene, guaiol and α -santalene. The results thus confirmed it to be a maaliol chemotype. Further, the antidepressant-like effect of root essential oil (10, 20 and 40 mg/kg p.o.) was investigated in both acute and chronic treatment study using forced swim test in mice. Single administration of different doses produced an inverted U shaped curve and significantly inhibited the immobility period (39.7% and 58%) at doses 10 and 40 mg/kg respectively. Standard drug imipramine significantly decreased immobility period (59.8%). None of the doses altered locomotor activity except a significant decrease of 44.9% was observed with 40 mg/kg ($p < 0.05$). Similarly, daily administration of essential oil for 14 days produced a dose dependent effect with significantly reduced immobility period (70.9%) at 40 mg/kg dose only whereas imipramine produced 86% decrease ($p < 0.05$). The neurotransmitter levels in mouse brain were estimated on day 14 after the behavioral study. Significant increase in the level of norepinephrine (10%) and dopamine (23%) ($p < 0.05$) was found at 40 mg/kg dose, while no change was observed at 10 and 20 mg/kg doses. The antidepressant-like effect of essential oil (40 mg/kg) was prevented by pretreatment of mice with L-arginine (750 mg/kg i.p.) and sildenafil (5 mg/kg i.p.). On the contrary, pretreatment of mice with L-NAME (10 mg/kg i.p.) or methylene blue (10 mg/kg i.p.) potentiated the antidepressant action of essential oil (20 mg/kg). The findings thus demonstrated that nitric oxide pathway is involved in mediating antidepressant like effect of essential oil from this chemotype.

Keywords : Valeriana wallichii DC chemotype, essential oil, forced swim test, nitric oxide modulators, neurotransmitters

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