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The anxiolytic effect of Juniperus virginiana L. essential oil and determination of its active constituents

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Abstract

Essential oil from Juniperus virginiana L. (eastern red cedarwood essential oil, CWO) has been used to relax mind and enhance comfort for medical purposes. Few reports showed its effect on anxiety behaviors in animal models. The present study investigated the anxiolytic effect of CWO using two anxiety tests in mice, then determined the major active constituents, examined the change of neurotransmitters after intraperitoneal (i.p.) administration. Analysis using GC/MS revealed that the CWO contained (-)-α-cedrene (28.11%), (+)-β-cedrene (7.81%), (-)-thujopsene (17.71%) and (+)-cedrol (24.58%). CWO at 400-800mg/kg increased the percentage of open arm entries and the percentage of the time spent in open arms in the elevated plus maze (EPM), suggesting that the oil has anxiolytic effect. However, it didn't show anxiolytic effect in the light-dark box (LDB) test. Tests of the cedrene did not show anxiolytic effect in either test, but rather induced anxiety-related behaviors and inhibited the locomotor activity in EPM and LDB. Cedrol produced significant anxiolytic effect in both EPM and LDB tests at 400-1600mg/kg and 800-1600mg/kg, respectively. A more significant increase in locomotor activity was observed in cedrol at 200-1600mg/kg administration than CWO. CWO increased the 5-hydroxytryptamine (5-HT) concentration at 800mg/kg, whereas it didn't affect the dopamine (DA) concentration. Cedrol significantly reduced the DA level at 100-200mg/kg and elevated the 5-HT level at 1200-1600mg/kg. Moreover, it changed the ratio of 5-hydroxyindoleacetic acid/5-HT and 3, 4-dihydroxyphenyl acetic acid/DA at 1200-1600mg/kg. CWO and cedrol, in particular might act in an anxiolytic effect through the 5-HTnergic and DAnergic pathways.

Keywords: 5-Hydroxytryptamine; Anxiolytic effect; Cedrol; Dopamine; Juniperus virginiana L..

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