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# Anticonvulsant, Anxiolytic and Antidepressant Properties of the β-caryophyllene in Swiss Mice: Involvement of Benzodiazepine-GABAAergic, Serotonergic and Nitrergic Systems

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## Abstract

**Background:** Central nervous system disorders such as anxiety, depression and epilepsy are characterized by sharing several molecular mechanisms in common and the involvement of the L-arginine/NO pathway in neurobehavioral studies with β-caryophyllene is still little discussed.

**Objectives:** One of the objectives of the present study was to demonstrate the anxiolytic behavioral effect of β-caryophyllene (β-CBP) in female Swiss mice, as well as to investigate the molecular mechanisms underlying the results obtained.

**Methods:** This study evaluated the neurobehavioral effects of β-CBP using the open field test, rota- rod test, elevated plus maze test, novelty suppressed feeding test, tail suspension test and forced swim test, as well as pilocarpine, pentylenetetrazole and isoniazid-induced epileptic seizure models.

**Results:** The results demonstrated that the neuropharmacological activities of β-CBP may involve benzodiazepine/GABAergic receptors, since the pre-treatment of β-CBP (200 mg/kg) associated with flumazenil (5 mg/kg, benzodiazepine receptor antagonist) and bicuculline (1 mg/kg, selective GABAA receptor antagonist) reestablished the anxiety parameters in the elevated plus-maze test, as well as the results of reduced latency to consume food in the novelty suppressed feeding test. In addition to benzodiazepine/GABAergic receptors, the neuropharmacological properties of β-CBP may be related to inhibition of nitric oxide synthesis, since pre-treatment with L-arginine (500-750 mg/kg) reversed significantly the anxiolytic, antidepressant and anticonvulsant activities of β-CBP.

**Conclusion:** The results obtained provide additional support in understanding the neuromolecular mechanisms underlying the anxiolytic, antidepressant and anticonvulsive properties of β-CBP in female Swiss mice.

**Keywords:** L-arginine/NO pathway; benzodiazepine/GABAergic receptors; neurobehavioral effects; neuromolecular mechanisms; nitric oxide; β-caryophyllene.



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