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In Vitro Antioxidant Activity and *In Vivo* Antidepressant-like Effect in Mice of the Ethanolic Extract from Leaves of *Ocimum gratissimum* Linn.

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ABSTRACT

This paper investigated the antioxidant activity and antidepressant-like effect of ethanolic leaf extract of Ocimum gratissimum (OGE). In vitro antioxidant activity of OGE was assessed in three complimentary test systems: DPPH (1, 1-Diphenyl-2-picrylhydrazyl), nitric oxide scavenging activity and reducing power assay. The antidepressant-like effect of OGE was investigated in mice using the forced swim test (FST) and tail suspension test (TST). Additionally, the mechanisms involved in the antidepressant-like effect of OGE were investigated using TST in four receptor systems: serotonergic, noradrenergic, dopaminergic and GABAergic. The extract showed potent antioxidant activity in all three in vitro test systems. OGE (100-400 mg/kg, p.o.) decreased the immobility time of mice in both FST and TST in a dose-dependent manner, without accompanying changes in locomotor activity in the digital photoactometer. The anti-immobility effect of the extract (400 mg/kg, p.o.) in the TST was significantly reversed by prazosin (1 mg/kg, i.p., an α_1-adrenoceptor antagonist), levosulpiride (50 mg/kg, i.p., a dopamine D_2 receptor antagonist) and p-chlorophenylalanine (p-CPA, 100 mg/kg, i.p., an inhibitor of serotonin synthesis) but not by yohimbine (1 mg/kg, i.p., an α_2-adrenoceptor antagonist) and baclofen (10 mg/kg, i.p., a $GABA_B$ agonist). OGE produced a specific antidepressant-like effect that was dependent on the interaction with serotonergic, noradrenergic (α_1-adrenoceptor) and dopaminergic (D_2 receptor) systems. The results suggested that O. gratissimum possessed potent antioxidant and antidepressant-like activities and this plant deserved further investigation as an alternative therapeutic tool for treatment of depression.

Keywords: Antidepressant, Antioxidant, Forced swim test, Monoaminergic, *Ocimum gratissimum,* Tail suspension test

INTRODUCTION

Depression is a chronic and potentially life-threatening heterogeneous disorder that manifests with various behavioural, psychological and physiological symptoms, such as depressed mood, feeling of guilt or worthlessness, decreased