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Evaluation of the anti-inflammatory activity and bioactive compounds of *Citrus aurantifolia*(L) leaf extracts

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Citrus aurantifolia L. is used in traditional systems of medicine as remedy for stomach ailments, constipation, headache, arthritis, colds, coughs, sore throats, and appetite stimulant. This study investigated the chemical composition and the immunomodulatory activity of the ethanolic extract and essential oils extracted by Hydro distillation (HD) from the leaves of *Citrus aurantifolia* L. The bioactivities were evaluated by performing DPPH free radical scavenging assay, ferric ion reducing antioxidant power (FRAP) assay, 5-lipoxygenase inhibition (5-LOX) assay, inhibition of LPS-induced Nitric Oxide (NO) production by Griess assay, total phenolic content (TPC) and total flavonoid content (TFC). The EO was analyzed for its chemical compositions using Gas ChromatographyMass Spectrometry (GC-MS) to identify the chemical components for bioactivity. The ethanolic extract of *C. aurantifolia* leaves were given the IC_{50} value of 735.29 ± 38.01 µg/ml for DPPH free radical scavenging assay. FRAP, TPC and TFC values for the ethanolic extract were 13.35 ± 2.09 µg/ml Trolox equivalent (TE)/g, 16.41 ± 1.59 mg Gallic acid equivalent (GAE)/g and 21.28 ± 0.42 mg Quercetin equivalent (QE)/g respectively. *C. aurantifolia* leaves ethanolic extract and EOs dose dependently inhibit 5-lipoxyganase enzyme having the IC_{50} values of 6.77± 0.34 µg/ml and 7.40 ± 1.46 µg/ml respectively, compared to the positive control baicalein IC_{50} value 1.76± 0.15 µg/ml. The percentage inhibition of NO production by LPS stimulated RAW 264.7 cells were 79% and 64% respectively for 250 µg/ml ethanolic extract and EO. A total of 87 phytochemicals were identified from *C. aurantifolia* leaves EO. D-limonene (35.65%) and Caryophyllene (20.91%) were major compounds and ϒ-elemene (3.93%), Caryophyllene oxide (3.62%), β-Bisabolene (3.11%), β-elemene (3.04%), are high in abundance. The result of ethanolic extract and EO showed appreciable reduction in nitric oxide production of LPS-stimulated RAW 264.7 cells and the inhibition of 5-LOX. Biologically active components in *C. aurantifolia* leaves are active against inflammation supports the ethnomedicinal claims of the use of the plant in the management of pain and inflammation.

Keywords:
Hydro-distillation, Gas Chromatography, Mass Spectrometry, Lipoxygenases, Griess assay.

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