

Composition and biological activities of the essential oil and extracts of *Anisosciadium orientale*

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Background and Aims: The plants of the Apiaceae family have about 3000 species in 400 genera. In Iranian ancient medicine, the fruits of *Anisosciadium orientale* have been used for treatment of toothache, diarrhea and epilepsy. This paper describes the chemical analysis of the essential oil from *A. orientale*. Antioxidant activity and total phenol contents were also determined in the essential oil and extracts (methanolic, 80% methanolic and DCM) of the plant.

Methods: The essential oil of *A. orientale* was analyzed by gas chromatography (GC) and gas chromatography-mass spectroscopy (GC-MS). The essential oil and extracts were screened for antioxidant activities using 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay and Folin-Ciocalteu reagent total phenol. For antibacterial activity, the volatile oil and extracts of this plant have been tested with micro dilution method using a gram positive bacterium (*Bacillus subtilis*) and a gram negative bacterium (*Escherichia coli*). The cytotoxic activity was measured on 3 human cancer cell lines including K562 (human chronic myelogenous leukemia), LS180 (human colon adenocarcinoma) and MCF-7 (human breast adenocarcinoma) cells.

Results: Sixteen compounds were identified representing 92.86% of the total components of the oil from which myristicine (30.07%), terpinolene (24.54%) and limonene (20.99%) were major constituents. Antioxidant activity was observed for the oil, while no antibacterial activity could be detected. The methanolic extract of the plant showed higher antibacterial activity than the others, and 80% methanolic extract was observed to have highest antioxidant activity. IC₅₀ values of cytotoxic activity on K562, LS180 and MCF-7 cells were 396.8 ± 64.9 , 183.2 ± 42.8 and 159.5 ± 29.0 $\mu\text{g/ml}$, respectively (mean \pm S.E.M.).

Conclusions: Monoterpene hydrocarbons were identified as one of the major fraction of the oil (45.53%). The plant antioxidant activity was due to phenolic constituents.

Keywords: Apiaceae (Umbelliferae); *Anisosciadium orientale*; Essential oil; Antioxidant activity; Antibacterial activity