



Phytochemical analysis and biological activity evaluation of essential oil of *Scrophularia atropatana*

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Background and objectives: *Scrophularia atropatana* (*S. atropatana*) is endemic to western and central regions of Iran. It belongs to the genus of *Scrophularia* (family: *Scrophulariaceae*). These species have been found to possess antibacterial, antitumor and anti-inflammatory properties. Most of these effects were proven to be attributed to the non-volatile components, which were known as secondary metabolites. Iridoids, phenylpropanoids, phenolic acids and flavonoids have been identified as their main secondary metabolites. This investigation was performed to analyze the composition of the essential oil (EO) of *S. atropatana* and evaluation of its anti-oxidant and total toxicity properties. **Methods:** About 150 g powder of the air dried parts of *S. atropatana* was submitted to hydro-distillation and also was successively extracted (with *n*-hexane, dichloromethane (DCM) and methanol (MeOH)), by using Clevenger and Soxhlet apparatus, respectively. In addition, Essential Oil (EO) was analyzed by GC-MS and GC-FID. Furthermore, the anti-oxidant activity of the extracts, fractions and EO as well as general toxicity were investigated by DPPH and brine shrimp larva assay, respectively. **Results:** Totally, sixty eight volatile compounds were identified, which constituted 91.78% of the total oil composition. Among the compounds, major constituents were identified as non-terpenoides (59.59%). Moreover, among the extracts and EO, methanol extract demonstrated high free radical scavenging and general toxic activities with RC_{50} equal 0.143 ± 0.13 mg/mL and LD_{50} 0.271 mcg/mL respectively. **Conclusion:** Overall, the main constituents of *S. atropatana* were hydrocarbons. In comparison to other species of *Scrophularia*, antioxidant activity of the essential oil of *S. atropatana* was less noticeable.

Keywords: antioxidant assay, GC-FID, GC-MS, *Scrophularia atropatana*