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A Study on the Ethanolic Extract of *Onosma aucheriana*

Biological and toxicological evaluation

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This research studies the antioxidant activity and efficacy of the ethanolic extract of the plant species Onosma aucheriana DC. This plant growing wild in Serbia, in inhibiting the development of selected fungi and bacteria. The most sensitive to the ethanolic extracts were bacteria B. subtilis and S. aureus (MIC = 15.62 µg/mL), while the fungi, A. niger (MIC = 15.62 µg/mL) showed the highest susceptibility. Total phenolic, flavonoid, condensed tannin and gallotannin contents were 90.26 mg GA/g, 35.24 mg RU/g, 74.65 mg GA/g and 31.74 mg GA/g, respectively. Phenolic compounds are found as dominant in the extract of rosmarinic acid. Total antioxidant capacity was 78.45 µg AA/g. IC₅₀ values were determined for each measurement: 21.45 µg/mL for DPPH free radical scavenging activity, 36.46 µg/mL for inhibitory activity against lipid peroxidation, 99.11 µg/mL for hydroxyl radical scavenging activity and 45.91 µg/mL for chelating ability. A potent inhibitor of cell growth to all three cell lines (Hep2c, RD, L2OB) is the ethanol extract of plant species O. aucheriana. Results of Allium anaphase-telophase genotoxicity assay revealed that the ethanolic extract of O. aucheriana at concentrations of 62.5 µg/mL does not produce toxic or genotoxic effects.

Keywords: antimicrobial activity, antioxidant activity, genotoxic examination, cytotoxic activity, *Onosma aucheriana* DC., HPLC analysis, phenolic compounds

For the treatment of many diseases but also for other reasons people use medicinal plant. Plants contain many biologically active natural products. These products are all biodegradable and renewable. Screening less-studied plant species for the presence of substances with potential medicinal significance is important. With their environment, plants communicate by producing a diverse range of chemicals. A common feature of specific plants and plant families are these secondary metabolites. Many plant extracts and secondary metabolites have antimicrobial properties. These antimicrobial properties make plant products successful in the treatment of fungal, bacterial and viral infections [1]. A number of diseases can be treated effectively by using different parts of plants. Synthetic antioxidants like butylated hydroxytoluene (BHT) and butylated hydroxyanisole (BHA), that are known to terminate the chain reaction of lipid peroxidation, have also been proven to cause liver damage and that they are carcinogenic. Bacterial resistance to a large number of antibiotics and the ability of the plants to synthesize biologically active substances are the cause of the increasing importance given to the use of plant-derived products in bacterial control. Plant use in the food industry has increased significantly over the last years to replace synthetic preservatives, antioxidants or other food additives [2]. Because of the content of phenolic compounds many herb species are active antioxidants [3-5]. Phenolic

compounds are pervasive in plants. For normal plant development and growth and defence against infection and injury, flavonoids and other plant phenolics, such as phenolic acids, stilbenes, tannins, lignans, and lignins are very important. Secondary metabolites such as alkaloids, polyphenols, naphtho-quinones, phytosterols and terpenoids are produced by many members of the Boraginaceae family [6, 7]. Anti-inflammatory, anti-viral and anti-bacterial activities of polyphenols, including flavonoids and phenolic acids [8, 9], among other pharmaceutical activities found in Boraginaceae, make them interesting for further research. With its cosmopolitan distribution, the Boraginaceae family consists of 117 genera and about 2400 species. *Onosma* L. includes about 150 species distributed in Asia, Eurasia, Mediterranean regions and Europe. *Onosma aucheriana* DC., is a plant with woody branching rhizome, and whitish leaves covered with dense bristly hairs [10-12]. Studies on the biological activity or chemical constituents of *O. aucheriana* have been reported in the [13]. Aqueous, extracts from Auchers golden-drop (*Onosma aucheriana*) from Lebanon were investigated for their *in vitro* immunomodulatory and antileishmanial activities as compared to their toxicity against human cells and exhibited interesting antileishmanial activities on the intracellular amastigote form of the parasite (IC₅₀=5.1 µg/mL; SI>49), while several extracts were shown to induce

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