Phytochemical screening and biological activity of extracts of plant species *Halacsya sendtneri* (Boiss.) Dörfl.

Pavle Z. Mašković[1], Nedeljko T. Manojlović[2], Anamarija I. Mandić[3], Aleksandra Č. Mišan[3], Ivan Lj. Milovanović[3], Marija M. Radojković[4], Milica S. Cvijović[1], Slavica R. Solujić[5]

[1]*University of Kragujevac, Faculty of Agronomy, Department of Chemistry and Chemical Engineering, Čačak, Serbia*
[2]*University of Kragujevac, Medical Faculty, Department of Pharmacy, Kragujevac, Serbia*
[3]*University of Novi Sad, Institute for Food Technology, Novi Sad, Serbia*
[4] *University of Novi Sad, Faculty of Technology, Department of Biotechnology and Pharmaceutical Engineering, Novi Sad, Serbia*
[5]*University of Kragujevac, Faculty of Science, Department of Biochemistry, Kragujevac, Serbia*

Abstract

This study is aimed at examining total polyphenol, flavonoid, gallotannin and condensed tannins contents in acetone, chloroform, ethyl acetate and petroleum ether extracts of *Halacsya sendtneri* (Boiss.) Dörfl., their antimicrobial and antioxidant activities, as well as identifying and quantifying the phenolic components. The antioxidant activity is consistent with the results of total quantity of phenolic compound. The results showed that the acetone extract of plant species *Halascya sendtneri* (Boiss.) Dörfl. possessed the highest antioxidant activity. The IC_{50} values determined were: 9.45±1.55 μg/mL for DPPH free radical scavenging activity, 13.46±1.68 μg/mL for inhibitory activity against lipid peroxidation, 59.11±0.83 μg/mL for hydroxyl radical scavenging activity and 27.91±0.88 μg/mL for ferrous ion chelating ability. The antimicrobial activity was tested using broth dilution procedure for determination of the minimum inhibitory concentration (*MIC*). The *MIC*s were determined for 8 selected indicator strains. All of the extracts showed strong to moderate strong antimicrobial activity. The phenolic composition of *Halacsya sendtneri* extracts was determined by the HPLC method. The dominant phenolic compound in acetone, chloroform and ethyl acetate extract is rosmarinic acid. Ethyl acetate extract was also abundant in *p*-hydroxybenzoic acid and ferulic acid. The main compounds in petrol ether extract were chlorogenic acid and quercetin.

Keywords: antimicrobial activity; antioxidant activity; HPLC analysis; *Halacsya sendtneri* (Boiss.) Dörfl.

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Recently, interest for plants that is recognized in traditional medicine for prophylactic and therapeutic application increased worldwide. Interactions between plants and their environment lead to production of different biologically active substances (secondary metabolites). These substances are common for certain plants and plant families. Many of them and his extracts show clearly antimicrobial effects (against bacteria, fungi and viruses) [1–3].

Effective prevention of a number of diseases may be achieved with different parts of plants (root, leaf, flower, fruit, stem and bark). Potential toxicity of these bioactive substances has not been well established in humans [4]. Their antimicrobial and antioxidant effects affect a range of physiological processes in the human body, but may provide protection on free radicals and growth of undesirable microorganisms.

Greater consumer awareness and concern regarding synthetic chemical additives has led researchers to look for natural food additives with a large spectrum of antimicrobial effects. Synthetic antioxidants, such as butylated hydroxytoluene (BHT) and butylated hydroxyanisole (BHA) have the ability to terminate lipid peroxidation, which causes liver damage and carcinogenic changes [5]. The capacity of plants to synthesize biologically active compounds and their resistance to great number of antibiotics are reasons for their use in bacterial control. In the last decade, the food industry has been trying to replace synthetic preservatives, antioxidants or other food additives by use of various plants [6]. Essential substances for antioxidant activity of medicinal herbs are phenolic compounds [7]. The abovementioned and many other compounds from plants are useful for substitutive therapy, or as models for new synthetically derived substances [8]. A great number of active substances form herbs are important for normal growth and development, or defense against infection

Correspondence: P.Z. Mašković, Department of Chemistry and Chemical Engineering, Faculty of Agronomy, University of Kragujevac, cara Dušana 34, 32 000 Čačak, Serbia
E-mail: pavlem@tfc.kg.ac.rs
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