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DODATNE INFORMACIJE**PUBLIKACIJE**

Dahija S., Karalija E., Bešta-Gajević R., Pilić S., Čaušević A., Đug S., Muratović E. (2022). Efficiency assessment of rhizofiltration by *Mentha aquatica* L. of polluted water from urban rivers. *Desalination and Water Treatment (Accepted)*.

Urban rivers in Bosnia and Herzegovina are under the influence of industrial as well as communal loads resulting in high concentrations of heavy metals as well as faecal bacteria, and investigating how this could be managed is essential. *Mentha aquatica* is a widely growing plant with the potential to be used in pollution management. In this study, a setup of artificial ponds using water from urban rivers was used to evaluate the efficacy of *M. aquatica* in rhizofiltration systems. During the 15-d trial various physico-chemical and microbiological parameters of water, as well as the removal rate of heavy metals and faecal bacteria, were evaluated. The chemical oxygen demand, dissolved oxygen, and pH values were reduced after the introduction of *M. aquatica* plants. Nitrite, nitrate, orthophosphate, and total phosphorus were also decreased after 15 d post *M. aquatica* introduction for highly polluted water. Absorption of lead and cadmium by *M. aquatica* and 45% and 100% pathogen removal ratio were recorded. The results obtained from this study suggest that *M. aquatica* has the potential to remove heavy metals and pathogens from polluted river ecosystems and could be considered for phytoremediation purposes through the process of rhizofiltration.

Karalija E., Dahija S., Demir A., Bešta-Gajević R., Zeljković S.Ć., Tarkowski P. (2022). Exploring New Sources of Bioactive Phenolic Compounds from Western Balkan Mountains. *Plants*, 11(7), p.1002.

<https://doi.org/10.3390/plants11071002>

This study presents the first report on phenolic composition and bioactivity of ethanolic extracts of three plant species that grow in the western Balkan mountains and are used in traditional folk medicine: *Valeriana montana*, *Salix retusa*, and *Campanula hercegovina*. Phenolics were extracted from different aerial plant parts using 80% ethanol to assess the possibility of sustainable use of these plants as a source of bioactive compounds without disruption to the roots (for *V. montana*) or destruction of whole habitats (for *S. retusa* and *C. hercegovina*). The ethanolic extract of *V. montana* flower contained noticeable levels of apigenin and quercetin. The branches and bark of *S. retusa* were significantly rich in catechin, while rutin was the major phenolic found in the leaf extract of *C. hercegovina*. Furthermore, the flower extract of *V. montana* revealed the best antioxidant activity, which was comparable to 4-hydroxybenzoic acid and quercetin. Considering antimicrobial activity, the leaf extracts of *V. montana* and *C. hercegovina* demonstrated potent activity against all microbes tested, while the extracts of *S. retusa* were moderately effective. The presented results emphasize the potential of these plants as novel sources of bioactive compounds.

Šamec D., Karalija E., Dahija S., STS Hassan. (2022). Biflavonoids: Important Contributions to the Health Benefits of Ginkgo (*Ginkgo biloba* L.). *Plants*, 11(10), 1381.

doi: [10.3390/plants11101381](https://doi.org/10.3390/plants11101381)

Ginkgo (*Ginkgo biloba* L.) is one of the most distinctive plants, characterized by excellent resistance to various environmental conditions. It is used as an ornamental plant and is recognized as a medicinal plant in both traditional and Western medicine. Its bioactive potential is associated with the presence of flavonoids and terpene trilactones, but many other compounds may also have synergistic effects. Flavonoid dimers—biflavonoids—are important constituents of ginkgophytopharmaceuticals. Currently, the presence of 13 biflavonoids has been reported in ginkgo, of which amentoflavone, bilobetin, sciadopitysin, ginkgetin and isoginkgetin are the most common. Their role in plants remains unknown, but their bioactivity and potential role in the management of human health are better investigated. In this review, we have provided an overview of the chemistry, diversity and biological factors that influence the presence of biflavonoids in ginkgo, as well as their bioactive and health-related properties. We have focused on their antioxidant, anticancer, antiviral, antibacterial, antifungal and anti-inflammatory activities as well as their potential role in the treatment of cardiovascular, metabolic and neurodegenerative diseases. We also highlighted their potential toxicity and pointed out further research directions.

Karalija E., Dahija S., Tarkowski P., Čavar Zeljković S. (2022) Influence of Climate-Related Environmental Stresses on Economically Important Essential oils of Mediterranean *Salvia* sp. *Frontiers in Plant Science*, p.1085.

<https://doi.org/10.3389/fpls.2022.864807>

Salvia L. is the largest genus in the family Lamiaceae, with about 1,000 species and a nearly cosmopolitan distribution. *Salvia* species are used in both traditional and conventional medicines, and other numerous industries, such as spices and perfumes. The number of papers dealing with *Salvia* exceeds 12,000 and mostly investigates their chemical composition and bioactive properties. A smaller proportion of papers however consider environmental factors, mostly on the effects of microclimate conditions on its geographic distribution along an altitudinal or longitudinal gradient, and very few studies can be found on the effects of emerging stressors on the commercial production of sages of medicinal and economical importance. Here, we summarize available data on the essential oil composition of three economically important sages from the Mediterranean area, that is, *Salvia officinalis*, *Salvia officinalis* subsp. *lavandulifolia*, and *Salvia fruticosa*, and the effects of climate-related environmental stressors on their chemical profiles. Environmental stress factors, such as an increase in soil salinity and aridity, and changes in annual average temperatures, are going to impose a serious risk on the commercial production of sage essential oils, which are commercially produced in many European countries. This review highlights the already confirmed effects of these stressors on three selected *Salvia* species and consequently the importance of mitigating the effects of climate change on the commercial production of these essential oils.

Karalija E., Čavar Zeljković S., Dahija S., Bešta-Gajević R., Parić, A. (2021). Phenolics of Aerial Parts of *Gentiana lutea* L. and Their Biological Activity. *Agronomy*, 11(7), p.1442.

<https://doi.org/10.3390/agronomy11071442>

Gentiana lutea L. is a medicinal plant the roots of which are primarily used in treatments of various human digestive disorders, but also the production of alcoholic liquors. The roots (radix) of *G. lutea* are described in the European Pharmacopeia, but knowledge about the chemical composition and biological activities of its aerial parts is still limited. Thus, until today aerial parts of this species have not been used in medical treatments or consumed. Therefore, flowers, leaves, and stems extracts of *G. lutea* obtained by using four different extraction solvents (petrol ether, chloroform, ethanol, and water) were examined for their chemical composition and biological activities. High concentrations of salicylic acid, apigenin, and naringenin were recorded for ethanol stem extracts, while significant amounts of kaempferol were detected in leaves and flowers in chloroform and water extracts, respectively. The highest antioxidant potential was recorded for flower and stem petrol ether extracts with the lowest IC₅₀ values, ranging from 94.46 ± 9.45 to 105.38 ± 10.54 µg/mL. Ethanol extracts of flowers and stems showed moderate antioxidant activity (IC₅₀ 143.15 ± 14.32 and 146.90 ± 14.69 µg/mL) as well as strong antimicrobial activity against *Candida albicans* (21.00 ± 1.00 and 27.50 ± 1.78 mm inhibition zones, respectively). In addition, ethanol extracts had higher antimycotic activity compared to naturally occurring phenolic compounds that are used as positive controls. Moreover, statistical analysis of the activities of plant extracts and single compounds showed that levels of chlorogenic and caffeic acids strongly correlate with the biological activities of the extracts, i.e., they are the main carriers of these biological activities. The presented results indicate the possible use of aerial parts of *G. lutea* as a natural preservative, as well as a antimicrobial agent, which significantly amplifies the benefits of this medicinal crop and greatly affects the sustainability of cultivated *Gentiana* plantation.

Karalija, E., Paric, A., Dahija, S., Besta Gajevic, R., Cavar Zeljkovic, S. (2021). "Aconitum lycoctonum L.: Phenolic Compounds and Their Bioactivities," Poisonous Plant Research (PPR). 4:1-9.

– 2021

The very first report on the phenolic composition of aerial parts of *Aconitum lycoctonum* L., a species belonging to the toxic *Aconitum* genus, is presented here. Aerial parts were subjected to the extraction with four different solvents and analyzed via LC-MS/MS for the content of phenolic acids and flavonoids. Furthermore, isolated extracts were tested for antimicrobial and antioxidant activities. Ethanolic extracts of both flowers and vegetative parts (leaves and stems) were found to be the richest in the phenolic compounds, following the water extracts. Ethanolic extract of flowers was very rich in flavonoid apigenin, while high levels of salicylic and 4-hydroxybenzoic acids were found in the same extract of leaves and stems. On contrary, water extract contained significant amounts of kaempferol and rosmarinic acid. All extracts showed potent antioxidant activity, which is correlated with the content of phenolics. The antimicrobial assay showed that all extracts, except aqueous, were quite potent against all microbial organisms tested.

Kaczorová, D., Karalija, E., Dahija, S., Bešta-Gajević, R., Parić, A., Čavar Zeljković, S. (2021). Influence of Extraction Solvent on the Phenolic Profile and Bioactivity of Two Achillea Species. Molecules. 26, 1601. (q2)

The phenolic composition, as well as the antioxidant and antimicrobial activities of two poorly investigated Achillea species, *Achillea lingulata* Waldst. and the endemic *Achillea abrotanoides* Vis., were studied. To obtain a more detailed phytochemical profile, four solvents with different polarities were used for the preparation of the plant extracts whose phenolic composition was analyzed using UHPLC-MS/MS (ultra-high performance liquid chromatography-tandem mass spectrometry). The results indicate that both of the investigated Achillea species are very rich in both phenolic acids and flavonoids, but that their profiles differ significantly. Chloroform extracts from both species had the highest yields and were the most chemically versatile. The majority of the examined extracts showed antimicrobial activity, while ethanolic extracts from both species were potent against all tested microorganisms. Furthermore, the antioxidant activity of the extracts was evaluated. It was found that the ethanolic extracts possessed the strongest antioxidant activities, although these extracts did not contain the highest amounts of detected phenolic compounds. In addition, several representatives of phenolic compounds were also assayed for these biological activities. Results suggest that ethanol is a sufficient solvent for the isolation of biologically active compounds from both Achillea species. Moreover, it was shown that the flavonoids naringenin and morin are mainly responsible for these antimicrobial activities, while caffeic, salicylic, chlorogenic, p-coumaric, p-hydroxybenzoic, and rosmarinic acid are responsible for the antioxidant activities of the Achillea extracts.

Karalija, E., Selović, A., Dahija, S., Demir, A., Samardžić, J., Vrobel, O., Čavar Zeljković, S., Parić, A. (2021). Use of seed priming to improve Cd accumulation and tolerance in *Silene sendtneri*, novel Cd hyper-accumulator. Ecotoxicology and Environmental Safety, 210: 111882. (q1)

Changes in the environment as a result of industrialisation and urbanisation impact negatively on plant growth and crop production. Cadmium (Cd) is one of the most dangerous metals that enters the food chain, with toxic effects on plants and human health. This study evaluated the potential of *Silene sendtneri* as a novel hyperaccumulator and the role of seed priming in tolerance and accumulation rate of Cd. The effect of different priming agents on germination performance, root growth, seedling development, metal uptake and accumulation, antioxidant defences including enzymatic and non-enzymatic antioxidants has been assessed. Seed priming using silicic acid, proline alone or in combination with salicylic acid- enhanced germination, seedling development, and root growth under Cd stress. The same priming treatments induced an increase of water content in shoots and roots when plants were exposed to Cd. The enzymatic antioxidant response was specific for the priming agent used. An increase in ferulic acid and rutin in shoots was related to the increase of Cd concentration in the medium. The concentration of malic and oxalic acid increased significantly in shoots of plants grown on high Cd concentrations compared to low Cd concentrations. *Silene sendtneri* can accumulate significant levels of Cd with enhanced accumulation rate and tolerance when seeds are primed. The best results are obtained by seed priming using 1% silicic acid, proline and salicylic acid.

Karalija, E., Dahija, S., Parić, A., Zeljković, S. Č. (2020). Phytotoxic potential of selected essential oils against *Ailanthus altissima* (Mill.) Swingle, an invasive tree. Sustainable Chemistry and Pharmacy, 15, 100219. (q2)

Ailanthus altissima (Mill.) Swingle, tree of heaven, is an exotic tree introduced as a horticultural tree in Europe and America in 18th Century. Now it is aggressively invading ecosystems. This study was aimed to estimate phytotoxic potential of essential oils (EOs) from fourteen industrial, aromatic and medicinal crops, such as *Thymus* sp., *Pinus* sp., *Origanum* sp. etc. against this invasive species. The phytotoxic potential was assessed through three different doses of EOs by a germination bioassay and the effects on seedling growth. Analysis of seedling growth revealed that seven EOs (*Petasites hybridus*, *Thymus serpyllum*, *Thymus vulgaris*, *Rosmarinus officinalis*, *Helichrysum italicum*, *Matricaria chamomilla*, *Origanum vulgare*) exhibit high phytotoxic effect resulting in 95–100% seedling mortality. Moreover, detailed GC-MS analysis of these oils

showed that they are mostly comprised either of oxygenated monoterpenes or sesquiterpene hydrocarbons, which are already known as compounds with allelopathic effects. Presented results indicate these essential oils might be used as natural herbicides by foliar application of oils on young plants of *Ailanthus altissima*.

Karalija E., Parić A., Dahija S., Bešta-Gajević R., Čavar Z.S. (2020). Phenolic compounds and bioactive properties of *Verbascum glabratum* subsp. *bosnense* (K. Malý) Murb., an endemic plant species. *Natural product research*. 34(16):2407-2411. (q2).

Detailed analysis of phenolic composition and antioxidant and antimicrobial activities of *Verbascum glabratum* subsp. *bosnense* (K. Malý) Murb., an endemic species of southeastern Dinaric Alps was performed for the first time. The phenolic composition measured via UHPLC-MS/MS of four extracts with different polarity suggested this plant species is very rich in both phenolic acids and flavonoids. Ethanol extract was chemically the most versatile containing 12 compounds with quercitrin and rosmarinic acid as the majors, while water extracts were rich in 4-hydroxybenzoic acid, salicylic acid, morin, and apigenin. All extracts showed high antioxidant potential measured spectrophotometrically with IC50 values ranging 0.139 - 0.021 mg/mL. Antimicrobial testing using agar diffusion test showed that ethanol extract was the most potent against all tested organisms. Also, these activities are correlated with the content of phenolic compounds, which suggest they are active ingredients of the extracts.

Mahmutović-Dizdarević I., Dizdar M., Culum D., Vidic D., Dahija, S. & Jerković-Mujkić A., Bešta-Gajević R. (2020). Phenolic Composition, Antioxidant and Antimicrobial Activity of *Cotoneaster Medik.* Species from Bosnia and Herzegovina. *Glasnik hemičara i tehnologa Bosne i Hercegovine Bulletin of the Chemists and Technologists of Bosnia and Herzegovina*,. 54:1-6.

Although the genus *Cotoneaster Medik.* includes mainly ornamental species, there are some data regarding its biological activity. The purpose of this study was to analyze the content of phenolic compounds, acetylcholinesterase inhibition, antioxidant and antimicrobial activity of methanolic extracts of leaf and bark of *C. integerrimus Medik.*, *C. tomentosus* (Aiton) Lindl. and *C. horizontalis* Decne. The *C. tomentosus* leaf extract exhibited the highest content of total phenols (135.86 mg GAE/g) and flavonoids (18.17 mgQE/g), and also the most potent antioxidant activity against nonbiogenic free radicals, while the highest inhibition of acetylcholinesterase had the leaf extract of *C. horizontalis* (IC50 0.34 mg/mL). All extracts showed a significant level of antibacterial and antifungal activity against tested microbial strains. The largest inhibition zones were observed against *Candida albicans* treated with *C. integerrimus* leaf extract (30.50±0.50 mm). Furthermore, *C. integerrimus* extract was the most effective in the majority of bacterial strains tested. The results indicated that methanolic extracts of the investigated *Cotoneaster* species have promising bioactive and therapeutic potentials.

Dahija S., Bešta-Gajević R., Jerković-Mujkić A., Đug S., Muratović E. (2019). Utilization of *Mentha aquatica* L. for removal of fecal pathogens and heavy metals from water of Bosna River, Bosnia and Herzegovina". *International Journal of Phytoremediation*, 21:8, 807-815. (q3).

The aim of the present study was to investigate the potential of *Mentha aquatica* L. for phytoremediation of water contaminated with heavy metals and fecal pathogens from Bosna river. The water was treated with *M. aquatica* for 5, 10, and 15 days consecutively after which it was analyzed for the various physicochemical and microbiological parameters. The initial concentration of cadmium (Cd) ranged from 3.644 to 6.108 µg/l, while lead (Pb) varied between 0.1 and 1.386 µg/l. After treatment, *M. aquatica* accumulated significant amounts of cadmium (Cd) and lead (Pb) with the highest removal rates of 96.49% for Cd and 45.72% for Pb. Values of several physicochemical parameters were decreased after 15 days treatment period. All water samples were analyzed for enumeration of aerobic heterotrophic bacteria, total coliforms, and fecal coliforms by the membrane filtration. Removal efficiency was greater than 80% for microbiological parameters. The concentration of heavy metals was determined in different plant parts and subsequently, the translocation factor was determined. In *M. aquatica* plant parts, concentrations of Pb and Cd were increased after 15 days of treatment. Our results demonstrated that *M. aquatica* could be good candidates for the removal of fecal pathogens and heavy metals present in surface water.

Pilić S., Jerković-Mujkić A., Dahija S., Bešta-Gajević R. (2019). Cytopathological changes induced by Alfalfa mosaic virus infection in ornamental petunia. *Works of the Faculty of Agriculture and Food Sciences, University of Sarajevo*, LXIV (69/1): 79-88.

Petunije kao ukrasne biljke, cijenjene su zbog svojih estetskih svojstava i predstavljaju važan dio hortikulture. Viroze na ukrasnim biljkama značajno umanjuju njihovu dekorativnu vrijednost. Cilj ovog istraživanja je utvrditi citopatološke promjene i izvršiti procjenu stepena osjetljivosti odabranih sorti petunija na infekciju uzrokovanu virusom mozaika lucerke (Alfalfa mosaic virus – AMV). Virus je pribavljen od renomiranog proizvođača DSMZ (Deutsche Sammlung von Microorganismen und Zellkulturen GmbH, Njemačka) i umnožen u duhanu *Nicotiana tabacum* L. "White Burly" sa kojeg je mehaničkim putem prenešen na testirane sorte petunija: *Petunia nana compatta* blu x hybrida (ljubičasta), *Petunia nana compatta* rossa x hybrida (crvena), *Petunia nana compatta* bianca x hybrida (bijela), *Petunia nana compatta* multicolor x hybrida (višebojna) i *Petunia mix* (višebojna). Za mikroskopska istraživanja korištene su

epidermalne trake inficiranih i kontrolnih biljaka, koje su bojene Azure A bojom prema metodi Christie & Edwardson (1986). Biološka karakterizacija virusa mozaika lucerke izvršena je na osnovu karakterističnih simptoma koji su se pojavili nakon perioda inkubacije na test biljkama, a identifikacija virusa je potvrđena DAS-ELISA testom. Mikroskopskom opservacijom virusno inficiranih listova petunija uočeno je prisustvo amorfnih i kristaličnih inkluzija u epidermalnom tkivu. U epidermalnom tkivu zdravih biljaka, virusne inkluzije nisu uočene. Na osnovu reakcije odabranih sorti petunija na infekciju virusom mozaika lucerke, može se zaključiti da je sorta *Petunia nana compacta rossa* x hibrida pokazala najveći stepen osjetljivosti, dok se sorta *Petunia nana compacta bianca* x hibrida pokazala kao najotpornija. U svrhu održivosti vitalnosti i dekorativnih vrijednosti ukrasnih biljaka, trebale bi se favorizovati sorte biljaka koje su otpornije na viruse.

[Bešta-Gajević R., Karalija E., Jerković-Mujkić A., Karadža D., Smajlović-Skenderagić L., Dahija S. \(2018\). Antimicrobial and antioxidant activity of the extracts from *Origanum vulgare* L. growing wild in Bosnia and Herzegovina. *Genetics & Applications*, 2\(2\), 62-66.](#)

Antifungal, antimicrobial, insecticidal and antioxidant activities of *Origanum vulgare* L. provide the basis for suggesting that oregano plant extracts may be useful for prevention and treatment of many infection. The main goal of this study was to determine antimicrobial and antioxidant activities of methanolic and aqueous extracts from the leaves and flowers of *Origanum vulgare*. Antimicrobial testing of plant extracts was done using well diffusion method. Activity of extracts were tested against Gram positive bacteria: *Staphylococcus aureus* ATCC 25923, methicillin-resistant *Staphylococcus aureus* (MRSA) ATCC 33591, *Bacillus subtilis* ATCC 6633, *Enterococcus faecalis* ATCC 29212 and five Gram-negative bacteria: *Salmonella abony* ATCC 6017, *Salmonella enterica* serovar Enteritidis ATCC 31194, *Pseudomonas aeruginosa* ATCC 9027, *Escherichia coli* ATCC 25922, extended-spectrum β -lactamase (ESBL) producing *Escherichia coli* ATCC 35218 and fungi *Candida albicans* ATCC 1023. Antibiotics ampicillin, streptomycin and antimycotic nystatin were used as positive controle. The antioxidant activity was determined by using the DPPH (1,1-diphenyl-2-picrylhydrazyl) method. The highest values for inhibition zone for methanolic and aqueous extracts were recorded for Gram positive *Bacillus subtilis*, *Staphylococcus aureus* and MRSA. Methanolic extracts exhibited antibacterial activity against tested Gram negative bacteria in variable degree while the growth of these bacteria was not inhibited by aqueous extracts. Tested fungi *Candida albicans* was not susceptible to investigated oregano extracts. All the extracts showed moderate to potent antioxidant activity, among which the methanolic flower extract demonstrated the strongest antioxidant activity with the IC50 value of 0.205 mg/mL. Therefore it can be concluded that flower and leaf oregano extracts have great antibacterial and antioxidant potential.

[Mahmutović I., Dahija S., Bešta-Gajević R., Karalija E. \(2017\) Biological activity of *Juniperus communis* L. extracts. Works of the Faculty of Agriculture and Food Sciences, University of Sarajevo, LXII\(67/2\): 536-544.](#)

Juniperus communis L. is one of the plants used in folk medicine, especially juniper berries, for the treatment of many infections, and as a spice and flavour in preparation of some drinks. Data regarding the biological activity of juniper leaves are scattered. In this research paper total phenol and flavonoid content, DPPH radical scavenging activity and antimicrobial properties of methanol extracts of leaves and berries were determined. Also, for extract preparation from female and male plants young and old shoots, and berries from female plants were separated and extraction was performed using 80% methanol. Total phenol content was statistically higher in shoots of male plants, the same was recorded for flavonoid content. The reducing power of methanol extracts was statistically higher than used control (α -pinol), and reduction of DPPH radical ranged from 91 up to 94%. Antimicrobial activity of juniper methanol extracts was determined by the paper disc diffusion method. In this research two Gram-positive bacteria *Staphylococcus aureus* ATCC 6538, *Bacillus subtilis* ATCC 6633, two Gram-negative bacteria *Escherichia coli* ATCC 8739, *Pseudomonas aeruginosa* ATCC 9027, and yeast *Candida albicans* were used. Juniper methanol extracts exhibited antibacterial activity against tested strains in variable degree. Gram-negative *P. aeruginosa* was the most sensitive tested strain compared to reference ampicillin antibiotic. The results showed that *Juniperus communis* has a great antioxidant and antimicrobial potential, especially leaves of the male plants.

[Dahija S., Haverić S., Čakar J., Parić A. \(2016\): Antimicrobial and cytotoxic activity of *Alnus glutinosa* \(L.\) Gaertn., *A. incana* \(L.\) Moench, and *A. viridis* \(Chaix\) DC. extracts. *Journal of Health Sciences*, 6\(2\): 100-104.](#)

Introduction: The objective of the present study was to evaluate the antimicrobial and cytotoxic activities of water extracts of leaves and barks from *Alnus glutinosa* (L.) Gaertn., *A. incana* (L.) Moench, and *A. viridis* (Chaix) DC.

Methods: The antimicrobial activities of extracts were tested against gram-negative and gram-positive bacteria as well as yeast strains by the agar diffusion method. The cell viability was determined by the Trypan blue dye exclusion method.

Results: The largest diameters of inhibition zone (DIZ) were recorded with *Staphylococcus aureus* ATCC 6538 and *Bacillus subtilis* 168M. The highest percentage of cell viability was observed with water bark extracts of *A. glutinosa* (97.46%).

Conclusions: Potential antimicrobial properties of *A. glutinosa*, *A. incana*, and *A. viridis* demonstrated in this study, as well as their low levels of toxicity, make them an interesting subject for further studies.

Dahija S., Čakar J., Vidic D., Maksimović M., Parić A. (2014): Total phenolic and flavonoid contents, antioxidant and antimicrobial activities of *Alnus glutinosa* (L.) Gaertn., *Alnus incana* (L.) Moench and *Alnus viridis* (Chaix) DC. extracts. *Natural Product Research*, 28:24, 2317-2320. (q2).

The objective of this study was to determine total phenolic and flavonoid contents, antioxidant and antimicrobial activities of methanolic extracts from the leaves and barks of three *Alnus* species. The phenolic and flavonoid contents of extracts were determined spectrophotometrically using Folin–Ciocalteu and aluminium chloride methods, respectively. In addition, antioxidant activity of the extracts was determined using 1,1-diphenyl-2-picrylhydrazyl radical scavenging method. The antimicrobial activity was performed by disc diffusion assay against six reference bacterial strains including Gram-negative and Gram-positive bacteria and two fungal strains. Extract of *Alnus viridis* bark contained the highest amounts of total phenolics (780 mg CAT/g), while extract of *A. viridis* leaves had the highest amount of flavonoids (30.01 mg RUT/g). All extracts showed antioxidant activity higher than thymol, which was used as a positive probe. The largest diameters of inhibition zone (25 mm) were recorded with *Bacillus subtilis* 168 M and *Staphylococcus aureus* ATCC 6538.

KONFERENCIJE I SEMINARI

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PROJEKTI

Primjena indikatora u procjeni stanja vodotoka Kantona Sarajevo i bioremedijacija kao perspektivno rješenje zaštite. 2022

Ministarstvo za nauku, visoko obrazovanje i mlade Kantona Sarajevo

2021 – TRENUTAČNO

Povećanje efikasnosti bioremedijacijskih procesa u saniranju zagađenih riječnih ekosistema na području FBiH. Voditelj projekta: Doc. dr. Sabina Dahija

Projekat je finansiran od strane Federalnog Ministarstva obrazovanja i nauke.

2019 – 2021

Povećanje stepena akumulacije teških metala kod odabranih hiperakumulatorskih biljnih vrsta metodom prajminga Projekat je finansiran od strane Ministarstva za obrazovanje, nauku i mlade Kantona Sarajevo.

2018 – 2019

Detekcija i molekularna identifikacija biljnih virusa na kultivisanim biljkama u Federaciji BiH Projekat je finansiran od strane Federalnog Ministarstva obrazovanja i nauke.

2018 – 2018

Mapiranje divljih deponija - doprinos remedijaciji tla Projekat je finansiran od strane Fonda za zaštitu okoliša.

2012 – 2013

Projekat šumskih i planinskih zaštićenih područja Broj: BA-FMPAPTF091919-CQ-21-S-12/FBIH „Izrada crvene liste ugroženih biljaka, životinja i gljiva u Federaciji Bosne i Hercegovine” Projekat je finansiran od strane Federalnog ministarstva okoliša i turizma.

2009 – 2010

Ispitivanje kvaliteta površinskih voda na području sliva rijeke Save u Federaciji BiH: definiranje tipova površinskih voda – izrada nacrtu tipologije površinskih kopnenih voda Bosne i Hercegovine (na dijelu Federacije Bosne i Hercegovine) Projekat je finansiran od strane Agencije za vodno područje rijeke Save.

KOMUNIKACIJSKE I MEĐULJUDSKE VJEŠTINE

Komunikacijske i međuljudske vještine Sklonost timskom radu

Dobre komunikacijske vještine zahvaljujući iskustvu na radnom mjestu asistenta i višeg asistenta

Dobre komunikacijske vještine zahvaljujući učešću na brojnim konferencijama i seminarima iz oblasti istraživanja

RECENZENT U MEĐUNARODNIM I DOMAĆIM ČASOPISIMA

Natural Product Research

Drug & Chemical Toxicology

Radovi Poljoprivredno-prehrambenog fakulteta Univerziteta u Sarajevu

KNJIGE

Dahija S., Karalija E. (2021). Alelopatija i alelopatski spojevi. Univerzitet u Sarajevu - Prirodno - matematički fakultet. ISBN 978-9926-453-39-8

POČASTI I NAGRADE

Nagrada za naučnoistraživački rad za 2020. godinu Univerzitet u Sarajevu

Nagrada za naučnoistraživački rad za 2021. godinu Univerzitet u Sarajevu