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and
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CONTENT

Munevera Begić, Semina Pinjić, Eldar Hasandić, Lejla Biber, QUALITY OF SMOKED CHICKEN BREASTS PRODUCED UNDER TRADITIONAL CONDITIONS WITH THE ADDITION OF VARIOU SPICES 1
Lejla Biber, **Melisa Ljuša**, **Jasmin Grahić**, **Munevera Begić**, APPLICATION OF INFORMATION TECHNOLOGIES IN BEEKEEPING FOR PRODUCTION IMPROVEMENT AND BIODIVERSITY CONSERVATION 3
Dubravka Bigović, **Katarina Šavikin**, **Nemanja Krgović**, **Jelena Živković**, EFFECTS OF CHOKEBERRY AND TART CHERRY BASED DIETARY SUPPLEMENTS IN DYSLIPIDEMIC INDIVIDUALS 5
Jasmina Lapić, **Anica Bebek Markovinović**, **Nikolina Račić**, **Lana Vujanić**, **Marko Kostić**, **Dušan Rakić**, **Senka Djaković**, **Danijela Bursać Kovačević**, BIOACTIVE POTENTIAL OF *Arbutus unedo* L. LEAVES: INFLUENCE OF GEOGRAPHICAL LOCATION, EXTRACTION METHOD AND SOLVENT TYPE 7
Petar Čanak, **Mioljub Mišović**, **Goran Pošarac**, **Miloš Crevar**, **Vesna Perić**, **Bojan Mitrović**, **Milan Stevanović**, SEED TREATMENT: EVOLUTION AND ALTERNATIVES 9
Beatrice Cellini, **Silvia Tappi**, **Fatemeh Shanbeh Zadeh**, **Junior Bernardo Molina Hernandez**, **Marco Dalla Rosa**, **Pietro Rocculi**, **Lucia Vannini**, COLD PLASMA TO TREAT READY-TO-EAT APPLES: AN ACTIVE SOLUTION AGAINST *ARCOBACTER* SPP. AND *CRONOBACTER* SPP. CONTAMINATION 11
Zorana Golubović, **Ivan Zlatanović**, **Vojislav Simonović**, **Božica Bojović**, ADVANCEMENTS AND CHALLENGES OF 3D PRINTING IN MODERN AGRICULTURE 12
Lenka Grubač, **Milana Pribić**, **Jelena Pejin**, IMPACT OF DIFFERENT MASHING REGIMES ON TECHNOLOGICAL PARAMETERS OF ALCOHOL-FREE BEER 14
Jasna Halambek, **Ivana Kolić**, **Predrag Putnik**, **Danijela Bursać Kovačević**, **Sandra Zavadlav**, FUTURE TRENDS AND LIMITATIONS OF ESSENTIAL OILS AND PLANT EXTRACTS AS ADDITIVES IN THE FORMULATION OF EDIBLE PACKAGING 16
Nevena Hromiš, **Senka Popović**, **Danijela Šuput**, **Jovana Pantić**, **Sandra Bulut**, **Zorica Tomičić**, **Ivana Čabarkapa**, THE STRUCTURE OF THE PROTEIN CONCENTRATE OBTAINED BY THE ULTRASONIC AND CHEMICAL DEPROTEINIZATION PROCESS OF THE SPINY CRAYFISH SHELL FROM THE DANUBE RIVER 18
Rosalba Lanciotti, **Clara Gomez-Urios**, **Renato Illiano**, **Davide Gottardi**, **Lorenzo Siroli**, **Francesca Patrignani,** EFFECT OF HIGH-PRESSURE TREATMENTS ON THE QUALITY AND SHELF-LIFE OF AN ORANGE-BERGAMOT BEVERAGE 20
Mirjana Ljubojević, **Biljana Božanić Tanjga**, **Nataša Simin**, **Marija Lesjak**, **Tijana Narandžić**, **Magdalena Pušić Devai**, **Veljko Šarac**, **Milana Čurčić**, DIVERSIFIYING ROSES FOR 21st CENTURY'S ENVIRONMENTAL AND SOCIAL NEEDS 21
Muamer Mandra, **Azra Sinanović**, **Mladenka Pestorić**, **Nikola Maravić**, **Dubravka Škrobot**, **Dragana Ubiparip Samek**, **Miloš Županjac**, PIVOT PROFILE METHOD IN SENSORY EVALUATION OF CHICKEN BREAST 23
Marko Nedić, THE FUTURE OF A BIOGAS IN SERBIA 25
Ana Cristina De Auiar Saldahna Pinheiro, **Davide Gottardi**, **Lorenzo Siroli**, **Muhammad Rehan Khan**, **Daniele Alberoni**, **Diana Di Gioia**, **Lucia Vannini**, **Pietro Rocculi**, **Rosalba Lanciotti**, **Francesca Patrignani**, FULL CHARACTERIZATION OF CHITOSAN, RESULTING FROM THE VALORISATION OF FISH WASTE, TO BE USED FOR THE FORMULATION OF BIOSTIMULANTS 27
Mladenka Pestorić, **Dragana Ubiparip Samek**, **Nikola Maravić**, **Predrag Ikonić**, **Tatjana Peulić**, **Miloš Županjac**, **Nenad Magazin**, SENSORY LEXICON FOR FROZEN ARILJE RASPBERRIES 28
Mladenka Pestorić, **Dragana Ubiparip Samek**, **Nikola Maravić**, **Tatjana Peulić**, **Renata Kovač**, **Mirjana Milutinović**, **Jovana Mićović**, SENSORY CHARACTERIZATION OF FRESH ARILJE RASPBERRIES USING RAPID EVALUATION TECHNIQUES 29
Robert Daniel Neagu, **Corina Dana Misca**, **Delia-Gabriela Dumbrava**, **Camelia Moldovan**, **Viorica Mirela Popa**, **Marius Robert Lungu**, **Diana Nicoleta Raba**, NUTRITIONAL PROFILE OF SOME EDIBLE FRESHWATER AND MARINE FISH SPECIES. A REVIEW 30
Cosmin Salasan, **Iasmina Iosim**, **Carmen Dumitrescu**, **Cosmina Toader**, **Tabita Adamov**, **Cristian Gaina**, **Raul Pascalau**, THE LINK BETWEEN THE STRUCTURAL ADJUSTMENTS AND THE CROP RANGE IN ROMANIAN WESTERN AGRICULTURE 31
Katarina Šavikin, **Jelena Živković**, **Nemanja Krgović**, **Dubravka Bigović**, BENEFICIAL IMPACTS OF CHOKEBERRY AND TART CHERRY BASED DIETARY SUPPLEMENTS IN DIABETICS 32
Marina Šćiban, **Dragana Lukić**, **Vesna Vasić**, **Jelena Prodanović**, **Teodora Subić**, NOVEL APPROACHES TO UTILIZING OF PRUNING RESIDUES OF RASPBERRIES AND BLACKBERRIES 34

Fatemeh Shanbeh Zadeh, **Beatrice Cellini**, **Gebremedhin Gebremariam Gebremical**, **Junior Bernardo Molina Hernandez**, **Pietro Rocculi**, **Silvia Tappi**, **Fausto Gardini**, **Santina Romani**, **Lucia Vannini**, INNOVATIVE NON-THERMAL TECHNOLOGY TO IMPROVE SAFETY AND QUALITY IN READY-TO-EAT VEGETABLES 36
Branimir Šimić, **Luka Andrić**, **Matija Domačinović**, **Snežana V. Jovanović**, **I. Miškulin**, **Ivana Prakatur**, THE INFLUENCE OF GENOTYPE AND SOWING DENSITY ON AGRONOMIC CHARACTERISTICS OF CORN HYBRIDS FOR SILAGE PRODUCTION 37
Đorđe Petrić, **Milica Vranešević**, OPTIMIZATION OF PUMPING STATIONS IN VOJVODINA THROUGH ENERGY CONSUMPTION ANALYSIS AND IMPROVEMENT OPPORTUNITIES 39
Milica Vranešević, **Maja Meseldžija**, **Jasna Grabić**, BLUE CARBON IN FRESHWATER ECOSYSTEMS OF VOJVODINA, SERBIA: POTENTIALS AND CHALLENGES 40
Jasna Halambek, **Ivana Kolić**, **Denis Kotarski**, **Predrag Putnik**, **Danijela Bursać Kovačević**, **Sandra Zavadlav**, INNOVATIVE THREE-DIMENSIONAL 3D-ESSERTS WITH DIETARY SUPPLEMENTS IN EDIBLE PACKAGING 41
Jana Žilović, **Aleksandra Đukić-Vuković**, **Mihajlo Bogdanović**, **Jovana Grbić**, **Vanja Tadić**, **Ana Žugić**, FERMENTATION OF POPLAR BUD EXTRACTS USING LACTIC ACID BACTERIA 43
Jelena Živković, **Dejan Pljevljakušić**, **Dubravka Bigović**, **Katarina Šavikin**, CHEMICAL CHARACTERIZATION OF CHOKEBERRY SEEDS AND THEIR DERIVED OIL: COMPOSITION AND POTENTIAL HEALTH BENEFITS 45
Ana Matin, **Ivan Brabdić**, **Vanja Jurišić**, **Božidar Matin**, **Tajana Krička**, **Mateja Grubor**, **Karlo Špelić**, COMPARISON OF THE NUTRITIONAL COMPOSITION OF MAIZE GRAIN UNDER DIFFERENT DRYING TREATMENTS 47
Aleksandar Miljatović, **Veljko Vukoje**, **Mirela Tomaš Simin**, MEASURING THE PRODUCTIVITY CHANGE IN SERBIAN FARMS USING FADN DATA 49
Dragana Novaković, **Dragan Milić**, **Beba Mutavdžić**, **Vladislav Zekić**, **Maja Radišić**, **Srboljub Nikolić**, **Milan Mihajlović**, **Tihomir Novaković**, PANEL REGRESSION ANALYSIS OF PROFITABILITY FACTORS OF OIL PRODUCTION COMPANIES FROM THE REPUBLIC OF SERBIA 51
Dobrivoj Poštić, **Ratibor Štrbanović**, **Nenad Đurić**, **Nikola Koković**, **Nenad Pavlović**, **Ivana Živković**, **Rade Stanisavljević**, YIELD OF EARLY POTATOES IN THE CONDITIONS OF WESTERN SERBIA 53
Danica Savanović, **Ana Velemir**, **Aleksandar Savić**, **Ljiljana Topalić Trivunović**, **Branislav Šojić**, **Jovo Savanović**, **Jelena Knežević**, BIOLOGICAL PROPERTIES OF FRESH CREAM CHEESE WITH THE ADDITION OF SELECTED PLANT SPECIES 55
Rade Stanisavljević, **Dobrivoj Poštić**, **Ratibor Štrbanović**, **Violeta Oro**, **Mile Sečenski**, **Marijenka Tabaković**, **Jasmina Knežević**, VITALITY OF PUMPKIN SEEDS FROM DIFFERENT REGIONS DURING A THREE-YEAR STORAGE PERIOD 57
Marijenka Tabaković, **Natalija Kravić**, **Vesna Perić**, **Vojka Babić**, **Rade Stanisavljević**, **Violeta Oro**, RESPECT AND CARE FOR TRADITIONAL UNDERSTANDINGS OF AGROBIODIVERSITY 59
Branislav Šojić, **Snežana Škaljac**, **Branimir Pavlić**, **Eva Ivanišová**, **Monika Božiková**, **Danica Savanović**, **Michał Binczarski**, SAGE ESSENTIAL OIL EXHIBITS ANTIOXIDATIVE AND ANTIMICROBIAL ACTIVITY IN CHICKEN COOKED SAUSAGES 61
Sarah Aisyah Khurun Hizar, **Hasmadi Mamat**, **Rovina Kobun**, **Norliza Julmohammad**, **Siti Faridah Mohd Amin**, **Nor Qhairul Izzreen Mohd Noor**, **Mohd Sharizan Md Sarip**, **Azrul Nurfaiz Mohd Faizal**, **Nicky Rahmana Putra**, **Ahmad Hazim Abdul Aziz**, SOLUBILITY CORRELATION OF SABAH GREEN ROBUSTA COFFEE (COFFEA CANEPHORA) BEAN EXTRACT IN SUPERCRITICAL CARBON DIOXIDE EXTRACTION 63
Macdalyna Esther Ronie, **Hasmadi Mamat**, **Ahmad Hazim Abdul Aziz**, **Mohamad Khairi Zainol**, **Norazlina Mohammad Ridhwan**, **Rovina Kobun**, **Nicky Rahmana Putra**, PHYTOCHEMICALS AND ANTIOXIDANT ACTIVITIES OF SARAWAK BARIO RICE VARIETIES 64
Danijela Šuput, **Senka Popović**, **Nevena Hromiš**, **Jovana Pantić**, **Aleksandra Cvetanović**, APPLICATION OF BIOINDICATORS IN BIOPOLYMER PACKAGING MATERIALS 65
Vladimir Kozomora, **Andreja Živkov**, **Nikola Oluški**, **Slobodan Tašin**, **Maša Bukurov**, MICROFLUIDICS AND MICROFABRICATION 67
Ivana Živković, **Nenad Pavlović**, **Jelena Stoiljković**, **Marijenka Tabaković**, **Marina Ivanović**, **Aleksandra Rakonjac**, **Vesna Perić**, CLIMATE CHANGE IMPACTS ON SEED PRODUCTION AND QUALITY OF PEPPER 69
Ana Žugić, **Vanja Tadić**, **Marija Tasić Kostov**, **Ivana Nešić**, ENCAPSULATION OF CANNABIDIOL-RICH HEMP EXTRACT 71
Vanja Tadić, **Ana Žugić**, **Dragica Bojović**, **Miomir Šoškić**, **Ivana Nešić**, COMPARATIVE CHEMICAL STUDY OF THREE JUNIPERUS SPECIES 73

Rafat Al Afif, **Siniša Bikić**, **Milivoj Radojčin**, KEY OBSTACLES IN OPTIMIZING BIOGAS PRODUCTION FOR POWERING COMBINED HEAT AND POWER AND FUEL CELL: A CASE STUDY REVIEW 75
Mihajlo Bogdanović, **Jovana Grbić**, **Dragana Mladenović**, **Ana Žugić**, **Vanja Tadić**, **Predrag Petrović**, **Aleksandra Djukić-Vuković**, VALORIZATION OF NETTLE TEA INDUSTRY BY-PRODUCTS THROUGH INNOVATIVE GREEN EXTRACTION AND FERMENTATION FOR FUNCTIONAL FOOD APPLICATIONS 76
Jovana Grbić, **Mihajlo Bogdanović**, **Dragana Mladenović**, **Saša Lazović**, **Tanja Radu**, **Aleksandra Djukić-Vuković**, A NOVEL BIOREFINERY APPROACH FOR FRACTIONATION OF CROP RESIDUES 78
Dragana Mladenović, **Jovana Grbić**, **Mihajlo Bogdanović**, **Dušan Mijin**, **Ljiljana Mojović**, **Aleksandra Đukić-Vuković**, NATURAL DEEP EUTECTIC SOLVENTS FOR DELIGNIFICATION AND VALORIZATION OF AGRO-INDUSTRIAL WASTE 80
Büşra Oktar, **Atul Baliram Khalangre**, **Ana Cristina De Aguiar Saldanha Pinheiro**, **Urszula Tylewicz**, **Pietro Rocculi**, **Marco Dalla Rosa**, OPTIMIZING GREEN PEA DRYING: EFFECTS OF PULSED ELECTRIC FIELD ON DRYING KINETICS AND SUSTAINABILITY 82
Monika Božiková, **Peter Hlaváč**, **Matúš Bilčík**, **Daniela Kunecová**, **Ľubomír Kubík**, EXPERIMENTAL IDENTIFICATION OF PELLET´S THERMAL AND THERMO-ENERGETIC PARAMETERS PRODUCED FROM AGRICULTURAL AND FOOD WASTE 83
Irzada Taljić, **Edita Sarić**, **Esma Karahmet Farhat**, **Almir Toroman**, THE PRODUCTION OF TEMPEH 84
Olivera Đuragić, **Marija Milašinović-Šeremešić**, **Slađana Rakita**, **Danka Dragojlović**, THE ROLE OF THE CAMELINA OIL IN DOG DIETS 85
Vanja Jurišić, **Karlo Špelić**, **Ivan Brandić**, **Gabrijel Barčić**, **Ana Matin**, THE ROLE OF SUSTAINABLE AGRICULTURE IN BIOECONOMY 87
Michal Binczarski, **Milivoj Radojčin**, **Ivan Pavkov**, **Izabela Witonska**, THE ROLE OF SUGAR PLATFORM COMPOUNDS IN THE SUSTAINABLE PROCESSING OF INDUSTRIAL BIO-WASTE 89
Izabela Witonska, **Milivoj Radojčin**, **Ivan Pavkov**, **Michal Binczarski**, PRODUCTION OF HIGH-PROTEIN FEED BASED ON BEET PULP AND RAPESEED MEAL 90
Adam Dobosz, **Ewa Wiktorowska-Sowa**, **Milivoj Radojčin**, **Ivan Pavkov**, **Michal Binczarski**, **Izabela Witonska**, ENERGY POTENTIAL OF THE SUGAR INDUSTRY IN THE CONTEXT OF USING MOLASSES AS THE MAIN RAW MATERIAL FOR BIOGAS PRODUCTION 91
Franciszek Osowski, **Milivoj Radojčin**, **Ivan Pavkov**, **Michal Binczarski**, **Izabela Witonska**, USE OF DEFECATION LIME FROM SUGAR PRODUCTION AS FERTILIZER IN SUSTAINABLE SUGAR FACTORY MANAGEMENT 92
Emina Sijahović, **Hamdija Čivić**, **Drena Gadžo**, **Almina Kalić**, APPLICATION OF BIOINOCULANTS IN THE FUNCTION OF OPTIMIZING AND REDUCING THE USE OF MINERAL FERTILIZERS FOR ACHIEVING A HIGHER YIELD AND QUALITY OF SILAGE MAIZE 93
Marco Dalla Rosa, ARTIFICIAL INTELLIGENCE IN FOOD PROCESSING 94
Nevena Ilić, **Marija Milić**, **Slađana Davidović**, **Miona Miljković**, **Suzana Dimitrijević-Branković**, **Katarina Mihajlovski**, EXPLORING THE POTENTIAL OF AGRO-INDUSTRIAL LIGNOCELLULOSIC WASTE FOR LACCASE PRODUCTION BY WHITE-ROT FUNGUS AND LACCASE COMPREHENSIVE CHARACTERIZATION 95
Ignacijo Biluš, **Luka Kevorkijan**, HYDRODYNAMIC CAVITATION IN VENTURI CHANNELS WITH DIFFERENT DIVERGENT ANGLES 97
Vladimir Kitanovski, **Monika Lutovska**, **Zoran Trifunov**, **Sani Demiri**, **Olga Popovska**, **Stevan Kjosevski**, INCORPORATING NEXUS ECOLABELS INTO HOUSEHOLD LEVEL FOOD WASTE MITIGATION STRATEGIES – ENVIRONMENTAL PERSPECTIVES FROM LIFE CYCLE ASSESSMENT 99
Aleksandra Djukić-Vuković, **Jovana Grbić**, **Mihajlo Bogdanović**, **Dragana Mladenović**, **Jian Hao**, **Junsong Sun**, **Saša Lazović**, **Andromachi Tzani**, **Anastasia Detsi**, **Hemaka Bandulasena**, **Tanja Radu**, SPARKGREEN PROJECT: GREEN TECHNOLOGIES FOR VALORIZATION OF AGRI-FOOD RESIDUES 100
Luka Kevorkijan, **Tomislav Čavrgov**, **Ignacijo Biluš**, **Luka Lešnik**, NUMERICAL AND EXPERIMENTAL DETERMINATION OF WIND TURBINE CHARACTERISTICS 101
Stevan Kjosevski, **Monika Lutovska**, **Vladimir Mijakovski**, **Zoran Trifunov**, **Vladimir Kitanovski**, SOME ASPECTS OF POSITIONING PHOTO VOLTAIC PANELS IN AGROVOLTAICS APPLICATIONS 103
Nadežda Seratlić, **Nevena Hromiš**, **Branislav Šojić**, **Senka Popović**, **Danijela Šuput**, **Jovana Pantić**, **Ivana Čabarkapa**, POTENTIAL APPLICATION OF CHITOSAN-BASED BIOPOLYMER COATINGS ON FERMENTED DRY SAUSAGES: VARIOUS APPLICATION TECHNIQUES AND THEIR IMPACT ON PRODUCT QUALIT 104
Milivoj Radojčin, **Siniša Bikić**, **Ivan Pavkov**, **Rafat Al Afif**, EXPERIENCE WITH PRODUCTION OF CARBON NANOPARTICLES FROM AGRICULTURAL BIOMAS 106

COMPARATIVE CHEMICAL STUDY OF THREE *JUNIPERUS* SPECIES

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Plant-derived products and their compounds have been used in traditional medicine since early times. Recent works report promising potential regarding the use of plants in the treatment and/or prevention of several hard-to-cure diseases, such as atherosclerosis, cancer, cardiovascular diseases, diabetes, and neurological disorders, among others. The genus *Juniperus* has been recognized as the source of valuable active compounds. This genus includes roughly 68 species and 36 varieties and belongs to the Cupressaceae family. This work gave insight into differences in chemical composition and antioxidative properties of three *Juniperus* sp., namely *J. communis* L. (common juniper), *J. oxycedrus* L. (prickly juniper) and *J. sibirica* L. (Siberian juniper). Common juniper (*J. communis* L.), based on the information provided by EMA monograph and PDR, is traditionally used to treat renal suppression, acute and chronic cystitis, bladder catarrh, albuminuria, leucorrhea, and amenorrhea. These uses are mainly attributed to its bioactive compounds belonging to different secondary metabolite groups, such as polyphenols, terpenoids, organic acids, flavonoids, tannins. While the data on common juniper are abundant, the investigations considering the prickly and Siberian juniper are scarce.

The folium and ripe pseudofructus from all three species were collected from a locality in Montenegro (Plav, the mountain Čakor) in August 2019. The extraction method was maceration, performed using 70% EtOH, the plant material was ground until the particle size was 0.7 mm, while the drug:extract ratio was kept to be 1:5. To determine total phenolics, Folin–Ciocalteu (FC) spectrophotometric method was applied, while total procyanidins and tannins were estimated by following the procedure described in 10th European Pharmacopoeia. The antioxidant capacity of extracts was assessed by the DPPH and FRAP assays. The obtained results (Table 1) pointed out the differences between the investigated species. While the TP content was similar in *J. communis* and *J. oxycedrus, J. sibirica* although less abundant in tannin and polyphenolic content, exhibited significant antioxidant properties, comparable to control (BHT).

Table 1. Total polyphenolic (TP), total tannin (TT) and procyanidin content and antioxidant potential of macerates obtained from different plant parts of three investigated *Juniperus* species

Plant species	Plant part	Antioxidant activity		TP (mg GAE/g)	TT (%)	Procyanidins (%)
		DPPH IC_{50} (µg/ml)	FRAP (mmol Fe2+/g)			
J. communis	*Ripe pseudofructus*	98.60	0.17	13.23	1.73	-
	Folium	34.65	0.46	134.22	6.70	4.41
J. oxycedrus	*Ripe pseudofructus*	325.68	0.19	10.84	1.48	1.47
	Folium	28.20	0.02	159.55	3.11	6.24
J. sibirica	*Ripe pseudofructus*	90.80	0.17	15.60	1.53	-
	Folium	29.60	0.66	18.73	0.72	1.74
BHT		20.00	1.71			

Considering the chemical composition and pharmacological properties of the examined *Juniperus sp.* extracts, the results of the current study might represent the base for further investigation of the cytotoxic and safety profile of this species.

Key words: *Juniperus sp., maceration, chemical and antioxidant properties.*

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UPOREDNA ANALIZA HEMIJSKOG PROFILA TRI VRSTE RODA *JUNIPERUS*

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Proizvodi biljnog porekla i njihova jedinjenja koriste se u tradicionalnoj medicini od davnina. Nedavni radovi pokazuju obećavajući potencijal u pogledu upotrebe biljaka u lečenju i/ili prevenciji teško izlečivih bolesti, kao što su ateroskleroza, rak, kardiovaskularne bolesti, dijabetes i neurološki poremećaji, između ostalih. Rod *Juniperus* obuhvata oko 68 vrsta i 36 varijeteta i pripada porodici Cupressaceae i prepoznat je kao izvor vrednih aktivnih jedinjenja. Ovaj rad daje uvid u različitost hemijskog i antioksidantnog profila ekstrakata dobijenih iz tri *Juniperus* vrste, i to *J. communis L.* (obična kleka), *J. oxycedrus* L. (primorska kleka) i *J. sibirica* L. (patuljasta kleka). Obična kleka (*J. communis* L.), na osnovu podataka EMA monografije i PDR, tradicionalno se koristi za lečenje bubrežnih problema, akutnog i hroničnog cistitisa, katara bešike, albuminurije, leukoreje i amenoreje. Ova upotreba se uglavnom pripisuje njegovim bioaktivnim jedinjenjima koja pripadaju različitim grupama sekundarnih metabolita, kao što su polifenoli, terpenoidi, organske kiseline, flavonoidi, tanini. Dok su podaci o običnoj kleki obilni, istraživanja o primorskoj i patuljastoj kleki su oskudna. List i zreli plod sve tri vrste prikupljeni su na lokalitetima u Crnoj Gori (Plav, planina Čakor) u avgustu 2019. Metoda ekstrakcije je bila maceracija, sa 70% EtOH kao ekstragensom, biljni materijal je mleven do veličine čestica 0,7 mm, dok je odnos biljni materijal:ekstrakt bio 1:5. Za određivanje ukupnih fenola primenjena je Folin–Ciocalteu (FC) spektrofotometrijska metoda, dok su ukupni procijanidini i tanini kvantifikovani po postupku opisanom u 10. Evropskoj Farmakopeji. Antioksidativni kapacitet ekstrakata je procenjen DPPH i FRAP testovima. Dobijeni rezultati (**Tabela 1**) ukazali su na razlike između ispitivanih vrsta. Dok je sadržaj TP bio sličan kod *J. communis* i *J. oxycedrus, J. sibirica*, iako manje bogat u sadržaju tanina i polifenola, pokazala je značajna antioksidativna svojstva, uporediva sa kontrolom (BHT).

Tabela 1. Sadržaj ukupnih polifenola (TP), ukupnih tanina (TT) i proantocijanidina i antioksidantni potencijal macerata dobijenih iz listova i zrelih plodova tri ispitivane *Juniperus* vrste

Biljna vrsta	Droga	Antioksidativni potencijal		TP (mg GAE/g)	TT (%)	Procyanidins (%)
		DPPH IC_{50} (µg/ml)	FRAP (mmol Fe2+/g)			
J. communis	*Zreo plod*	98.60	0.17	13.23	1.73	-
	List	34.65	0.46	134.22	6.70	4.41
J. oxycedrus	*Zreo plod*	325.68	0.19	10.84	1.48	1.47
	List	28.20	0.02	159.55	3.11	6.24
J. sibirica	*Zreo plod*	90.80	0.17	15.60	1.53	-
	List	29.60	0.66	18.73	0.72	1.74
BHT		20.00	1.71			

S obzirom na hemijski sastav i farmakološka svojstva ekstrakata ispitivanih *Juniperus* vrsta, rezultati prikazane studije mogu predstavljati osnovu za dalje istraživanje citotoksičnog i bezbednosnog profila ovih vrsta.

***Key words**: Juniperus vrste, maceracija, hemijska karakreiyacija i antioksidativni potencijal.*

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