



# BOOK OF ABSTRACTS

*XI International Scientific  
Agriculture Symposium  
"AGROSYM 2020"  
October 8-9, 2020*



# **BOOK OF ABSTRACTS**

**XI International Scientific Agriculture Symposium  
“AGROSYM 2020”**



**October 8 - 9, 2020**

## Impressum

XI International Scientific Agriculture Symposium „AGROSYM 2020“

### Book of Abstracts Published by

University of East Sarajevo, Faculty of Agriculture, Republic of Srpska, Bosnia  
University of Belgrade, Faculty of Agriculture, Serbia  
Mediterranean Agronomic Institute of Bari (CIHEAM - IAMB) Italy  
International Society of Environment and Rural Development, Japan  
Balkan Environmental Association (B.EN.A), Greece  
Centre for Development Research, University of Natural Resources and Life Sciences (BOKU), Austria  
Perm State Agro-Technological University, Russia  
Voronezh State Agricultural University named after Peter The Great, Russia  
Faculty of Bioeconomy Development, Vytautas Magnus University, Lithuania  
Enterprise Europe Network (EEN)  
Faculty of Agriculture, University of Akdeniz - Antalya, Turkey  
Selçuk University, Turkey  
University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania  
Slovak University of Agriculture in Nitra, Slovakia  
Ukrainian Institute for Plant Variety Examination, Kyiv, Ukraine  
National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine  
Valahia University of Targoviste, Romania  
National Scientific Center „Institute of Agriculture of NAAS“, Kyiv, Ukraine  
Saint Petersburg State Forest Technical University, Russia  
University of Valencia, Spain  
Faculty of Agriculture, Cairo University, Egypt  
Tarbiat Modares University, Iran  
Chapingo Autonomous University, Mexico  
Department of Agricultural, Food and Environmental Sciences, University of Perugia, Italy  
Higher Institute of Agronomy, Chott Mariem-Sousse, Tunisia  
Watershed Management Society of Iran  
Institute of Animal Science- Kostinbrod, Bulgaria  
Faculty of Agriculture, University of Banja Luka, Bosnia and Herzegovina  
Faculty of Economics Brcko, University of East Sarajevo, Bosnia and Herzegovina  
Biotechnical Faculty, University of Montenegro, Montenegro  
Institute of Field and Vegetable Crops, Serbia  
Institute of Lowland Forestry and Environment, Serbia  
Institute for Science Application in Agriculture, Serbia  
Agricultural Institute of Republic of Srpska - Banja Luka, Bosnia and Herzegovina  
Maize Research Institute “Zemun Polje”, Serbia  
Faculty of Agriculture, University of Novi Sad, Serbia  
Institute for Animal Science, Ss. Cyril and Methodius University in Skopje, Macedonia  
Academy of Engineering Sciences of Serbia, Serbia  
Balkan Scientific Association of Agricultural Economics, Serbia  
Institute of Agricultural Economics, Serbia

### Editor in Chief

Dusan Kovacevic

### Technical editors

Sinisa Berjan

Noureddin Driouech

Milan Jugovic

### Website:

<http://agrosym.ues.rs.ba>

CIP - Каталогизacija у публикацији

Народна и универзитетска библиотека  
Републике Српске, Бања Лука

631(048.3)(0.034.4)

INTERNATIONAL Scientific Agricultural Symposium "Agrosym 2020" (11)  
(Jahorina)

Book of Abstracts [Elektronski izvor] / XI International Scientific Agriculture  
Symposium "Agrosym 2020", Jahorina, October 8-9, 2020 ; [editor in chief Dušan  
Kovačević]. - East Sarajevo = Istočno Sarajevo : Faculty of Agriculture = Poljoprivredni  
fakultet, 2020. - 1 elektronski optički disk (CD-ROM) : tekst, slika ; 12 cm

CD ROM čitač. - Nasl. sa nasl. ekrana. - Registar.

ISBN 978-99976-787-4-4

COBISS.RS-ID 129689857

## **XI International Scientific Agricultural Symposium “Agrosym 2020” October 08-09, 2020, Bosnia and Herzegovina**

### **HONORARY COMMITTEE**

BORIS PASALIC, Minister of Agriculture, Water Management and Forestry of Republic of Srpska, Bosnia, SRDJAN RAJCEVIC, Minister of Scientific-Technological Development, Higher Education and Information Society of Republic of Srpska, Bosnia, MILAN KULIC, Rector of the University of East Sarajevo, Bosnia, DUSAN ZIVKOVIC, Dean of the Faculty of Agriculture, University of Belgrade, Serbia, MAURIZIO RAELI, Director of the Mediterranean Agronomic Institute of Bari, Italy, MARIO T. TABUCANON, President of the International Society of Environment and Rural Development, Japan, MUSTAFA ŞAHIN, Rector of the Selcuk University, Turkey, ALEKSEY ANDREEV, Rector of the Perm State Agro-Technological University, Russia, NIKOLAY I. BUKHTOYAROV, Rector of the Voronezh State Agricultural University named after Peter The Great, Russia, ANTANAS MAZILIAUSKAS, Rector of the Vytautas Magnus University Agriculture Academy, Lithuania, BARBARA HINTERSTOISSER, Vice-Rector of the University of Natural Resources and Life Sciences (BOKU), Austria, JOSÉ SERGIO BARRALES DOMÍNGUEZ, Rector of the Chapingo Autonomous University, Mexico, KLAUDIA HALÁSZOVÁ, Rector of the Slovak University of Agriculture in Nitra, Slovakia, CALIN D. OROS, Rector of the Valahia University of Targoviste, Romania, VIKTOR KAMINSKYI, Director of National Scientific Center „Institute of Agriculture of NAAS“, Kyiv, Ukraine, AMR AHMED MOSTAFA, Dean of the Faculty of Agriculture, Cairo University, Egypt, SORIN MIHAI CIMPEANU, Rector of the University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania, FRANCESCO TEI, Director of the Department of Agricultural, Food and Environmental Sciences, University of Perugia, Italy, DAVUT KARAYEL, Dean of Faculty of Agriculture, University of Akdeniz - Antalya, Turkey, CHOKRI THABET, the General Director of the High Agronomic Institute of Chott Mariem, Sousse, Tunisia, SEYED HAMIDREZA SADEGHI, Professor at Tarbiat Modares University and the President of the Watershed Management Society of Iran, Iran, IVAN YANCHEV, Director of the Institute of Animal Science- Kostinbrod, Bulgaria, ZLATAN KOVACEVIC, Dean of the Faculty of Agriculture, University of Banja Luka, Bosnia and Herzegovina, LAZAR RADOVANOVIC, Dean of the Faculty of Economics Brcko, Universtiy of East Sarajevo, Bosnia and Herzegovina, MIRZA DAUTBASIC, Dean of the Faculty of Forestry, University of Sarajevo, Bosnia and Herzegovina, BOZIDARKA MARKOVIC, Dean of the Biotechnical Faculty, University of Podgorica, Montenegro, RADE JOVANOVIC, Director of the Institute for Science Application in Agriculture, Serbia, SASA ORLOVIC, Director of the Institute of Lowland Forestry and Environment, Serbia, BRANKO KOVACEVIC, President of the Academy of Engineering Sciences of Serbia, Serbia, VOJISLAV TRKULJA, Director of Agricultural Institute of Republic of Srpska - Banja Luka, Bosnia and Herzegovina, BRANKA KRESOVIC, Director of the Maize Research Institute “Zemun Polje”, Serbia, SVETLANA BALESEVIC-TUBIC, Director of the Institute of Field and Vegetable Crops, Serbia, NEDELJKO TICA, Dean of the Faculty of Agriculture, University of Novi Sad, Serbia, RODNE NASTOVA, Director of the Institute for Animal Science, Skoplje, Macedonia, RADOVAN PEJANOVIC, President of Balkan Scientific Association of Agricultural Economics, Serbia, JONEL SUBIC, Director of the Institute of Agricultural Economics, Serbia

### **SCIENTIFIC COMMITTEE**

DUSAN KOVACEVIC, Faculty of Agriculture, University of Belgrade, Serbia, WILLIAM MEYERS, Howard Cowden Professor of Agricultural and Applied Economics, University of Missouri, USA, JOHN BRAYDEN, Norwegian Agricultural Economics Research Institute (NILF), Norway, STEVE QUARIE, Visiting Professor, School of Biology, Newcastle University, United Kingdom, ANDREAS MELCHER, CDR, University of Natural Resources and Life Sciences (BOKU), Vienna, Austria, DANI SHTIENBERG, full professor, Department of Plant pathology and Weed Research, ARO, the Volcani Center, Bet Dagan, Israel, THOMAS G. JOHNSON, University of Missouri – Columbia, USA, DIETER TRAUTZ, University of Applied Science, Germany, MACHITO MIHARA, Tokyo University of Agriculture, Japan, MARKUS SCHERMER, Department of Sociology, University of Innsbruck, Austria, JORGE BATLLE-SALES, Department of Biology, University of Valencia, Spain, SERGEI ELISEEV, Vice-Rector for Research and Innovations, Perm State Agro-Technological University, Russia, RICHARD BARICHELLO, Faculty of Land and Food Systems, University of British Columbia, Canada, NOVO PRZULJ, Faculty of Agriculture, University of Banjaluka, Bosnia and Herzegovina, TATIANA SIVKOVA, Faculty for Veterinarian Medicine and Zootechny, Perm State Agro-Technological University, Russia, ADRIANO CIANI, Department of Agricultural, Foods and Environmental Sciences, Perugia University, Italy, ALEKSEJ LUKIN, Voronezh State Agricultural University named after Peter The Great, Russia, MATTEO VITTUARI, Faculty of Agriculture, University of Bologna, Italy, SEYED MOHSEN HOSSEINI, Faculty of Natural Resources, Tarbiat Modares University, Iran, ARDIAN MACI, Faculty of Agriculture and Environment, Agricultural University of Tirana, Albania, REGUCIVILLA A. POBAR, Bohol Island State University, Philippines, SUDHEER KUNDUKULANGARA PULISSERY, Kerala Agricultural University, India, EPN UDAYAKUMARA, Faculty of Applied Sciences, Sabaragamuwa University, Sri Lanka, VLADIMIR SMUTNÝ, full professor, Mendel University, Faculty of agronomy, Czech Republic, FRANC BAVEC, full professor, Faculty of Agriculture and Life Sciences, Maribor, Slovenia, JAN MOUDRÝ, full professor, Faculty of Agriculture, South Bohemia University, Czech Republic, STEFAN TYR, full professor,

Faculty of Agro-biology and Food Resources, Slovakia, NATALIJA BOGDANOV, Faculty of Agriculture, University of Belgrade, Serbia, SABAHUDIN BAJRAMOVIC, Faculty of Agriculture and Food Sciences, University of Sarajevo, Bosnia, FRANCESCO PORCELLI, University of Bari Aldo Moro, Italy, VASILIJE ISAJEV, Faculty of Forestry, University of Belgrade, Serbia, ELAZAR FALLIK, Agricultural Research Organization (ARO), Volcani, Israel, JUNAID ALAM MEMON, Pakistan Institute of Development Economics, Pakistan, HIROMU OKAZAWA, Faculty of Regional Environment Science, Tokyo University of Agriculture, Japan, PANDI ZDRULI, Land and Water Resources Department; IAMB, Italy, MLADEN TODOROVIC, Land and Water Resources Department; IAMB, Italy, HAMID EL BILALI, Mediterranean Agronomic Institute of Bari, Italy, MAKSYM MELNYCHUK, National Academy of Agricultural Science of Ukraine, Ukraine, BORYS SOROCHYNSKYI, Ukrainian Institute for Plant Variety Examination, Kyiv, Ukraine, LORENZ PROBST, CDR, University of Natural Resources and Life Sciences (BOKU), Vienna, Austria, MOHSEN BOUBAKER, High Institute of Agronomy of Chott Meriem, Sousse, Tunisia, NOUREDDIN DRIOUECH, Coordinator of MAIB Alumni Network (FTN), Mediterranean Agronomic Institute of Bari, Italy, ION VIOREL, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania, CHULEEMAS BOONTHAI IWAI, Faculty of Agriculture, Khon Kaen University, Thailand, WATHUGE T.P.S.K. SENARATH, Department of Botany, University of Sri Jayewardenepura, Colombo, Sri Lanka, HAMADA ABDELRAHMAN, Soil Science Dept., Faculty of Agriculture, Cairo University, Egypt, MAYA IGNATOVA, Agricultural Academy – Sofia, Bulgaria, IOANNIS N. XYNIAS, School of Agricultural Technology & Food Technology and Nutrition, Western Macedonia University of Applied Sciences, Greece, ARTUR RUTKIEWICZ, Department of Forest Protection, Forest Research Institute - IBL, Poland, MOHAMMAD SADEGH ALLAHYARI, Islamic Azad University, Rasht Branch, Iran, LALITA SIRIWATTANANON, Faculty of Agricultural Technology, Rajamangala University of Technology Thanyaburi (RMUTT), Thailand, KONSTANTIN KORLYAKOV, Perm Agricultural Research Institute, Russia, MOHAMMAD FAROOQUE HASSAN, Shaheed Benazir Bhutto University of Veterinary & Animal Sciences Sakrand, Sindh, Pakistan, LARYSA PRYSIAZHNIUK, Ukrainian Institute for Plant Variety Examination, Kyiv, Ukraine, OKSANA KLIACHENKO, National University of Life and Environmental Science of Ukraine, Ukraine, IVAN SIMUNIC, Department of amelioration, Faculty of agriculture, University of Zagreb, Croatia, ABID HUSSAIN, International Centre for Integrated Mountain Development (ICIMOD), Nepal, AMRITA GHATAK, Gujarat Institute of Development Research (GIDR), India, NASER SABAGHNI, University of Maragheh, Iran, MONICA PAULA MARIN, Department for Animal Husbandry, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania, PENKA MONEVA, Institute of Animal Science - Kostinbrod, Bulgaria, MOSTAFA K. NASSAR, Animal husbandry Dept., Faculty of Agriculture, Cairo University, Egypt, MÁRTA BIRKÁS, full professor, St. Istvan University, Godollo – Hungary, ANDRZEJ KOWALSKI, Director of the Institute for Agricultural and Food Economy, Warszawa-Poland, YALCIN KAYA, The Director of the Plant Breeding Research Center, University of Trakya, Turkey, SANJA RADONJIC, Biotechnical Faculty, University of Montenegro, Montenegro, IONELA DOBRIN, Department for Plant Protection, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania, INOCENCIO BUOT JR., Institute of Biological Sciences, College of Arts and Sciences, University of the Philippines Los Banos, Philippines, KAROL WAJSZCZUK, Poznan University of Life Sciences, Poland, REDOUANE CHOUKR-ALLAH, International Center for Biosaline Agriculture (ICBA), United Arab Emirates, MOHAMMAD AL-MAMUN, Department of Animal Nutrition, Bangladesh Agricultural University, Bangladesh, ANUCHA WITTAYAKORN-PURIPUNPINYOO, School of Agriculture and Co-operatives, Sukhothai Thammathirat Open University, Nonthaburi, Thailand, NEDELJKA NIKOLOVA, Institute for Animal Science, Ss. Cyril and Methodius University in Skopje, Republic of Macedonia, IGNACIO J. DÍAZ-MAROTO, High School Polytechnic, University of Santiago de Compostela, Spain, NIDAL SHABAN, University of Forestry Sofia, Bulgaria, MEHDI SHAFAGHATI, Faculty of Geography, Tarbiat Moalem (Kharazmi) University, Iran, YOUSSEF SASSINE, Lebanese University Beirut, Lebanon, CAFER TOPALOGLU, Faculty of Tourism, Mugla Sitki Kocman University, Turkey, SEYED HAMIDREZA SADEGHI, Faculty of Natural Resources, Tarbiat Modares University, Iran, MOHSEN MOHSENI SARAVI, University of Teheran and Member of WMSI Management Board, Iran, MAHMOOD ARABKHEDRI, Soil Conservation and Watershed Management Research Institute and Member of WMSI Management Board, Iran, BRANISLAV DRASKOVIC, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina, ATAOLLAH KAVIAN, Sari Agricultural Science and Natural Resources University and Member of WMSI Management Board, Iran, TUGAY AYASAN, Department of Organic Farming Business Management, Osmaniye, Applied Science School of Kadirli, Osmaniye Korkut Ata University, Turkey, SAKINE ÖZPINAR, Department of Farm Machinery and Technologies Engineering, Faculty of Agriculture, Çanakkale Onsekiz Mart University, Çanakkale, Turkey, SHEREIN SAEIDE ABDELGAYED, Faculty of Veterinary Medicine, Cairo University, Cairo, Egypt, ZOHREH MASHAK, Islamic Azad University, Karaj Branch, Iran, KHALID AZIM, National Institute of Agriculture Research, Morocco, SRDJAN LALIC, University of East Sarajevo, Bosnia and Herzegovina, ZELJKO VASKO, Faculty of Agriculture, University of Banja Luka, Bosnia and Herzegovina, EDOUARD MUSABANGANJI, School of Economics/CBE, University of Rwanda, Rwanda, KUBILAY BAŞTAŞ, Department of Plant Protection, Faculty of Agriculture, Selçuk University, Turkey, BRANKA KRESOVIC, Director of the Maize Research Institute “Zemun Polje”, Serbia, NENAD DELIC, Maize Research Institute “Zemun Polje”, Serbia, MILAN STEVANOVIC, Maize Research Institute “Zemun Polje”, Serbia, SVETLANA

BALESEVIC-TUBIC, Institute of Field and Vegetable Crops Novi Sad, Serbia, ANA MARJANOVIĆ JEROMELA, Institute of Field and Vegetable Crops Novi Sad, Serbia, TATJANA KRAJIŠNIK, Faculty of Agriculture, University of East Sarajevo, Bosnia, ALEKSANDRA GOVEDARICA-LUCIC, Faculty of Agriculture, University of East Sarajevo, Bosnia, DESIMIR KNEZEVIC, University of Pristina, Faculty of Agriculture, Kosovska Mitrovica - Lesak, Kosovo i Metohija, Serbia, SNEZANA MLADENOVIC-DRINIC, Maize Research Institute “Zemun Polje”, Serbia, NEBOJSA MOMIROVIC, Faculty of Agriculture, University of Belgrade, Serbia, OSMAN MUJEZINOVIC, Faculty of Forestry, University of Sarajevo, Bosnia and Herzegovina, DALIBOR BALLIAN, Faculty of Forestry, University of Sarajevo, Bosnia and Herzegovina, VELIBOR SPALEVIC, Faculty of Philosophy, Geography, University of Montenegro, ZORAN JOVOVIC, Biotechnical Faculty, University of Montenegro, Montenegro, DANIJEL JUG, associate professor, Faculty of Agriculture, University of Osijek, Croatia, MILAN MARKOVIC, Biotechnical Faculty, University of Montenegro, Montenegro, ZELJKO DOLIJANOVIC, Faculty of Agriculture, University of Belgrade, Serbia, DEJAN STOJANOVIC, Institute of Lowland Forestry and Environment, Serbia, DOBRIVOJ POŠTIĆ, Institute for plant protection and environment, Belgrade, Serbia, SRDJAN STOJNIC, Institute of Lowland Forestry and Environment, Serbia

#### **ORGANIZING COMMITTEE**

VESNA MILIC, Faculty of Agriculture, University of East Sarajevo, Bosnia, MARKO GUTALJ, Vice rector of the University of East Sarajevo, Bosnia, JELENA KRUNIC, Vice rector of the University of East Sarajevo, Bosnia, MAROUN EL MOUJABBER, Mediterranean Agronomic Institute of Bari, Italy, ROSANNA QUAGLIARIELLO, Mediterranean Agronomic Institute of Bari, Italy, NOUREDDIN DRIOUECH, Coordinator of MAIB Alumni Network (FTN), Mediterranean Agronomic Institute of Bari, Italy, ALEKSANDRA DESPOTOVIC, Biotechnical Faculty Podgorica, University of Montenegro, Montenegro, MILIC CUROVIC, The journal “Agriculture and Forestry”, Biotechnical Faculty Podgorica, University of Montenegro, Montenegro, ANA MARJANOVIĆ JEROMELA, Institute of Field and Vegetable Crops, Serbia, OKSANA FOTINA, International Relations Center, Perm State Agro-Technological University, Russia, TATIANA LYSAK, International Relations Office, Voronezh State Agricultural University named after Peter The Great, Russia, ANASTASIJA NOVIKOVA, Faculty of Bioeconomy Development, Vytautas Magnus University, Lithuania, ENGR. TEODORA POPOVA, Institute of Animal Science - Kostinbrod, Bulgaria, MEHMET MUSA OZCAN, Faculty of Agriculture, Selçuk University, Turkey, NIKOLA PACINOVSKI, Institute for Animal Science, Ss. Cyril and Methodius University in Skopje, Republic of Macedonia, ABDULVAHED KHALEDI DARVISHAN, Faculty of Natural Resources, Tarbiat Modares University, Iran, HAMADA ABDELRAHMAN, Soil Science Dept., Faculty of Agriculture, Cairo University, Egypt, ECATERINA STEFAN, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania, JEERANUCH SAKKHAMDUANG, The International Society of Environmental and Rural Development, Japan, RAOUDHA KHANFIR BEN JENANA, High Institute of Agronomy of Chott Meriem, Sousse, Tunisia, ERASMO VELÁZQUEZ CIGARROA, Department of Rural Sociology, Chapingo Autonomous University, Mexico, DRAGANA SUNJKA, Faculty of Agriculture, University of Novi Sad, Serbia, VEDRAN TOMIC, Institute for Science Application in Agriculture, Serbia, MILAN STEVANOVIC, Maize Research Institute “Zemun Polje”, Serbia, ANDREJ PILIPOVIC, Institute of Lowland Forestry and Environment, Serbia, MORTEZA BEHZADFAR, Tarbiat Modares University, Tehran, Iran, LARYSA PRYSIAZHNIUK, Ukrainian Institute for Plant Variety Examination, Kyiv, Ukraine, DIANA BILIC-SOBOT. Faculty of Agriculture, University of Nis, Serbia, SEAD IVOJEVIC, Faculty of Forestry, University of Sarajevo, Bosnia, NENAD MARKOVIC, Enterprise Europe Network (EEN) Coordinator, University of East Sarajevo, Bosnia, BRANISLAVKA BOROJA, Agricultural Institute of Republic of Srpska - Banja Luka, Bosnia, MILAN JUGOVIC, Faculty of Agriculture, University of East Sarajevo, Bosnia, IGOR DJURDJIC, Faculty of Agriculture, University of East Sarajevo, Bosnia, MILENA STANKOVIC, Faculty of Agriculture, University of East Sarajevo, Bosnia, STEFAN STJEPANOVIC, Faculty of Agriculture, University of East Sarajevo, Bosnia, DEJANA STANIC, Dean of the Faculty of Agriculture, University of East Sarajevo, Bosnia, STEFAN BOJIC, Faculty of Agriculture, University of East Sarajevo, Bosnia, TANJA JAKISIC, Faculty of Agriculture, University of East Sarajevo, Bosnia, TIJANA BANJANIN, Faculty of Agriculture, University of East Sarajevo, Bosnia, BOBAN MILETIC, Faculty of Agriculture, University of East Sarajevo, Bosnia, TODOR DJOREM, Faculty of Agriculture, University of East Sarajevo, Bosnia, SINISA BERJAN, Faculty of Agriculture, University of East Sarajevo, Bosnia, General secretary

## METABOLIC ENGINEERING IN CHICORY BY CRISPR/CAS9 EDITING

Milica BOGDANOVIĆ\*<sup>1</sup>, Slađana TODOROVIĆ<sup>1</sup>, Katarina ĆUKOVIĆ<sup>1</sup>, Milan DRAGIĆEVIĆ<sup>1</sup>, Jules BEEKWILDER<sup>2</sup>, Katarina CANKAR<sup>2</sup>, Ana SIMONOVIĆ<sup>1</sup>

<sup>1</sup>Institute for Biological Research "Siniša Stanković"- National Institute of Republic of Serbia, University of Belgrade, Bul. despota Stefana 142, 11060 Belgrade, Republic of Serbia

<sup>2</sup>Wageningen University and Research, Droevendaalsesteeg 1, Wageningen 6708 PB, The Netherlands

\*Corresponding author: milica.bogdanovic@ibiss.bg.ac.rs

### Abstract

Chicory (*Cichorium intybus* L.) is a valuable crop grown mostly in northern France, Belgium and the Netherlands, whose roots, leaves and etiolated shoots are used as vegetable, coffee replacement and remedy for several conditions including inflammation. Roots of chicory are an important source of inulin, a prebiotic fiber and a sweetener. Chicory also contains bioactive terpene compounds that protect the plant against herbivores, but are also responsible for medicinal properties of the plant, as they have anti-microbial, anti-cancer and anti-inflammatory activity. Biosynthesis of plant bioactive metabolites can be modified using new plant breeding techniques, especially new gene editing techniques like CRISPR/Cas9 to improve their health-promoting qualities. Chicory was transformed with *Agrobacterium tumefaciens* carrying CRISPR/Cas9 constructs to knock-out expression of key genes in the sesquiterpene biosynthesis pathway. Regenerated plants were selected on media with kanamycin and further tested by PCR for the presence of transgenes. Obtained plants were also tested for mutations in target genes, by PCR with primers surrounding the mutation site detecting larger indels and by Sanger sequencing detecting smaller indels. Further analysis was performed detecting heteroduplex DNA fragments as a result of either hetero- or homozygous mutation events.

**Keywords:** *chicory, terpenes, CRISPR/Cas9, Agrobacterium tumefaciens.*

**Acknowledgments:** This research was funded by EU Horizon 2020 research & innovation programme under grant agreement N. 760891 and the Ministry of Education, Science and Technological Development of the Republic of Serbia (contract: 451-03-68/2020-14/200007).