

Charakteristika predkladaného výstupu tvorivej činnosti / Characteristics of the submitted research/ artistic/other output

Tlačivo VTC slúži na predkladanie výstupov tvorivej činnosti podľa metodiky hodnotenia tvorivých činností (časť V. Metodiky na vyhodnocovanie štandardov) / The form is used to submit the research/artistic/other outputs according to the evaluation methodology of research/artistic/other activities (part V. The Methodology for Standards Evaluation).

ID konania/ID of the procedure: ¹

Kód VTC/Code of the research/artistic/other output (RAOO):¹

OCA1. Priezvisko hodnotenej osoby / Surname awarded to the assessed person ²	Kraic
OCA2. Meno hodnotenej osoby / Name awarded to the assessed person ²	Ján
OCA3. Tituly hodnotenej osoby / Degrees awarded to the assessed person ²	prof., RNDr., PhD.
OCA4. Hyperlink na záznam osoby v Registri zamestnancov vysokých škôl / Hyperlink to the entry of the person in the Register of university staff ³	https://www.portalvs.sk/regzam/detail/10524
OCA5. Oblasť posudzovania / Area of assessment ⁴	4. Biotechnológie / 4. Biotechnology
OCA6. Kategória výstupu tvorivej činnosti / Category of the research/ artistic/other output <i>Výber zo 6 možností (pozri Vysvetlivky k položke OCA6) / Choice from 6 options (see Explanations for OCA6).</i>	Vedecký výstup/ scientific output
OCA7. Rok vydania výstupu tvorivej činnosti / Year of publication of the research/artistic/other output	2019
OCA8. ID záznamu v CREPČ alebo CREUČ (ak je) / ID of the record in the Central Registry of Publication Activity (CRPA) or the Central Registry of Artistic Activity (CRAA) ⁵	159935
OCA9. Hyperlink na záznam v CREPČ alebo CREUČ / Hyperlink to the record in CRPA or CRAA ⁶	https://app.crepc.sk/?fn=detailBiblioForm&sid=BCCBB3B3C2736EEF32BB4FCC05
Charakteristika výstupu, ktorý nie je registrovaný v CREPČ alebo CREUČ / Characteristics of the output that is not registered in CRPA or CRAA	OCA10. Hyperlink na záznam v inom verejne prístupnom registri, katalógu výstupov tvorivých činností / Hyperlink to the record in another publicly accessible register, catalogue of research/ artistic/other outputs ⁷
	OCA11. Charakteristika výstupu vo formáte bibliografického záznamu CREPČ alebo CREUČ, ak výstup nie je vo verejne prístupnom registri alebo katalógu výstupov / Characteristics of the output in the format of the CRPA or the CRAA bibliographic record, if the output is not available in a publicly accessible register or catalogue of outputs

Ondreičková, K.; Gubišová, M.; Piliarová, M.; Horník, M.; Matušinský, P.; Gubiš, J.; Klčová, L.; Hudcovicová, M.; **Kraic, J.** Responses of Rhizosphere Fungal Communities to the Sewage Sludge Application into the Soil. *Microorganisms* 2019, 7, 505.
<https://doi.org/10.3390/microorganisms7110505>

OCA12. Typ výstupu (ak nie je výstup registrovaný v CREPČ alebo CREUČ) / Type of the output (if the output is not registered in CRPA or CRAA) <i>Výber zo 67 možností (pozri Vysvetlivky k položke OCA12) / Choice from 67 options (see Explanations for OCA12).</i>	Článok/article
OCA13. Hyperlink na stránku, na ktorej je výstup sprístupnený (úplný text, iná dokumentácia a podobne) / Hyperlink to the webpage where the output is available (full text, other documentation, etc.)	https://www.mdpi.com/2076-2607/7/11/505
OCA14. Charakteristika autorského vkladu / Characteristics of the author's contribution	[11 %] Spoluautor konceptu experimentálnej časti a metodológie, vedúci príslušného výskumného projektu, zabezpečenie a úprava (sušenie, homogenizácia) experimentálneho materiálu (t.j. čistiarenskeho kalu), príprava konceptu rukopisu, finálne úpravy rukopisu (po recenzii). [11 %] Co-author of the concept of the experimental part and methodology, leader of the relevant research project, provision and treatment of experimental material (i.e. sewage sludge), preparation of the manuscript concept, final manuscript modifications (after review).
OCA15. Anotácia výstupu s kontextovými informáciami týkajúcimi sa opisu tvorivého procesu a obsahu tvorivej činnosti a pod. / Annotation of the output with contextual information concerning the description of creative process and the content of the research/artistic/other activity, etc. ⁸Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak ⁹Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English	
OCA16. Anotácia výstupu v anglickom jazyku / Annotation of the output in English ⁹Rozsah do 200 slov / Range up to 200 words	Due to the increasing sewage sludge production in the world and problems with its disposal, an application of sludge to the soil appears to be a suitable solution considering its fertilizer properties and ability to improve the soil physical conditions. On the other hand, the sludge may also contain undesirable and toxic substances. Since soil microorganisms are sensitive to environmental changes, they can be used as indicators of soil quality. In this study, we used sewage sludge (SS) from two municipal wastewater treatment plants (SS-A and SS-B) in the dose of 5 t/ha and 15 t/ha in order to determine possible changes in the fungal community diversity, especially arbuscular mycorrhizal fungi (AMF), in the rhizosphere of <i>Arundo donax</i> L. Rhizosphere samples were collected in summer and autumn for two consecutive years and the fungal diversity was examined using terminal restriction fragment length polymorphism and 18S rDNA sequencing. Fungal alpha diversity was more affected by SS-A than SS-B probably due to the higher heavy metal content. However, based on principal component analysis and ANOSIM, significant changes in overall fungal diversity were not observed. Simultaneously, 18S rDNA sequencing showed that more various fungal taxa were detected in the sample with sewage sludge than in the control. <i>Glomus</i> sp. as a representative of AMF was the most represented. Moreover, <i>Funneliformis</i> in both samples and <i>Rhizophagus</i> in control with <i>Septoglomus</i> in the sludge sample were other representatives of AMF. Our results indicate that the short-term sewage sludge application into the soil does not cause a shift in the fungal community composition.
OCA17. Zoznam najviac 5 najvýznamnejších ohlasov na výstup / List of maximum 5 most significant citations corresponding to the output <i>Rozsah do 200 slov / Range up to 200 words</i>	Record 1 of 5 By: Iticescu, C (Iticescu, Catalina); Georgescu, PL (Georgescu, Puiu-Lucian); Arseni, M (Arseni, Maxim); Rosu, A (Rosu, Adrian); Timofti, M (Timofti, Mihaela); Carp, G (Carp, Gabriel); Cioca, LI (Cioca, Lucian-Ionel) Title: Optimal Solutions for the Use of Sewage Sludge on Agricultural Lands Source: WATER Volume: 13 Issue: 5 Article Number: 585 DOI: 10.3390/w13050585 Published: MAR 2021 Accession Number: WOS:000628587600001 Record 2 of 5 By: Latosinska, J (Latosinska, Jolanta); Kowalik, R (Kowalik, Robert); Gawdzik, J (Gawdzik, Jaroslaw) Title: Risk Assessment of Soil Contamination with Heavy Metals from Municipal Sewage Sludge Source: APPLIED SCIENCES-BASEL Volume: 11 Issue: 2 Article Number: 548 DOI: 10.3390/app11020548 Published: JAN 2021 Times Cited in Web of Science Core Collection: 0 Total Times Cited: 0

	Accession Number: WOS:000610950000001 Record 3 of 5 By: Wydro, U (Wydro, Urszula); Wolejko, E (Wolejko, Elzbieta); Lozowicka, B (Lozowicka, Bozena); Jablonska-Trypuc, A (Jablonska-Trypuc, Agata) Title: Microbial Diversity and P Content Changes after the Application of Sewage Sludge and Glyphosate to Soil Source: MINERALS Volume: 11 Issue: 12 Article Number: 1423 DOI: 10.3390/min11121423 Published: DEC 2021 Accession Number: WOS:000737008900001 Record 4 of 5 By: De Corato, U (De Corato, Ugo) Title: Effect of value-added organic co-products from four industrial chains on functioning of plant disease suppressive soil and their potentiality to enhance soil quality: A review from the perspective of a circular economy Source: APPLIED SOIL ECOLOGY Volume: 168 Article Number: 104221 Published: DEC 2021 DOI: 10.1016/j.apsoil.2021.104221 Accession Number: WOS:000701814300010 Record 5 of 5 By: Boudjabi, S (Boudjabi, Sonia); Chenchouni, H (Chenchouni, Haroun) Title: On the sustainability of land applications of sewage sludge: How to apply the sewage biosolid in order to improve soil fertility and increase crop yield? Source: CHEMOSPHERE Volume: 282 Article Number: 131122 Published: NOV 2021 DOI: 10.1016/j.chemosphere.2021.131122 Accession Number: WOS:000541750900095
OCA18. Charakteristika dopadu výstupu na spoločensko-hospodársku prax / Characteristics of the output's impact on socio-economic practice <i>Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak</i> <i>Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English</i>	Vzhľadom na zvyšujúcu sa produkciu splaškových kalov vo svete a problémy s ich zneškodňovaním, sa javí aplikácia kalu do pôdy ako vhodné riešenie vzhľadom na jeho vlastnosti hnojiva a schopnosť zlepšovať fyzikálne parametre pôdy. Kal však môže obsahovať aj nežiadúce a toxické látky. Pôdne mikroorganizmy sú citlivé na zmeny životného prostredia, môžu sa teda použiť ako ukazovatele kvality pôdy. V tejto štúdii bol použitý čistiarenský kal z komunálnych čistiarní odpadových vôd v rôznych dávkach, s cieľom stanoviť možné zmeny v rozmanitosti spoločenstiev húb, najmä arbuskulárnych mykorizných húb (AMF) v rizosfére <i>Arundo donax</i> L. Vzorky rizosféry a diverzita húb sa sledovali pomocou polymorfizmu dĺžky terminálnych reštrikčných fragmentov a sekvenovania 18S rDNA. Na základe analýz neboli pozorované významné zmeny v celkovej diverzite húb. Sekvenovanie 18S rDNA súčasne ukázalo, že vo vzorke s čistiarenským kalom bolo identifikovaných viac rôznych taxónov húb ako v kontrole. <i>Glomus</i> sp., ako zástupca AMF, bol najviac zastúpený. Ďalšími zástupcami AMF boli <i>Funneliformis</i> v oboch vzorkách a <i>Rhizophagus</i> v kontrole so <i>Septoglomus</i> vo vzorke kalu. Výsledky naznačili, že krátkodobá aplikácia týchto kalov do pôdy nespôsobuje zmeny v zložení spoločenstiev húb. Due to the increasing production of sewage sludge in the world and the problems with their disposal, the application of sludge to the soil seems to be a suitable solution due to its fertilizer properties and ability to improve the physical parameters of the soil. However, the sludge may also contain undesirable and toxic substances. Soil microorganisms are sensitive to environmental changes, so they can be used as indicators of soil quality. In this study, sewage sludge from municipal wastewater treatment plants was used in different doses to determine possible changes in the diversity of fungal communities, especially arbuscular mycorrhizal fungi (AMF) in the <i>Arundo donax</i> L rhizosphere. restriction fragments and 18S rDNA sequencing. Based on the analyses, no significant changes in the overall diversity of fungi were observed. Simultaneous sequencing of 18S rDNA showed that more different fungal taxa were identified in the sewage sludge sample than in the control. <i>Glomus</i> sp., as a representative of AMF, was the most represented. Other representatives of AMF were <i>Funneliformis</i> in both samples and <i>Rhizophagus</i> in control with <i>Septoglomus</i> in the sludge sample. The results indicated that short-term application of these sludges to the soil does not cause changes in the composition of fungal communities.
OCA19. Charakteristika dopadu výstupu a súvisiacich aktivít na vzdelávací proces / Characteristics of the output and related activities' impact on the educational process <i>Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak</i> <i>Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English</i>	Výstup je orientovaný na environmentálne biotechnológie a je viazaný na výučbu biotechnologických predmetov v rámci študijného programu Biotechnológie. Do vzdelávacieho procesu budú z tohto výstupu implementované použité laboratórne postupy a poznatky, skúsenosti a výsledky z interakcií bioindikátorov prostredia (pôdy) s bezpečnosťou aplikácie čistiarenských kalov buď ako objemových materiálov (podkladové materiály, násypy, úpravy terénu), alebo ako druhotných surovín považovaných za pôdne aditíva a kondicionéry (aj v prípade ornej pôdy). Dopady sa prejavujú vo výučbe predmetov s biotechnologickým, mikrobiologickým, biologickým a molekulárno-biotechnologickým obsahom. The output is focused on environmental biotechnology and is linked to the teaching of biotechnology subjects within the study program Biotechnology. From this output, the used laboratory procedures and knowledge, experience and results from the interactions of bioindicators of the environment (soil) with the safety of sewage sludge application will be implemented into the educational process either as bulk materials (substrates, embankments, landscaping) or as secondary raw materials considered as soil additives and conditioners (also in the case of arable land). Impacts will be reflected in the teaching of subjects with biotechnological, microbiological, biological and molecular-biotechnological content.

Charakteristika predkladaného výstupu tvorivej činnosti / Characteristics of the submitted research/ artistic/other output

Tlačivo VTC slúži na predkladanie výstupov tvorivej činnosti podľa metodiky hodnotenia tvorivých činností (časť V. Metodiky na vyhodnocovanie štandardov) / The form is used to submit the research/artistic/other outputs according to the evaluation methodology of research/artistic/other activities (part V. The Methodology for Standards Evaluation).

ID konania/ID of the procedure: ¹ Kód VTC/Code of the research/artistic/other output (RAOO): ¹	
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OCA1. Priezvisko hodnotenej osoby / Surname awarded to the assessed person ²	Kraic
OCA2. Meno hodnotenej osoby / Name awarded to the assessed person ²	Ján
OCA3. Tituly hodnotenej osoby / Degrees awarded to the assessed person ²	prof., RNDr., PhD.
OCA4. Hyperlink na záznam osoby v Registri zamestnancov vysokých škôl / Hyperlink to the entry of the person in the Register of university staff ³	https://www.portalvs.sk/regzam/detail/10524
OCA5. Oblasť posudzovania / Area of assessment ⁴	4. Biotechnológie / 4. Biotechnology
OCA6. Kategória výstupu tvorivej činnosti / Category of the research/ artistic/other output <i>Výber zo 6 možností (pozri Vysvetlivky k položke OCA6) / Choice from 6 options (see Explanations for OCA6).</i>	Vedecký výstup/ scientific output
OCA7. Rok vydania výstupu tvorivej činnosti / Year of publication of the research/artistic/other output	2013
OCA8. ID záznamu v CREPČ alebo CREUČ (ak je) / ID of the record in the Central Registry of Publication Activity (CRPA) or the Central Registry of Artistic Activity (CRAA) ⁵	
OCA9. Hyperlink na záznam v CREPČ alebo CREUČ / Hyperlink to the record in CRPA or CRAA ⁶	
Charakteristika výstupu, ktorý nie je registrovaný v CREPČ alebo CREUČ / Characteristics of the output that is not registered in CRPA or CRAA OCA10. Hyperlink na záznam v inom verejne prístupnom registri, katalógu výstupov tvorivých činností / Hyperlink to the record in another publicly accessible register, catalogue of research/ artistic/other outputs ⁷ OCA11. Charakteristika výstupu vo formáte bibliografického záznamu CREPČ alebo CREUČ, ak výstup nie je vo verejne prístupnom registri alebo katalógu výstupov / Characteristics of the output in the format of the CRPA or the CRAA bibliographic record, if the output is not available in a publicly	Gubišová, M., Gubiš, J., Žofajová, A., Mihálik, D., Kraic, J.: Enhanced <i>in vitro</i> propagation of <i>Miscanthus × giganteus</i>, Industrial Crops and Products, Volume 41, 2013, Pages 279-282, ISSN 0926-6690, https://doi.org/10.1016/j.indcrop.2012.05.004.

	accessible register or catalogue of outputs	
	OCA12. Typ výstupu (ak nie je výstup registrovaný v CREPČ alebo CREUČ) / Type of the output (if the output is not registered in CRPA or CRAA) <i>Výber zo 67 možností (pozri Vysvetlivky k položke OCA12) / Choice from 67 options (see Explanations for OCA12).</i>	Článok/article
	OCA13. Hyperlink na stránku, na ktorej je výstup sprístupnený (úplný text, iná dokumentácia a podobne) / Hyperlink to the webpage where the output is available (full text, other documentation, etc.)	https://www.sciencedirect.com/science/article/abs/pii/S0926669012002695
	OCA14. Charakteristika autorského vkladu / Characteristics of the author's contribution	[20 %] Korešpondujúci autor, autor konceptu, metodológie, príprava rukopisu, vedúci projektu, vedenie experimentov. [20 %] Corresponding author, author of the concept, methodology, preparation of the manuscript, project leader, conducting experiments.
	OCA15. Anotácia výstupu s kontextovými informáciami týkajúcimi sa opisu tvorivého procesu a obsahu tvorivej činnosti a pod. / Annotation of the output with contextual information concerning the description of creative process and the content of the research/artistic/other activity, etc. ⁸ Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak ⁸ Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English	
	OCA16. Anotácia výstupu v anglickom jazyku / Annotation of the output in English ⁹ Rozsah do 200 slov / Range up to 200 words	Two approaches for <i>Miscanthus × giganteus</i> in vitro propagation – direct and indirect, were improved as effective alternatives to asexual propagation from rhizomes. The direct multiplication using stem segments containing axillary buds combined with in vitro tillering phase turns out to be fifty–sixty times more effective than the conventional ex vitro rhizome-based approach. On average, 64 regenerants per one immature inflorescence were produced using the indirect system through callus growth and shoots regeneration and inclusion of in vitro tillering increased multiplication by coefficient 2–2.5. Both in vitro systems were improved and could be integrated into effective production of <i>M. × giganteus</i> plantlets.
	OCA17. Zoznam najviac 5 najvýznamnejších ohlasov na výstup / List of maximum 5 most significant citations corresponding to the output <i>Rozsah do 200 slov / Range up to 200 words</i>	Record 1 of 5 Title: Present and future options for <i>Miscanthus</i> propagation and establishment Author(s): Xue, S (Xue, Shuai); Kalinina, O (Kalinina, Olena); Lewandowski, I (Lewandowski, Iris) Source: RENEWABLE & SUSTAINABLE ENERGY REVIEWS Volume: 49 Pages: 1233-1246 DOI: 10.1016/j.rser.2015.04.168 Published: SEP 2015 Times Cited in Web of Science Core Collection: 30 Total Times Cited: 35 Accession Number: WOS:000357141900097 Record 2 of 5 Title: In vitro-propagated <i>Miscanthus x giganteus</i> plants can be a source of diversity in terms of their chemical composition Author(s): Plazek, A (Plazek, A.); Dubert, F (Dubert, F.); Kopec, P (Kopec, P.); Krepski, T (Krepski, T.); Kacorzyk, P (Kacorzyk, P.); Micek, P (Micek, P.); Kurowska, M (Kurowska, M.); Szarejko, I (Szarejko, I.); Zurek, G (Zurek, G.) Source: BIOMASS & BIOENERGY Volume: 75 Pages: 142-149 DOI: 10.1016/j.biombioe.2015.02.009 Published: APR 2015 Times Cited in Web of Science Core Collection: 8 Total Times Cited: 9 Accession Number: WOS:000353744100015 Record 3 of 5 Title: <i>Miscanthus</i> : Genetic Diversity and Genotype Identification Using ISSR and RAPD Markers

	Author(s): Cichorz, S (Cichorz, Sandra); Goska, M (Goska, Maria); Litwiniec, A (Litwiniec, Anna) Source: MOLECULAR BIOTECHNOLOGY Volume: 56 Issue: 10 Pages: 911-924 DOI: 10.1007/s12033-014-9770-0 Published: OCT 2014 Times Cited in Web of Science Core Collection: 14 Total Times Cited: 20 Accession Number: WOS:000341815700005 Record 4 of 5 Title: An efficient in vitro shoot regeneration from immature inflorescence and ex vitro rooting of <i>Arnebia hispidissima</i> (Lehm). DC. - A red dye (Alkannin) yielding plant Author(s): Phulwaria, M (Phulwaria, Mahendra); Shekhawat, NS (Shekhawat, N. S.) Source: PHYSIOLOGY AND MOLECULAR BIOLOGY OF PLANTS Volume: 19 Issue: 3 Pages: 435-441 DOI: 10.1007/s12298-013-0171-9 Published: JUL 2013 Times Cited in Web of Science Core Collection: 9 Total Times Cited: 11 Accession Number: WOS:000322015100012 Record 5 of 5 Title: Shoot organogenesis in three <i>Miscanthus</i> species and evaluation for genetic uniformity using AFLP analysis Author(s): Rambaud, C (Rambaud, Caroline); Arnoult, S (Arnoult, Stephanie); Bluteau, A (Bluteau, Aurelie); Mansard, MC (Mansard, Marie Chantal); Blassiau, C (Blassiau, Christelle); Brancourt-Hulmel, M (Brancourt-Hulmel, Maryse) Source: PLANT CELL TISSUE AND ORGAN CULTURE Volume: 113 Issue: 3 Pages: 437-448 DOI: 10.1007/s11240-012-0284-9 Published: JUN 2013 Times Cited in Web of Science Core Collection: 11 Total Times Cited: 11 Accession Number: WOS:000319358000008
OCA18. Charakteristika dopadu výstupu na spoločensko-hospodársku prax / Characteristics of the output's impact on socio-economic practice <i>Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak</i> <i>Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English</i>	V práci boli vylepšené dva prístupy pre množenie in vitro <i>Miscanthus × giganteus</i> - priamy a nepriamy, ako účinné alternatívy k nepohlavnému množeniu z rizómov. Priame množenie pomocou segmentov stonky ukázalo, že segmenty obsahujúce axilárne púčiky kombinované s in vitro fázou odnožovania je 50-60 krát účinnejšie ako konvenčný prístup založený na rizómoch ex vitro. V priemere sa produkovalo 64 regenerantov na jedno nezrelé súkvetie pomocou nepriameho systému prostredníctvom rastu kalusu a regenerovaných výhonkov. Inklúzia kultivácie in vitro zvýšila multiplikáciu koeficientom 2–2,5. Oba in vitro systémy boli vylepšené a môžu byť integrované do efektívnej produkcie energeticky použiteľných rastlín <i>Miscanthus × giganteus</i>. Two approaches for in vitro propagation of <i>Miscanthus × giganteus</i> have been improved - direct and indirect as effective alternatives to asexual reproduction from rhizomes. Direct propagation using stem segments has shown that segments containing axillary buds combined with an in vitro rooting phase are 50-60 times more effective than the conventional approach based on ex vitro risks. On average, 64 regenerants per immature inflorescence were produced by an indirect system through callus growth and regenerated shoots. Inclusion of in vitro culture increased the multiplication by a factor of 2–2.5. Both in vitro systems have been improved and can be integrated into the efficient production of energy-efficient <i>Miscanthus × giganteus</i> plants.
OCA19. Charakteristika dopadu výstupu a súvisiacich aktivít na vzdelávací proces / Characteristics of the output and related activities' impact on the educational process <i>Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak</i> <i>Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English</i>	Výstup je orientovaný na rastlinné a energetické biotechnológie a je viazaný na výučbu biotechnologických predmetov v rámci študijného programu Biotechnológie. Do vzdelávacieho procesu budú z tohto výstupu implementované poznatky, skúsenosti a výsledky z in vitro postupov a in vitro mikropropagácie významnej energetickej rastliny. Dopady sa prejavujú vo výučbe predmetov s biotechnologickým a biologickým obsahom. The output is focused on plant and energy biotechnology and is tied to the teaching of biotechnology subjects within the study program Biotechnology. From this output, knowledge, experience and results from in vitro procedures and in vitro micropropagation of an important energy plant will be implemented into the educational process. Impacts will be reflected in the teaching of subjects with biotechnological and biological content.

Charakteristika predkladaného výstupu tvorivej činnosti / Characteristics of the submitted research/ artistic/other output

Tlačivo VTC slúži na predkladanie výstupov tvorivej činnosti podľa metodiky hodnotenia tvorivých činností (časť V. Metodiky na vyhodnocovanie štandardov) / The form is used to submit the research/artistic/other outputs according to the evaluation methodology of research/artistic/other activities (part V. The Methodology for Standards Evaluation).

ID konania/ID of the procedure: ¹ Kód VTC/Code of the research/artistic/other output (RAOO): ¹	
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OCA1. Priezvisko hodnotenej osoby / Surname awarded to the assessed person ²	Kraic
OCA2. Meno hodnotenej osoby / Name awarded to the assessed person ²	Ján
OCA3. Tituly hodnotenej osoby / Degrees awarded to the assessed person ²	prof., RNDr., PhD.
OCA4. Hyperlink na záznam osoby v Registri zamestnancov vysokých škôl / Hyperlink to the entry of the person in the Register of university staff ³	https://www.portalvs.sk/regzam/detail/10524
OCA5. Oblasť posudzovania / Area of assessment ⁴	4. Biotechnológie / 4. Biotechnology
OCA6. Kategória výstupu tvorivej činnosti / Category of the research/ artistic/other output <i>Výber zo 6 možností (pozri Vysvetlivky k položke OCA6) / Choice from 6 options (see Explanations for OCA6).</i>	Vedecký výstup/ scientific output
OCA7. Rok vydania výstupu tvorivej činnosti / Year of publication of the research/artistic/other output	2018
OCA8. ID záznamu v CREPČ alebo CREUČ (ak je) / ID of the record in the Central Registry of Publication Activity (CRPA) or the Central Registry of Artistic Activity (CRAA) ⁵	175582
OCA9. Hyperlink na záznam v CREPČ alebo CREUČ / Hyperlink to the record in CRPA or CRAA ⁶	https://app.crepc.sk/?fn=detailBiblioForm&sid=7E3114D01432D19183706423
Charakteristika výstupu, ktorý nie je registrovaný v CREPČ alebo CREUČ / Characteristics of the output that is not registered in CRPA or CRAA	OCA10. Hyperlink na záznam v inom verejne prístupnom registri, katalógu výstupov tvorivých činností / Hyperlink to the record in another publicly accessible register, catalogue of research/ artistic/other outputs ⁷ OCA11. Charakteristika výstupu vo formáte bibliografického záznamu CREPČ alebo CREUČ, ak výstup nie je vo verejne prístupnom registri alebo katalógu výstupov / Characteristics of the output in the format of the CRPA or the CRAA bibliographic record, if the output is not available in a publicly

Ján Kraic, Daniel Mihálik, Lenka Klčová, Marcela Gubišová, Tatiana Klempová, Martina Hudcovicová, Katarína Ondreičková, Michaela Mrkvová, Michaela Havrlentová, Jozef Gubiš, Milan Čertík, Progress in the genetic engineering of cereals to produce essential polyunsaturated fatty acids, Journal of Biotechnology, Volume 284, 2018, Pages 115-122, ISSN 0168-1656.
<https://doi.org/10.1016/j.jbiotec.2018.08.009>.

	accessible register or catalogue of outputs	
	OCA12. Typ výstupu (ak nie je výstup registrovaný v CREPČ alebo CREUČ) / Type of the output (if the output is not registered in CRPA or CRAA) <i>Výber zo 67 možností (pozri Vysvetlivky k položke OCA12) / Choice from 67 options (see Explanations for OCA12).</i>	Článok/article
	OCA13. Hyperlink na stránku, na ktorej je výstup sprístupnený (úplný text, iná dokumentácia a podobne) / Hyperlink to the webpage where the output is available (full text, other documentation, etc.)	https://www.sciencedirect.com/science/article/abs/pii/S0168165618306084
	OCA14. Charakteristika autorského vkladu / Characteristics of the author's contribution	[35 %] Korešpondujúci autor, autor a príprava konceptu review rukopisu, finálne úpravy rukopisu (po recenzii). [35 %] Corresponding author, preparation of the manuscript review concept, final manuscript modifications (after review).
	OCA15. Anotácia výstupu s kontextovými informáciami týkajúcimi sa opisu tvorivého procesu a obsahu tvorivej činnosti a pod. / Annotation of the output with contextual information concerning the description of creative process and the content of the research/artistic/other activity, etc. ⁸ Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak ⁹ Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English	
	OCA16. Anotácia výstupu v anglickom jazyku / Annotation of the output in English ⁹ Rozsah do 200 slov / Range up to 200 words	Essential polyunsaturated fatty acids with more than two double bonds and length of carbon chain 18–22 must be taken in the diet to prevent diseases and imbalances caused by their deficiency. Terrestrial sources of polyunsaturated fatty acids are limited to only a few plant species whose large-scale cultivation is not possible and the production of their seeds and oil is ineffective. The complete biosynthetic pathway of fatty acids is known in organisms, including plants. After the first gene encoding the enzyme catalysing the initial steps of PUFA biosynthesis (ω -3 desaturase, Δ 6-desaturase) were isolated, isolation of other genes encoding relevant enzymes of the PUFA pathway from different donor organisms followed. Genetic transformations of model plants by the desaturase- and elongase-encoding genes opened the way for the genetic engineering of oilseed crop species. Some of the developed transgenic plants produced PUFAs, including eicosapentaenoic and docosahexaenoic acids. Seed oils extracted from them were similar to fish oil. Tools of the synthetic biology can be applied in modifications of the PUFA pathway and also in overcoming of limitations when the gene and its expression product are absent in the pathway. Such progress in cereals (barley, wheat, maize) has been made only recently, when the first successful modifications of the ω -3 and ω -6 PUFA pathways succeeded. This review focuses on genetic modifications of the PUFA biosynthetic pathway in cereals in relation to the status reached in model plants and oilseed crops.
	OCA17. Zoznam najviac 5 najvýznamnejších ohlasov na výstup / List of maximum 5 most significant citations corresponding to the output <i>Rozsah do 200 slov / Range up to 200 words</i>	Record 1 of 5 Title: Genetic modification of cereal plants: A strategy to enhance bioethanol yields from agricultural waste Author(s): Rocha-Meneses, L (Rocha-Meneses, Lisandra); Ferreira, JA (Ferreira, Jorge A.); Mushtaq, M (Mushtaq, Maryam); Karimi, S (Karimi, Sajjad); Orupold, K (Orupold, Kaja); Kikas, T (Kikas, Timo) Source: INDUSTRIAL CROPS AND PRODUCTS Volume: 150 Article Number: 112408 DOI: 10.1016/j.indcrop.2020.112408 Published: AUG 2020 Times Cited in Web of Science Core Collection: 2 Total Times Cited: 2 Accession Number: WOS:000530684700027 Record 2 of 5

	Title: Development and characterization of marker-free and transgene insertion site-defined transgenic wheat with improved grain storability and fatty acid content Author(s): Cao, XM (Cao, Xuemin); Dong, ZY (Dong, Zhenying); Tian, D (Tian, Dong); Dong, LL (Dong, Lingli); Qian, WQ (Qian, Weiqiang); Liu, JX (Liu, Jinxing); Liu, X (Liu, Xin); Qin, HJ (Qin, Huanju); Zhai, WX (Zhai, Wenxue); Gao, CX (Gao, Caixia); Zhang, KP (Zhang, Kunpu); Wang, DW (Wang, Daowen) Source: PLANT BIOTECHNOLOGY JOURNAL Volume: 18 Issue: 1 Pages: 129-140 DOI: 10.1111/pbi.13178 Published: JAN 2020 Times Cited in Web of Science Core Collection: 2 Total Times Cited: 2 Accession Number: WOS:000530370800016 Record 3 of 5 Title: Development and characterization of marker-free and transgene insertion site-defined transgenic wheat with improved grain storability and fatty acid content Author(s): Cao, XM (Cao, Xuemin); Dong, ZY (Dong, Zhenying); Tian, D (Tian, Dong); Dong, LL (Dong, Lingli); Qian, WQ (Qian, Weiqiang); Liu, JX (Liu, Jinxing); Liu, X (Liu, Xin); Qin, HJ (Qin, Huanju); Zhai, WX (Zhai, Wenxue); Gao, CX (Gao, Caixia); Zhang, KP (Zhang, Kunpu); Wang, DW (Wang, Daowen) Source: PLANT BIOTECHNOLOGY JOURNAL DOI: 10.1111/pbi.13178 Early Access Date: JUL 2019 Times Cited in Web of Science Core Collection: 2 Total Times Cited: 2 Accession Number: WOS:000474104700001 Record 4 of 5 Title: Postprandial incorporation of EPA and DHA from transgenic Camelina sativa oil into blood lipids is equivalent to that from fish oil in healthy humans Author(s): West, AL (West, Annette L.); Miles, EA (Miles, Elizabeth A.); Lillycrop, KA (Lillycrop, Karen A.); Han, LH (Han, Lihua); Sayanova, O (Sayanova, Olga); Napier, JA (Napier, Johnathan A.); Calder, PC (Calder, Philip C.); Burdge, GC (Burdge, Graham C.) Source: BRITISH JOURNAL OF NUTRITION Volume: 121 Issue: 11 Pages: 1235-1246 Article Number: PII S0007114519000825 DOI: 10.1017/S0007114519000825 Published: JUN 14 2019 Times Cited in Web of Science Core Collection: 4 Total Times Cited: 4 Accession Number: WOS:000476919700004 Record 5 of 5 Title: Ocimum basilicum var. purpurascens leaves (red rubin basil): a source of bioactive compounds and natural pigments for the food industry Author(s): Fernandes, F (Fernandes, Filipa); Pereira, E (Pereira, Eliana); Ciric, A (Ciric, Ana); Sokovic, M (Sokovic, Marina); Calhelha, RC (Calhelha, Ricardo C.); Barros, L (Barros, Lillian); Ferreira, ICFR (Ferreira, Isabel C. F. R.) Source: FOOD & FUNCTION Volume: 10 Issue: 6 Pages: 3161-3171 DOI: 10.1039/c9fo00578a Published: JUN 1 2019 Times Cited in Web of Science Core Collection: 2 Total Times Cited: 2 Accession Number: WOS:000476531200009
OCA18. Charakteristika dopadu výstupu na spoločensko-hospodársku prax / Characteristics of the output's impact on socio-economic practice Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English	V strave sa musia vyskytovať aj esenciálne polynenasýtené mastné kyseliny (PUFA) s viac ako dvoma dvojitzými väzbami a dĺžkou uhlíkového reťazca 18-22, aby sa zabránilo chorobám a nerovnováhe spôsobenej ich nedostatkom. Suchozemské zdroje PUFA sú obmedzené iba na niekoľko druhov rastlín, ktorých kultivácia nie je možná a produkcia ich semien a oleja je neefektívna. Kompletná biosyntetická dráha mastných kyselín je známa v organizmoch, vrátane rastlín. Po izolácii prvého génu kódujúceho enzým katalyzujúci počiatočné kroky biosyntézy PUFA (omega-3 desaturáza, delta 6-desaturáza) nasledovala izolácia ďalších génov kódujúcich príslušné enzýmy dráhy PUFA z rôznych donorových organizmov. Genetické transformácie modelových rastlín pomocou génov kódujúcich desaturázu a elongázu otvorili cestu pre genetické inžinierstvo druhov olejnatých rastlín. Niektoré z vyvinutých transgénnych rastlín produkovali PUFA, vrátane kyselín eikosapentaénovej a dokozahexaénovej. Oleje z nich vyrobené boli podobné rybiemu oleju. Nástroje syntetickej biológie možno použiť pri modifikáciách dráhy PUFA a tiež pri prekonávaní obmedzení, keď gén a jeho produkt expresie v biosyntetickej dráhe nie sú prítomné. Takýto pokrok v obilninách (jačmeň, pšenica, kukurica) sa dosiahol iba nedávno, keď boli úspešné prvé genetické modifikácie dráh PUFA omega-3 a omega-6. Táto práca sa zamerala na genetické modifikácie biosyntetickej dráhy PUFA v obilninách, vo vzťahu k stavu dosiahnutému v modelových rastlinách a olejnatých plodín. Essential polyunsaturated fatty acids (PUFAs) with more than two double bonds and a carbon chain length of 18-22 must also be present in the diet to prevent diseases and imbalances caused by their deficiency. Terrestrial PUFA resources are limited to a few plant species that cannot be cultivated and their seed and oil production is inefficient. The complete biosynthetic pathway of fatty acids is known in organisms, including plants. Isolation of the first gene encoding an enzyme catalyzing the initial steps of PUFA biosynthesis (omega-3 desaturase, delta 6-desaturase) was followed by isolation of additional genes encoding the respective enzymes of the PUFA pathway from various donor organisms. Genetic transformations of model plants using genes encoding desaturase and elongase have paved the way for the genetic engineering of oilseed species. Some

	of the developed transgenic plants produced PUFAs, including eicosapentaenoic and docosahexaenoic acids. The oils made from them were similar to fish oil. Synthetic biology tools can be used to modify the PUFA pathway, as well as overcoming limitations where the gene and its expression product are not present in the biosynthetic pathway. Such progress in cereals (barley, wheat, maize) has only recently been made when the first genetic modifications of the PUFA omega-3 and omega-6 pathways have been successful. This work focused on genetic modifications of the PUFA biosynthetic pathway in cereals, in relation to the state achieved in model plants and oilseeds.
OCA19. Charakteristika dopadu výstupu a súvisiacich aktivít na vzdelávací proces / Characteristics of the output and related activities' impact on the educational process <i>Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak</i> <i>Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English</i>	Výstup je orientovaný na rastlinné, potravinárske a medicínske biotechnológie a je viazaný na výučbu biotechnologických predmetov v rámci študijného programu Biotechnológie. Do vzdelávacieho procesu budú z tohto výstupu implementované poznatky, skúsenosti a výsledky z možností modifikovania biosyntetických dráh mastných kyselín, resp. aj konštrukcie nových biosyntetických dráh vo vybraných rastlinných druhoch. The output is focused on plant, food and medical biotechnology and is linked to the teaching of biotechnology subjects within study program Biotechnology. From this output, knowledge, experience and results from the possibilities will be implemented into the educational process modification of biosynthetic pathways of fatty acids, resp. as well as the construction of new biosynthetic pathways in selected plant species.

Charakteristika predkladaného výstupu tvorivej činnosti / Characteristics of the submitted research/ artistic/other output

Tlačivo VTC slúži na predkladanie výstupov tvorivej činnosti podľa metodiky hodnotenia tvorivých činností (časť V. Metodiky na vyhodnocovanie štandardov) / The form is used to submit the research/artistic/other outputs according to the evaluation methodology of research/artistic/other activities (part V. The Methodology for Standards Evaluation).

ID konania/ID of the procedure: ¹	
Kód VTC/Code of the research/artistic/other output (RAOO): ¹	

OCA1. Priezvisko hodnotenej osoby / Surname awarded to the assessed person ²	Kraic
OCA2. Meno hodnotenej osoby / Name awarded to the assessed person ²	Ján
OCA3. Tituly hodnotenej osoby / Degrees awarded to the assessed person ²	prof., RNDr., PhD.
OCA4. Hyperlink na záznam osoby v Registri zamestnancov vysokých škôl / Hyperlink to the entry of the person in the Register of university staff ³	https://www.portalvs.sk/regzam/detail/10524
OCA5. Oblasť posudzovania / Area of assessment ⁴	4. Biotechnológie / 4. Biotechnology
OCA6. Kategória výstupu tvorivej činnosti / Category of the research/ artistic/other output <i>Výber zo 6 možností (pozri Vysvetlivky k položke OCA6) / Choice from 6 options (see Explanations for OCA6).</i>	<i>Vedecký výstup/ scientific output</i>
OCA7. Rok vydania výstupu tvorivej činnosti / Year of publication of the research/artistic/other output	2022
OCA8. ID záznamu v CREPČ alebo CREUČ (ak je) / ID of the record in the Central Registry of Publication Activity (CRPA) or the Central Registry of Artistic Activity (CRAA) ⁵	503339
OCA9. Hyperlink na záznam v CREPČ alebo CREUČ / Hyperlink to the record in CRPA or CRAA ⁶	https://app.crepc.sk/?fn=detailBiblioForm&sid=B0397FD2063DC55628DA93E214
Charakteristika výstupu, ktorý nie je registrovaný v CREPČ alebo CREUČ / Characteristics of the output that is not registered in CRPA or CRAA	OCA10. Hyperlink na záznam v inom verejne prístupnom registri, katalógu výstupov tvorivých činností / Hyperlink to the record in another publicly accessible register, catalogue of research/ artistic/other outputs ⁷
	OCA11. Charakteristika výstupu vo formáte bibliografického záznamu CREPČ alebo CREUČ, ak výstup nie je vo verejne prístupnom registri alebo katalógu výstupov / Characteristics of the output in the format of the CRPA or the CRAA bibliographic record, if the
	Establishment of Stem Cell-like Cells of <i>Sida hermaphrodita</i> (L.) Rusby from Explants Containing Cambial Meristems. Kaňuková, ŠarlotaGubišová, MarcelaKlčová, LenkaMihálik, Daniel, Kraic, Ján . International Journal of Molecular Sciences 2022, 23, 7644.

	output is not available in a publicly accessible register or catalogue of outputs	
	OCA12. Typ výstupu (ak nie je výstup registrovaný v CREPČ alebo CREUČ) / Type of the output (if the output is not registered in CRPA or CRAA) <i>Výber zo 67 možností (pozri Vysvetlivky k položke OCA12) / Choice from 67 options (see Explanations for OCA12).</i>	Článok/article
	OCA13. Hyperlink na stránku, na ktorej je výstup sprístupnený (úplný text, iná dokumentácia a podobne) / Hyperlink to the webpage where the output is available (full text, other documentation, etc.)	https://www.mdpi.com/1422-0067/23/14/7644
	OCA14. Charakteristika autorského vkladu / Characteristics of the author's contribution	[40 %] Korešpondujúci autor, autor konceptu, metodológie, príprava rukopisu, vedenie experimentov. [40 %] Corresponding author, author of the concept, methodology, preparation of the manuscript, conducting experiments.
	OCA15. Anotácia výstupu s kontextovými informáciami týkajúcimi sa opisu tvorivého procesu a obsahu tvorivej činnosti a pod. / Annotation of the output with contextual information concerning the description of creative process and the content of the research/artistic/other activity, etc. ⁸ <i>Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak</i> ⁹ <i>Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English</i>	
	OCA16. Anotácia výstupu v anglickom jazyku / Annotation of the output in English ⁹ <i>Rozsah do 200 slov / Range up to 200 words</i>	The in vitro cultures of plant stem cells and stem cell-like cells can be established from tissues containing meristematic cells. Chemical compounds—as well as their production potential—is among the emerging topics of plant biotechnology. We induced the callus cell biomass growth and characterized the parameters indicating the presence of stem cells or stem cell-like cells. Four types of explants (stem, petiole, leaf, root) from <i>Sida hermaphrodita</i> (L.) Rusby and various combinations of auxins and cytokinins were tested for initiation of callus, growth of sub-cultivated callus biomass, and establishment of stem cells or stem cell-like cells. Induction of callus and its growth parameters were significantly affected both by the explant type and the combination of used plant growth hormones and regulators. The responsibility for callus initiation and growth was the highest in stem-derived explants containing cambial meristematic cells. Growth parameters of callus biomass and specific characteristics of vacuoles confirmed the presence of stem cells or stem cell-like cells in sub-cultivated callus cell biomass. Establishment of in vitro stem cell or stem cell-like cell cultures in <i>S. hermaphrodita</i> can lead to the development of various applications of in vitro cultivation systems as well as alternative applications of this crop.
	OCA17. Zoznam najviac 5 najvýznamnejších ohlasov na výstup / List of maximum 5 most significant citations corresponding to the output <i>Rozsah do 200 slov / Range up to 200 words</i>	Publikácia vyšla až v júli 2022, zatiaľ nemá ohlasy.

OCA18. Charakteristika dopadu výstupu na spoločensko-hospodársku prax / Characteristics of the output's impact on socio-economic practice <i>Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak</i> <i>Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English</i>	Založená bola in vitro kultúra rastlinných kmeňových buniek a im podobných buniek z tkanív obsahujúcich meristematické bunky. Indukoval sa rast biomasy kalusových buniek a charakterizovala sa prítomnosť rastlinných kmeňových buniek z viacerých typov explantátov sidy obojpohlavnej (<i>Sida hermaphrodita</i> L. Rusby). Rastové parametre kalusovej biomasy a špecifické charakteristiky vakuol potvrdili prítomnosť kmeňových buniek v subkultivovanej biomase kalusových buniek. Založenie in vitro kmeňových buniek alebo bunkových kultúr podobných kmeňovým bunkám pri <i>S. hermaphrodita</i> môže viesť na jednej strane k vývoju rôznych aplikácií in vitro kultivačných systémov, ako aj alternatívnych aplikácií tejto plodiny, na druhej strane, môže viesť ku zovšeobecneniu postupov a procesov získavania kultúr rastlinných kmeňových buniek. Takéto kultúry by umožnili efektívnejšie produkovať bunkovú biomasu rastlín, sekundárne metabolity produkované bunkami v in vitro systémoch, efektívnejšiu elicitáciu týchto metabolitov. Z praktického hľadiska bude možný prechod z malých kultivačných objemov rastlinných buniek k väčším objemom v bioreaktoroch. An in vitro culture of plant stem cells and similar cells from tissues containing meristematic cells was established. Callus cell biomass growth was induced and the presence of plant stem cells from several types of explants of the hermaphrodite (<i>Sida hermaphrodita</i> L. Rusby) was characterized. Growth parameters of callus biomass and specific characteristics of vacuoles confirmed the presence of stem cells in subcultured callus cell biomass. The establishment of in vitro stem cells or stem cell-like cell cultures in <i>S. hermaphrodita</i> can lead, on the one hand, to the development of various applications of in vitro culture systems as well as alternative applications of this crop, on the other hand, it can lead to the generalization of procedures and processes for obtaining plant cultures stem cells. Such cultures would allow more efficient production of plant cell biomass, secondary metabolites produced by cells in in vitro systems, more efficient elicitation of these metabolites. From a practical point of view, it will be possible to move from small cultivation volumes of plant cells to larger volumes in bioreactors.
OCA19. Charakteristika dopadu výstupu a súvisiacich aktivít na vzdelávací proces / Characteristics of the output and related activities' impact on the educational process <i>Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak</i> <i>Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English</i>	Výstup je orientovaný na rastlinné a farmaceutické biotechnológie a je viazaný na výučbu biotechnologických predmetov v rámci študijného programu Biotechnológie. Do vzdelávacieho procesu budú z tohto výstupu implementované poznatky, skúsenosti a výsledky z metód zakladania kalusových kultúr rastlín a kultúr rastlinných kmeňových buniek. Dopady sa prejavujú vo výučbe predmetov s biotechnologickým obsahom (hlavne do predmetu In vitro systémy rastlín). The output is oriented towards plant and pharmaceutical biotechnologies and is linked to the teaching of biotechnological subjects within the study program of Biotechnology. Knowledge, experience and results from the methods of establishing plant callus cultures and plant stem cell cultures will be implemented in the educational process from this output. The impacts will be reflected in the teaching of subjects with biotechnological content (mainly in the subject In vitro plant systems).

Charakteristika predkladaného výstupu tvorivej činnosti / Characteristics of the submitted research/ artistic/other output

Tlačivo VTC slúži na predkladanie výstupov tvorivej činnosti podľa metodiky hodnotenia tvorivých činností (časť V. Metodiky na vyhodnocovanie štandardov) / The form is used to submit the research/artistic/other outputs according to the evaluation methodology of research/artistic/other activities (part V. The Methodology for Standards Evaluation).

ID konania/ID of the procedure: ¹ Kód VTC/Code of the research/artistic/other output (RAOO): ¹	
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OCA1. Priezvisko hodnotenej osoby / Surname awarded to the assessed person ²	Kraic
OCA2. Meno hodnotenej osoby / Name awarded to the assessed person ²	Ján
OCA3. Tituly hodnotenej osoby / Degrees awarded to the assessed person ²	prof., RNDr., PhD.
OCA4. Hyperlink na záznam osoby v Registri zamestnancov vysokých škôl / Hyperlink to the entry of the person in the Register of university staff ³	https://www.portalvs.sk/regzam/detail/10524
OCA5. Oblasť posudzovania / Area of assessment ⁴	4. Biotechnológie / 4. Biotechnology
OCA6. Kategória výstupu tvorivej činnosti / Category of the research/ artistic/other output <i>Výber zo 6 možností (pozri Vysvetlivky k položke OCA6) / Choice from 6 options (see Explanations for OCA6).</i>	Vedecký výstup/ scientific output
OCA7. Rok vydania výstupu tvorivej činnosti / Year of publication of the research/artistic/other output	2021
OCA8. ID záznamu v CREPČ alebo CREUČ (ak je) / ID of the record in the Central Registry of Publication Activity (CRPA) or the Central Registry of Artistic Activity (CRAA) ⁵	253983
OCA9. Hyperlink na záznam v CREPČ alebo CREUČ / Hyperlink to the record in CRPA or CRAA ⁶	https://app.crepc.sk/?fn=detailBiblioForm&sid=992271BC46F7F8BAC57C96ABA7
Charakteristika výstupu, ktorý nie je registrovaný v CREPČ alebo CREUČ / Characteristics of the output that is not registered in CRPA or CRAA	OCA10. Hyperlink na záznam v inom verejne prístupnom registri, katalógu výstupov tvorivých činností / Hyperlink to the record in another publicly accessible register, catalogue of research/ artistic/other outputs ⁷
OCA11. Charakteristika výstupu vo formáte bibliografického záznamu CREPČ alebo CREUČ, ak výstup nie je vo verejne prístupnom registri alebo katalógu výstupov / Characteristics of the output in the format of the CRPA or the CRAA bibliographic record, if the output is not available in a publicly	Biotic and Abiotic Elicitors of Stilbenes Production in Vitis vinifera L. Cell Culture, Sák, Martin; Dokupilová, Ivana; Kaňuková, Šarlota; Mrkvová, Michaela; Mihálik, Daniel; Hauptvogel, Pavol; Kraic, Ján . Plants-Basel , 2021, 10, 3, no. 490, 1-14.

	accessible register or catalogue of outputs	
	OCA12. Typ výstupu (ak nie je výstup registrovaný v CREPČ alebo CREUČ) / Type of the output (if the output is not registered in CRPA or CRAA) <i>Výber zo 67 možností (pozri Vysvetlivky k položke OCA12) / Choice from 67 options (see Explanations for OCA12).</i>	Článok/article
	OCA13. Hyperlink na stránku, na ktorej je výstup sprístupnený (úplný text, iná dokumentácia a podobne) / Hyperlink to the webpage where the output is available (full text, other documentation, etc.)	https://www.mdpi.com/2223-7747/10/3/490
	OCA14. Charakteristika autorského vkladu / Characteristics of the author's contribution	[24 %] Spoluautor konceptu experimentálnej časti a metodológie iniciovania <i>in vitro</i> kultúry a elicitácie produkcie sekundárnych metabolitov, vyhodnotenie výsledkov experimentálnej časti práce, príprava konceptu rukopisu a finálnej verzie rukopisu, konečné úpravy a opravy po recenzii, korešpondujúci autor. [24 %] Co-author of the concept of the experimental part and the methodology of initiating <i>in vitro</i> culture and elution of production of secondary metabolites, evaluation of the results of the experimental part of the work, preparation of the concept of the manuscript and the final version of the manuscript, final adjustments and corrections after review, corresponding author.
	OCA15. Anotácia výstupu s kontextovými informáciami týkajúcimi sa opisu tvorivého procesu a obsahu tvorivej činnosti a pod. / Annotation of the output with contextual information concerning the description of creative process and the content of the research/artistic/other activity, etc. ⁸ Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in SlovakRozsah do 200 slov v anglickom jazyku / Range up to 200 words in English	
	OCA16. Anotácia výstupu v anglickom jazyku / Annotation of the output in English ⁹ Rozsah do 200 slov / Range up to 200 words	The <i>in vitro</i> cell cultures derived from the grapevine (<i>Vitis vinifera</i> L.) have been used for the production of stilbenes treated with different biotic and abiotic elicitors. The red-grape cultivar Váh has been elicited by natural cellulose from <i>Trichoderma viride</i> , the cell wall homogenate from <i>Fusarium oxysporum</i> and synthetic jasmonates. The sodium-orthovanadate, known as an inhibitor of hypersensitive necrotic response in treated plant cells able to enhance production and release of secondary metabolite into the cultivation medium, was used as an abiotic elicitor. Growth of cells and the content of phenolic compounds trans-resveratrol, trans-piceid, δ-viniferin, and ε-viniferin, were analyzed in grapevine cells treated by individual elicitors. The highest accumulation of analyzed individual stilbenes, except of trans-piceid has been observed after treatment with the cell wall homogenate from <i>F. oxysporum</i> . Maximum production of trans-resveratrol, δ- and ε-viniferins was triggered by treatment with cellulase from <i>T. viride</i> . The accumulation of trans-piceid in cell cultures elicited by this cellulase revealed exactly the opposite effect, with almost three times higher production of trans-resveratrol than that of trans-piceid. This study suggested that both used fungal elicitors can enhance production more effectively than commonly used jasmonates.
	OCA17. Zoznam najviac 5 najvýznamnejších ohlasov na výstup / List of maximum 5 most significant citations corresponding to the output <i>Rozsah do 200 slov / Range up to 200 words</i>	Record 1 of 5 Title: Light Quality Modulates Growth, Triggers Differential Accumulation of Phenolic Compounds, and Changes the Total Antioxidant Capacity in the Red Callus of <i>Vitis davidii</i> Author(s): Lai, CC (Lai, Cheng-Chun); Pan, H (Pan, Hong); Zhang, J (Zhang, Jing); Wang, Q (Wang, Qi); Que, QX (Que, Qiu-Xia); Pan, R (Pan, Ruo); Lai, ZX (Lai, Zhong-Xiong); Lai, GT (Lai, Gong-Ti) Source: JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY Volume: 70 Issue: 41 Pages: 13264-13278 DOI: 10.1021/acs.jafc.2c04620 Early Access Date: OCT 2022 Published: OCT 19 2022 Record 2 of 5 Title: Advances in Fungal Elicitor-Triggered Plant Immunity

	Author(s): Guo, J (Guo, Jia); Cheng, YL (Cheng, Yulin) Source: INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES Volume: 23 Issue: 19 Article Number: 12003 DOI: 10.3390/ijms231912003 Published: OCT 2022 Record 3 of 5 Title: Abiotic Stresses Elicitation Potentiates the Productiveness of Cardoon Calli as Bio-Factories for Specialized Metabolites Production Author(s): D'Alessandro, R (D'Alessandro, Rosa); Docimo, T (Docimo, Teresa); Graziani, G (Graziani, Giulia); D'Amelia, V (D'Amelia, Vincenzo); De Palma, M (De Palma, Monica); Cappetta, E (Cappetta, Elisa); Tucci, M (Tucci, Marina) Source: ANTIOXIDANTS Volume: 11 Issue: 6 Article Number: 1041 DOI: 10.3390/antiox11061041 Published: JUN 2022 Record 4 of 5 Title: Response of Saponaria officinalis L. hairy roots to the application of TiO2 nanoparticles in terms of production of valuable polyphenolic compounds and SO6 protein Author(s): Hedayati, A (Hedayati, Ahad); Naseri, F (Naseri, Fatemeh); Nourozi, E (Nourozi, Elnaz); Hosseini, B (Hosseini, Bahman); Honari, H (Honari, Hossein); Hemmaty, S (Hemmaty, Syavash) Source: PLANT PHYSIOLOGY AND BIOCHEMISTRY Volume: 178 Pages: 80-92 DOI: 10.1016/j.plaphy.2022.03.001 Early Access Date: MAR 2022 Published: MAY 1 2022 Record 5 of 5 Title: Stilbenes: Characterization, bioactivity, encapsulation and structural modifications. A review of their current limitations and promising approaches Author(s): Navarro-Orcajada, S (Navarro-Orcajada, Silvia); Conesa, I (Conesa, Irene); Vidal-Sanchez, FJ (Vidal-Sanchez, Francisco Jose); Matencio, A (Matencio, Adrian); Albaladejo-Marico, L (Albaladejo-Marico, Lorena); Garcia-Carmona, F (Garcia-Carmona, Francisco); Lopez-Nicolas, JM (Lopez-Nicolas, Jose Manuel) Source: CRITICAL REVIEWS IN FOOD SCIENCE AND NUTRITION DOI: 10.1080/10408398.2022.2045558 Early Access Date: FEB 2022
OCA18. Charakteristika dopadu výstupu na spoločensko-hospodársku prax / Characteristics of the output's impact on socio-economic practice Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English	<i>In vitro</i> bunkovými kultúrami sa dajú získavať z viniča hroznorodého, ale aj iných druhov rastlín, sekundárne metabolity s rôznymi biologickými účinkami. V tomto prípade išlo o stilbény a ich syntéza bola zvýšená rôznymi biotickými a abiotickými elicitorami. Použitie je možné aj biotické elicitory (celulóza z <i>Trichoderma viride</i> a homogenát bunkovej steny z <i>Fusarium oxysporum</i> v tejto práci) a tiež bežnými syntetickými jasmonátmi. Rast buniek a obsahy fenolických zlúčenín trans-resveratrol, trans-piceid, δ-viniferín a ε-viniferín boli potvrdené v bunkách ošetrovaných jednotlivými elicitorami. Najvyššia akumulácia analyzovaných stilbénov, okrem trans-piceidu, bola pozorovaná po ošetrovaní homogenátom bunkovej steny z <i>F. oxysporum</i>. Maximálna produkcia trans-resveratrolu, δ- a ε-viniferínov bola indukovaná elicitáciou s celulázou z <i>T. viride</i>. Akumulácia trans-piceidu v bunkových kultúrach vyvolaná touto celulázou odhalila presne opačný účinok, s takmer trikrát vyššou produkciou trans-resveratrolu ako trans-piceid. Táto štúdia naznačila, že oba použité hubové elicitory môžu zvýšiť produkciu efektívnejšie ako bežne používané jasmonáty. <i>In vitro</i>, secondary metabolites with various biological effects, can be obtained from grapevine as well as other plant species. In this case, they were stilbenes and their synthesis was increased by various biotic and abiotic elicitors. It is also possible to use biotic elicitors (cellulase from <i>Trichoderma viride</i> and cell wall homogenate from <i>Fusarium oxysporum</i> in this work) as well as common synthetic jasmonates. Cell growth and the contents of the phenolic compounds trans-resveratrol, trans-piceid, δ-viniferin and ε-viniferin were confirmed in cells treated with individual elicitors. The highest accumulation of analyzed stilbenes, except trans-piceid, was observed after treatment with cell wall homogenate from <i>F. oxysporum</i>. Maximal production of trans-resveratrol, δ- and ε-viniferins was induced by elicitation with cellulose from <i>T. viride</i>. The accumulation of trans-piceid in cell cultures induced by this cellulase revealed the exact opposite effect, with almost three times higher production of trans-resveratrol than trans-piceid. This study suggested that both fungal elicitors used could increase production more efficiently than commonly used jasmonates.
OCA19. Charakteristika dopadu výstupu a súvisiacich aktivít na vzdelávací proces / Characteristics of the output and related activities' impact on the educational process Rozsah do 200 slov v slovenskom jazyku / Range up to 200 words in Slovak Rozsah do 200 slov v anglickom jazyku / Range up to 200 words in English	Výstup je orientovaný na rastlinné, potravinárske a medicínske biotechnológie a je viazaný na výučbu biotechnologických predmetov v rámci študijného programu Biotechnológie. Do vzdelávacieho procesu budú z tohto výstupu implementované poznatky, skúsenosti a výsledky z možností biotechnologického využitia biosyntetických dráh sekundárnych metabolitov vo vybraných rastlinných druhoch. The output is focused on plant, food and medical biotechnology and is linked to the teaching of biotechnology subjects within the study program Biotechnology. From this output, knowledge, experience and results from the possibilities of biotechnological use of biosynthetic pathways of secondary metabolites in selected plant species will be implemented into the educational process.