Кумар Адарш
Researcher
Research Laboratory "Biotechnology of Components Maintenance and Restoration of Natural and Transformed Biosystems"

Research interests

English language proficiency: Native speaker

Area of research: Environmental biotechnology for restoration of natural and technogenic disturbed environment

Research interests

Plant-Soil-Microbe interaction,

Solid and Hazardous Waste Management,

Sustainable Waste Management, Ecotoxicology,

Carbon Dynamics,

Health Hazard assessment
A graduate can perform the works in fully instrument-equipped laboratories of Microbiology, Molecular Genetics, Plant Physiology and Biochemistry. Possibility to visit for short-term research work with the Colorado State University USA, Jagiellonian University, Poland, IIT-ISM- India. Bhartiyar University, India, inner Mongolia University, China.
Supervisor's specific requirements to prospective PhD students:

Field of study: 06.06.01 Biological sciences

Communicative English

Skills in using academic literature databases

Knowledge of biotechnological and environmental equipment

Working experience with MS-EXCEL/statistical software

Basic knowledge of plant, soil and water contamination

Basic knowledge of preparing a draft of the manuscript for publication
Additional publications:

Tripti, Kumar, A., Maleva, M. *et al.* Nickel and copper accumulation strategies in *Odontarrhena obovata* growing on copper smelter-influenced and non-influenced serpentine soils: a comparative field study. *Environ Geochem Health* **43,** 1401–1413 (2021). https://doi.org/10.1007/s10653-020-00575-6

Jitendra Ahirwal, Sneha Kumari, Ashutosh Kumar Singh, Adarsh Kumar, Subodh Kumar Maiti, Changes in soil properties and carbon fluxes following afforestation and agriculture in tropical forest, Ecological Indicators, Volume 123, 2021, 107354, ISSN 1470-160X, https://doi.org/10.1016/j.ecolind.2021.107354

Adarsh Kumar, Tripti, Olga Voropaeva, Maria Maleva, Ksenia Panikovskaya, Galina Borisova, Mani Rajkumar, L. Benedict Bruno, Bioaugmentation with copper tolerant endophyte Pseudomonas lurida strain EOO26 for improved plant growth and copper phytoremediation by Helianthus annuus, Chemosphere, Volume 266, 2021, 128983, ISSN 0045-6535, https://doi.org/10.1016/j.chemosphere.2020.128983.

Kumar, A., Tripti, Maleva, M. *et al.* Toxic metal(loid)s contamination and potential human health risk assessment in the vicinity of century-old copper smelter, Karabash, Russia. *Environ Geochem Health* 42, 4113–4124 (2020). https://doi.org/10.1007/s10653-019-00414-3

Filimonova, E., Lukina, N., Glazyrina, M. *et al.* A comparative study of *Epipactis atrorubens* in two different forest communities of the Middle Urals, Russia. *J. For. Res.* 31, 2111–2120 (2020). https://doi.org/10.1007/s11676-019-01010-y

Qualifications

Unknown, PhD, Indian Institute of Technology (Indian School of Mines)
15 Jan 2015 → …

Research outputs

1. Kumar, A., Borisova, G., Maleva, M., Tripti, Shiryaev, G., Tugbaeva, A., Sobenin, A., & Kiseleva, I. (2022). Biofertilizer Based on Biochar and Metal-Tolerant Plant Growth Promoting Rhizobacteria Alleviates Copper Impact on Morphophysiological Traits in Brassica napus L. *Microorganisms*, *10*(11), [2164]. https://doi.org/10.3390/microorganisms10112164
2. Raj, D., Kumar, A., Tripti, & Maiti, S. K. (2022). Health Risk Assessment of Children Exposed to the Soil Containing Potentially Toxic Elements: A Case Study from Coal Mining Areas. *Metals*, *12*(11), [1795]. https://doi.org/10.3390/met12111795
3. Kumar, A., Tripti, Raj, D., Maiti, S. K., Maleva, M., & Borisova, G. (2022). Soil Pollution and Plant Efficiency Indices for Phytoremediation of Heavy Metal(loid)s: Two-Decade Study (2002–2021). *Metals*, *12*(8), [1330]. https://doi.org/10.3390/met12081330
4. Bhagat, S. K., Tiyasha, T., Kumar, A., Malik, T., Jawad, A. H., Khedher, K. M., Deo, R. C., & Yaseen, Z. M. (2022). Integrative artificial intelligence models for Australian coastal sediment lead prediction: An investigation of in-situ measurements and meteorological parameters effects. *Journal of Environmental Management*, *309*, [114711]. https://doi.org/10.1016/j.jenvman.2022.114711
5. Tripti, Kumar, A., Kumar, V., Anshumali, Bruno, L. B., & Rajkumar, M. (2022). Synergism of Industrial and Agricultural Waste as a Suitable Carrier Material for Developing Potential Biofertilizer for Sustainable Agricultural Production of Eggplant. *Horticulturae*, *8*(5), [444]. https://doi.org/10.3390/horticulturae8050444
6. Tripti, Kumar, A., Maleva, M., Borisova, G., Kiseleva, I., & Rajkumar, M. (2022). Effect of biochar on the growth of Ricinus communis grown on copper smelter slag: A pot scale study. In V. Bakulev, E. Kovaleva, T. Glukhareva, T. Beryozkina, Y. Schafran, P. Lyubyakina, & O. Koptyaeva (Eds.), *Actual Problems of Organic Chemistry and Biotechnology, OCBT 2020: Proceedings of the International Scientific Conference* [030094] (AIP Conference Proceedings; Vol. 2390). American Institute of Physics Inc.. https://doi.org/10.1063/5.0069735
7. Vishnupradeep, R., Bruno, L. B., Taj, Z., Karthik, C., Challabathula, D., Tripti, Kumar, A., Freitas, H., & Rajkumar, M. (2022). Plant growth promoting bacteria improve growth and phytostabilization potential of Zea mays under chromium and drought stress by altering photosynthetic and antioxidant responses. *Environmental Technology and Innovation*, *25*, [102154]. https://doi.org/10.1016/j.eti.2021.102154
8. Tripti, Kumar, A., Darkazanli, M., Maleva, M., Rajkumar, M., & Bruno, L. B. (2021). Metal and drought tolerant biochar based biofertilizer for enhanced growth of Raphanus sativus. In G. V. Zyryanov, S. Santra, & O. S. Taniya (Eds.), *Modern Synthetic Methodologies for Creating Drugs and Functional Materials, MOSM 2020: Proceedings of the IV International Conference* [020036] (AIP Conference Proceedings; Vol. 2388). American Institute of Physics Inc.. https://doi.org/10.1063/5.0069290
9. Kumar, A., Tripti, Maleva, M., Bruno, L. B., & Rajkumar, M. (2021). Synergistic effect of ACC deaminase producing Pseudomonas sp. TR15a and siderophore producing Bacillus aerophilus TR15c for enhanced growth and copper accumulation in Helianthus annuus L. *Chemosphere*, *276*, [130038]. https://doi.org/10.1016/j.chemosphere.2021.130038
10. Bruno, L. B., Anbuganesan, V., Karthik, C., Tripti, Kumar, A., Banu, J. R., Freitas, H., & Rajkumar, M. (2021). Enhanced phytoextraction of multi-metal contaminated soils under increased atmospheric temperature by bioaugmentation with plant growth promoting Bacillus cereus. *Journal of Environmental Management*, *289*, [112553]. https://doi.org/10.1016/j.jenvman.2021.112553
11. Ahirwal, J., Kumari, S., Singh, A. K., Kumar, A., & Maiti, S. K. (2021). Changes in soil properties and carbon fluxes following afforestation and agriculture in tropical forest. *Ecological Indicators*, *123*, [107354]. https://doi.org/10.1016/j.ecolind.2021.107354
12. Tripti, Kumar, A., Maleva, M., Borisova, G., Chukina, N., Morozova, M., & Kiseleva, I. (2021). Nickel and copper accumulation strategies in Odontarrhena obovata growing on copper smelter-influenced and non-influenced serpentine soils: a comparative field study. *Environmental Geochemistry and Health*, *43*(4), 1401-1413. https://doi.org/10.1007/s10653-020-00575-6
13. Kumar, A., Tripti, Voropaeva, O., Maleva, M., Panikovskaya, K., Borisova, G., Rajkumar, M., & Bruno, L. B. (2021). Bioaugmentation with copper tolerant endophyte Pseudomonas lurida strain EOO26 for improved plant growth and copper phytoremediation by Helianthus annuus. *Chemosphere*, *266*, [128983]. https://doi.org/10.1016/j.chemosphere.2020.128983
14. Filimonova, E., Lukina, N., Glazyrina, M., Borisova, G., Tripti, Kumar, A., & Maleva, M. (2020). A comparative study of Epipactis atrorubens in two different forest communities of the Middle Urals, Russia. *Journal of Forestry Research*, *31*(6), 2111-2120. https://doi.org/10.1007/s11676-019-01010-y

15. Kumar, A., Tripti, T., Maleva, M., Kiseleva, I., Maiti, S. K., & Morozova, M. (2020). Toxic metal(loid)s contamination and potential human health risk assessment in the vicinity of century-old copper smelter, Karabash, Russia. *Environmental Geochemistry and Health*, *42*(12), 4113-4124. https://doi.org/10.1007/s10653-019-00414-3

16. Ahirwal, J., Kumar, A., & Maiti, S. K. (2020). Effect of fast-growing trees on soil properties and carbon storage in an afforested coal mine land (India). *Minerals*, *10*(10), 1-15. [840]. https://doi.org/10.3390/min10100840

17. Raj, D., Kumar, A., & Maiti, S. K. (2020). Brassica juncea (L.) Czern. (Indian mustard): a putative plant species to facilitate the phytoremediation of mercury contaminated soils. *International Journal of Phytoremediation*, *22*(7), 733-744. https://doi.org/10.1080/15226514.2019.1708861

18. Raj, D., Kumar, A., & Maiti, S. K. (2020). Mercury remediation potential of Brassica juncea (L.) Czern. for clean-up of flyash contaminated sites. *Chemosphere*, *248*, [125857]. https://doi.org/10.1016/j.chemosphere.2020.125857

19. Kumar, A., & Maiti, S. K. (2019). Phytoremediation of chromite-asbestos mine waste using aromatic grasses and organic manures. *Journal of Biotechnology*, *305*, S67-S67. https://doi.org/10.1016/j.jbiotec.2019.05.236

20. Tripti, Kumar, A., Kumar, V., & Singh, A. (2019). Plant growth promoting attributes of Burkholderia sp. sustained under multiple pesticide stress. *Journal of Biotechnology*, *305*, S49-S50. https://doi.org/10.1016/j.jbiotec.2019.05.176

21. Raj, D., Kumar, A., & Maiti, S. K. (2019). Evaluation of toxic metal(loid)s concentration in soils around an open-cast coal mine (Eastern India). *Environmental Earth Sciences*, *78*(22), [645]. https://doi.org/10.1007/s12665-019-8657-6

22. Maleva, M. G., Borisova, G. G., Shiryaev, G. I., Kumar, A., & Morozova, M. V. (2019). Adaptive potential of Typha latifolia L. under extreme technogenic pollution. In S. Santra, G. V. Zyryanov, & L. K. Sadieva (Eds.), *Modern Synthetic Methodologies for Creating Drugs and Functional Materials, MOSM 2018: Proceedings of the II International* (Vol. 2063). [030013] (AIP Conference Proceedings; Vol. 2063). American Institute of Physics Inc.. https://doi.org/10.1063/1.5087321

23. Kumar, A., Maleva, M., Kiseleva, I., & Tripti, T. (2019). Chromium tolerant plant growth promoting rhizobacteria from the rhizosphere of Trifolium pratense and Melilotus albus. In S. Santra, G. V. Zyryanov, & L. K. Sadieva (Eds.), *Modern Synthetic Methodologies for Creating Drugs and Functional Materials, MOSM 2018: Proceedings of the II International* (Vol. 2063). [040061] (AIP Conference Proceedings; Vol. 2063). American Institute of Physics Inc.. https://doi.org/10.1063/1.5087393

24. Kumar, A., Usmani, Z., Ahirwal, J., Tripti, T., & Rani, P. (2019). Phytomanagement of Chromium Contaminated Brown Fields. In VC. Pandey, & K. Bauddh (Eds.), *PHYTOMANAGEMENT OF POLLUTED SITES: MARKET OPPORTUNITIES IN SUSTAINABLE PHYTOREMEDIATION* (pp. 447-469). Elsevier. https://doi.org/10.1016/B978-0-12-813912-7.00018-1

25. Usmani, Z., Kumar, A., Tripti, Ahirwal, J., & Prasad, M. N. V. (2018). Scope for Applying Transgenic Plant Technology for Remediation and Fortification of Selenium. In *Transgenic Plant Technology for Remediation of Toxic Metals and Metalloids* (pp. 429-461). Elsevier BV. https://doi.org/10.1016/B978-0-12-814389-6.00020-1

26. Kumar, A., & Tripti, T. (2018). High ACC deaminase producing copper and nickel tolerant rhizobacteria enhances metal tolerance and seedling growth of Indian mustard plant. *New Biotechnology*, *44*, S90-S90. https://doi.org/10.1016/j.nbt.2018.05.944

27. Ahirwal, J., Kumar, A., Pietrzykowski, M., & Maiti, S. K. (2018). Reclamation of coal mine spoil and its effect on Technosol quality and carbon sequestration: a case study from India. *Environmental Science and Pollution Research*, *25*(28), 27992-28003. https://doi.org/10.1007/s11356-018-2789-1

28. Maleva, M., Borisova, G., Chukina, N., & Kumar, A. (2018). Urea increased nickel and copper accumulation in the leaves of Egeria densa (Planch.) Casp. and Ceratophyllum demersum L. during short-term exposure. *Ecotoxicology and Environmental Safety*, *148*, 152-159. https://doi.org/10.1016/j.ecoenv.2017.10.012

29. Kumar, A., Tripti, Prasad, M. N. V., Maiti, S. K., & Favas, P. J. C. (2018). Mycoremediation for Mine Site Rehabilitation. In *Bio-Geotechnologies for Mine Site Rehabilitation* (pp. 233-260). Elsevier BV. https://doi.org/10.1016/B978-0-12-812986-9.00014-2

30. Rani, P., Kumar, A., Arya, R. C., & Tripti, T. (2018). Ricinus communis and Calotropis procera As Putative Plant Species for the Phytostabilization of Tannery Contaminated Soil: A Dynamic Approach. In AS. Tretyakova, & DV. Veselkin (Eds.), *FOURTH INTERNATIONAL SCIENTIFIC CONFERENCE ECOLOGY AND GEOGRAPHY OF PLANTS AND PLANT COMMUNITIES* (pp. 10-18). (KnE Life Sciences). Knowledge E. https://doi.org/10.18502/kls.v4i7.3214

31. Mukhopadhyay, S., Rana, V., Kumar, A., & Maiti, S. K. (2017). Biodiversity variability and metal accumulation strategies in plants spontaneously inhibiting fly ash lagoon, India. *Environmental Science and Pollution Research*, *24*(29), 22990-23005. https://doi.org/10.1007/s11356-017-9930-4

32. Kumar, A., Maiti, S. K., Prasad, M. N. V., Singh, R. S., & Tripti, T. (2017). Grasses and legumes facilitate phytoremediation of metalliferous soils in the vicinity of an abandoned chromite-asbestos mine. *Journal of Soils and Sediments*, *17*(5), 1358-1368. https://doi.org/10.1007/s11368-015-1323-z

33. Rani, P., Kumar, A., & Arya, R. C. (2017). Stabilization of tannery sludge amended soil using Ricinus communis, Brassica juncea and Nerium oleander. *Journal of Soils and Sediments*, *17*(5), 1449-1458. https://doi.org/10.1007/s11368-016-1466-6

34. Kumar, A., Usmani, Z., Kumar, V., Anshumali, & Tripti (2017). Biochar and flyash inoculated with plant growth promoting rhizobacteria act as potential biofertilizer for luxuriant growth and yield of tomato plant. *Journal of Environmental Management*, *190*, 20-27. https://doi.org/10.1016/j.jenvman.2016.11.060

35. Borisova, G., Chukina, N., Maleva, M., Kumar, A., & Prasad, M. N. V. (2016). Thiols as biomarkers of heavy metal tolerance in the aquatic macrophytes of Middle Urals, Russia. *International Journal of Phytoremediation*, *18*(10), 1037-1045. https://doi.org/10.1080/15226514.2016.1183572

36. Maleva, M., Borisova, G., Chukina, N., Adarsh , K., & Prasad, M. N. V. (2016). High dose of urea enhances the nickel and copper toxicity in Brazilian elodea (Egeria densa Planch. Casp.). *Revista Brasileira de Botanica*, *39*(3), 965-972. https://doi.org/10.1007/s40415-016-0290-y

37. Tripti, T., & Kumar, A. (2016). Development of biochar and flyash based bioformulations using pesticide tolerant PGPRs and its effects on Lycopersicon esculentum Mill. *New Biotechnology*, *33*, S196-S196. https://doi.org/10.1016/j.nbt.2016.06.1398

38. Oshtrakh, M. I., Alenkina, I. V., Vinogradov, A. V., Kumar, A., Berkovsky, A. L., Zakharova, A. P., Konstantinova, T. S., Novikov, E. G., & Semionkin, V. A. (2016). The Fe-57 hyperfine interactions in the life sciences: application of Mossbauer spectroscopy with a high velocity resolution in the study of iron-containing biomolecules and pharmaceutical compounds. *Journal of Radioanalytical and Nuclear Chemistry*, *309*(1), 317-332. https://doi.org/10.1007/s10967-016-4769-6

39. Kumar, A., Prasad, M. N. V., Maiti, S. K., & Tripti, T. (2016). Asbestos: Resource Recovery and Its Waste Management. In *Environmental Materials and Waste: Resource Recovery and Pollution Prevention* (pp. 285-305). Elsevier Inc.. https://doi.org/10.1016/B978-0-12-803837-6.00013-5

40. Maiti, S. K., Kumar, A., & Ahirwal, J. (2016). Bioaccumulation of metals in timber and edible fruit trees growing on reclaimed coal mine overburden dumps. *International Journal of Mining, Reclamation and Environment*, *30*(3), 231-244. https://doi.org/10.1080/17480930.2015.1038864

41. Banerjee, S., Adarsh, K., Maiti, S. K., & Chowdhury, A. (2016). Seasonal variation in heavy metal contaminations in water and sediments of Jamshedpur stretch of Subarnarekha river, India. *Environmental Earth Sciences*, *75*(3), 1-12. [265]. https://doi.org/10.1007/s12665-015-4990-6

42. Kumar, A., Prasad, M. N. V., Tripti, & Maiti, S. K. (2016). Asbestos: Resource Recovery and Its Waste Management: chapter in book. In *ENVIRONMENTAL MATERIALS AND WASTE: RESOURCE RECOVERY AND POLLUTION PREVENTION: monograph* (pp. 285-305). Elsevier Inc..

43. Maiti, S. K., Kumar, A., Ahirwal, J., & Das, R. (2016). Comparative study on bioaccumulation and translocation of metals in Bermuda grass (Cynodon Dactylon) naturally growing on fly ash lagoon and topsoil. *Applied ecology and environmental research*, *14*(1), 1-12. https://doi.org/10.15666/aeer/1401_001012

44. Tripti, T., Adarsh, K., Kumar, V., & Anshumali (2015). Effect of commercial pesticides on plant growth-promoting activities of Burkholderia sp strain L2 isolated from rhizosphere of Lycopersicon esculentum cultivated in agricultural soil. *Toxicological and Environmental Chemistry*, *97*(9), 1180-1189. https://doi.org/10.1080/02772248.2015.1093632

45. Kumar, A., Zakharova, A. P., Alenkina, I. V., Oshtrakh, M. I., & Semionkin, V. A. (2015). An analysis of the features of the Mössbauer spectra of soybean leghemoglobin a in oxyand deoxy-forms in relation to protein structure. *Bulletin of the Russian Academy of Sciences: Physics*, *79*(8), 1041-1045. https://doi.org/10.3103/S1062873815080171

46. Kumar, A., Alenkina, I. V., Oshtrakh, M. I., Zakharova, A. P., & Semionkin, V. A. (2015). Mossbauer spectroscopy of some tetrameric and monomeric hemoglobins. *European biophysics journal with biophysics letters*, *44*, S58-S58.

47. Kumar, A., Alenkina, I. V., Zakharova, A. P., Oshtrakh, M. I., & Semionkin, V. A. (2015). Hyperfine interactions in soybean and lupin oxy-leghemoglobins studied using Mossbauer spectroscopy with a high velocity resolution. *Hyperfine Interactions*, *230*(1-3), 131-139. https://doi.org/10.1007/s10751-015-1132-1

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49. Oshtrakh, M. I., Kumar, A., Alenkina, I. V., Zakharova, A. P., Semionkin, V. A., & Kundu, S. (2014). Characterization of monomeric soybean leghemoglobin using Mossbauer spectroscopy with a high velocity resolution. *Hyperfine Interactions*, *226*(1-3), 431-438. https://doi.org/10.1007/s10751-013-1001-8

50. Ievlev, A. V., Jesse, S., Morozovska, A. N., Strelcov, E., Eliseev, E. A., Pershin, Y. V., Kumar, A., Shur, V. Y., & Kalinin, S. V. (2014). Intermittency, quasiperiodicity and chaos in probe-induced ferroelectric domain switching. *Nature Physics*, *10*(1), 59-66. https://doi.org/10.1038/NPHYS2796

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Projects

Биотехнологии поддержания и восстановления компонентов природных и трансформированных биосистем
Киселева, И. С., Дарказанли, К., Чукина, Н. В., Жуйкова, Е. В., Зимницкая, С. А., Кутлунина, Н. А., Малева, М. Г., Пауков, А. Г., Синенко, О. С., Тептина, А. Ю., Фирсов, Н. Н., Борисова, Г. Г., Ермошин, А. А., Адарш, К., Трипти, Т., Маджети, Н. В., Борзенкова, Р. А., Соколова, Е. И., Минин, А. А., Улитко, М. В., Дарказанли, М., Комотина, Е. С., Галишев, Б. А. & Лавренчук, Л. С.
09/12/2013 → …

Использование гидролизованных лигноцеллюлозных остатков для получения биочара и его применение с целью уменьшения содержания металлов в сырье для получения биоэтанола и для бактериальной фитостабилизации загрязненных тяжелыми металлами территорий
Адарш, К.
29/07/2021 → 30/06/2023

Создание и развитие Центра фундаментальной биотехнологии и биоинженерии
Киселева, И. С., Шур, В. Я., Нсенгиюмва, Д. С., Москович, Е. А., Галишев, Б. А., Колесникова, Т. О., Забегалов, К. С., Хацко, С. Л., Япаров, Б. Я., Юманова, И. Ф., Чумарная, Т. В., Хенди, А. С. А., Ушенин, К. С., Таширова, Е. Е., Солодушкин, С. И., Рывкин, А. М., Правдин, С. Ф., Балакина-Викулова, Н. А., Улитко, М. В., Адарш, К., Трипти, Т., Тептина, А. Ю., Пауков, А. Г., Малева, М. Г., Ермошин, А. А., Дарказанли, М., Борисова, Г. Г., Мухачева, Т. А., Кошелев, А. А., Кацнельсон, Л. Б., Курсанов, А. Г., Зверев, В. С., Хохлова, А. Д., Незлобинский, Т. В., Бажутина, А. Е., Корабельникова, С. В., Воропаева, О. В., Тугбаева, А. С., Ковалев, С. Ю., Соловьева, О. Э., Турыгин, А. П., Макаев, А. В., Чувакова, М. А., Кособоков, М. С., Карпов, В. Р., Зубарев, И. В., Есин, А. А., Ахматханов, А. Р., Шишкина, Е. В., Кузнецов, Д. К., Мингалиев, Е. А., Бессонова, Т. А., Лукин, О. Н., Волжанинов, Д. А., Слаутина, А. С., Линкер, Э. А., Лисьих, Б. И., Волчецкая, К. В., Мячина, Т. А., Бутова, К. А., Синенко, О. С., Вершинин, В. Л., Синица, М. В. & Погодина, Н. В.
12/11/2016 → …

Фундаментальные подходы к разработке биопрепарата на основе биочара и ризобактерий и его влияние на рост и продуктивность сельскохозяйственных культур в загрязненных тяжелыми металлами аридных/полуаридных регионах Индии и России
Трипти, Т., Синенко, О. С., Малева, М. Г., Воропаева, О. В., Борисова, Г. Г., Адарш, К., Паниковская, К. А. & Дарказанли, М.
08/10/2019 → 10/09/2021

Press/Media

16 проектов под руководством молодых ученых получили гранты РНФ
Алексей Сергеевич Волегов, Данил Александрович Прищенко, Андрей Ришатович Ахматханов, Дмитрий Дарисович Салимгареев, Александр Сергеевич Палкин, Любовь Валерьевна Торопова, Кирилл Михайлович Зейде , Екатерина Александровна Титова, Виктория Игоревна Пряхина, Валерий Олегович Филимонов, Юлия Сергеевна Петрова, Рамиль Фаатович Фатыхов, Кирилл Валентинович Гржегоржевский, Кумар Адарш, Татьяна Анатольевна Косых, Кирилл Евгеньевич Болотин & Федор Валерьевич Водолазский
06/07/2021
1 Media contribution

Ural Federal University Scientists - 'Bacteria Can Help Plants Remove Copper From Soil'
Adarsh Kumar, Tripti Tripti, Oiga Voropaeva, Maria Maleva, Ксения Александровна Паниковская & Galina Borisova
14/12/2020
1 Media contribution

UrFU Biologists Developed a Biofertilizer That Enhances Plant Durability
Irina Kiseleva & Adarsh Kumar
10/02/2020
1 Media contribution

Бактерии способны помочь растениям в очистке почв от меди
Трипти Трипти, Кумар Адарш, Ольга Викторовна Воропаева, Мария Георгиевна Малева, Ксения Александровна Паниковская & Галина Григорьевна Борисова
14/12/2020

1 Media contribution

Бактерии, найденные в клеверах рядом с медным комбинатом на Урале, помогут очистить почву
Кумар Адарш
13/08/2020
1 Media contribution

Биологи создали биоудобрение, улучшающее рост и стойкость растений
Ирина Сергеевна Киселева & Кумар Адарш
10/02/2020
1 Media contribution