Contribution ID: **1289** Type: **Poster**

Accumulation and translocation of copper, gold and silver nanoparticles (PVP-coated) in Calendula officinalis segments under root irrigation conditions

Monday 30 October 2023 21:45 (15 minutes)

The problem of the release of metal nanoparticles into the environment is becoming very relevant. Increasing production and consumption of nanomaterials leads to pollution of aquatic and terrestrial ecosystems, creating human health and safety risks. *Calendula officinalis* plants, which are valuable plant raw materials for medicine and pharmaceutics, were chosen as the object of research. The features of silver, gold and copper nanoparticles translocation and accumulation in the segments of *Calendula officinalis* under root irrigation conditions were investigated. During a 28-day experiment, plants were exposed to metal nanoparticles in a concentration range from 1 to 100 mg/L. The proton-induced x-ray emission (PIXE) method was used to determine the gold and silver content in plant and soil samples, while ICP-OES was used to determine copper content. Using transmission electron microscopy, the size and shape of nanoparticles were determined.

The content of gold after exposure to nanoparticles with the size of 1–5 nm increased proportionally with increasing concentrations of AuNPs solutions in all plant segments and soil. The content of silver (size of nanoparticles 4-5 nm) in roots, stems, leaves, flowers and soil was depended on the concentration of the nanoparticles in solutions. The maximum content was determined in the soil and aerial parts of plants when a solution of 100 mg/L was used. Copper nanoparticles with the size 15-70 nm were mainly accumulated in the soil. However, a fivefold increase of copper content in flowers and root systems compared to the control was observed.

The results of this study indicate the uptake of gold, silver and copper nanoparticles in plants under conditions of root exposure and present big interest for plant nanotoxicological studies.

Primary author: Ms PESHKOVA, Alexandra (Joint Institute for Nuclear Research, 6 Joliot-Curie Str., 141980, Dubna, Russia; Doctoral School Biological, Geonomic, Chemical and Technological Science, State University of Moldova, 60 Alexei Mateevici Str., MD-2009, Chisinau, Moldova)

Co-authors: Dr ZINICOVSCAIA, Inga (Joint Institute for Nuclear Research, 6 Joliot-Curie Str., 141980, Dubna, Russia;Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering, 30 Reactorului Str, 077125 Măgurele, Ilfov, Romania; Institute of Chemistry, 3, Academiei Str, MD-2028 Chisinau, Republic of Moldova); Dr CEPOI, Liliana (Institute of Microbiology and Biotechnology, Technical University of Moldova, 1 Academiei str., Chisinau, MD-2028, Republic of Moldova); Dr RUDI, Ludmila (Institute of Microbiology and Biotechnology, Technical University of Moldova, 1 Academiei str., Chisinau, MD-2028, Republic of Moldova); Dr YUSHIN, Nikita (Joint Institute for Nuclear Research, 6 Joliot-Curie Str., 141980, Dubna, Russia; Doctoral School Biological, Geonomic, Chemical and Technological Science, State University of Moldova, 60 Alexei Mateevici Str., MD-2009, Chisinau, Moldova); Dr CHIRIAC, Tatiana (Institute of Microbiology and Biotechnology, Technical University of Moldova, 1 Academiei str., Chisinau, MD-2028, Republic of Moldova)

Presenter: Ms PESHKOVA, Alexandra (Joint Institute for Nuclear Research, 6 Joliot-Curie Str., 141980, Dubna, Russia; Doctoral School Biological, Geonomic, Chemical and Technological Science, State University of Moldova, 60 Alexei Mateevici Str., MD-2009, Chisinau, Moldova)

Session Classification: In-person poster session & welcome drinks

Track Classification: Life Science