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Dr. Vesna Kandić
Milena Šenk, MSc
Marko Mladenović, MSc

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03 - 06 Poster

INFLUENCE OF ORANGE CARBON DOTS ON ANTIOXIDATIVE ACTIVITY IN MAIZE

Ivana Milenković[1*], Yiqun Zhou[2], Sladjana Z. Spasić[1,3], Roger Leblanc[2], Ksenija Radotić[1]

[1] University of Belgrade, Institute for Multidisciplinary Research, Department of Life Sciences, Kneza Višeslava 1, Belgrade, Serbia
[2] University of Miami, Department of Chemistry, Coral Gables, FL 33124, Florida, USA
[3] Singidunum University, Danijelova 32, 11010 Belgrade, Serbia

*Corresponding author e-mail address: ivana.milenkovic@imsi.rs

Carbon dots (CDs) are spherical organic nanoparticles with a huge potential for the application in various biomedical purposes such as sensing, bioimaging, and drug delivery, as well as in water remediation. The discovery of CDs was very popular in the 21th century because they can be used where metal nanoparticles cannot be applied, so they are considered as their green alternative. The main advantages of these nanoparticles are their ease of preparation, solubility in water, high photoluminescence, and biocompatibility. Having all these properties in mind, the main aim of this research was to investigate the effect of orange carbon dots (oCDs), synthesized from citric acid and o-phenylenediamine as precursors, on total antioxidative activity (TAA) in maize as a model plant and agricultural species. We tested antioxidative activity as an indicator of oxidative stress and metabolic disorder in plants. TAA mainly includes the contribution of different non-enzymatic components with antioxidant capacity (vitamins, phenolic acids, sugars, etc.). The maize plants were exposed to three different concentrations (1, 5, and 10 mg L^{-1}) of oCDs nanoparticles via KNOP/2 hydroponic solution during the growth under 16 h/8 h photoperiod. After the 2 week-growth, the leaves and roots of plants were separately harvested and collected. The results showed that oCDs did not induce any change in TAA in the leaves, but increased TAA in roots after the treatment of plants with 5 and 10 mg L^{-1} oCDs. It can be concluded that plant treatment with oCDs' concentrations $\geq$ 5 mg L^{-1} leads to the increase of oxidative stress in roots as a plant organ more exposed to the nanoparticles. This research opens new possibilities in the uses of oCDs in agricultural applications.

Key words: *total antioxidative activity; carbon dots; maize, nanoparticles, oxidative stress.*