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BOOK OF ABSTRACTS

*XII International Scientific
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EFFECT OF ORANGE CARBON DOTS ON PHOTOSYNTHETIC PARAMETERS IN MAIZE

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Abstract

Plant nanobionics studies nanoparticles application to plants, which improves certain plant functions. Due to many limitations, plants use less photosynthetic capacity than it is theoretically possible, so an increase in leaf photosynthesis can be important for increasing crop yield. For this purpose, carbon dots (CDs) as organic, non-toxic nanoparticles with a huge potential for application can be used. They are a green alternative to metal nanoparticles. The main advantages of these nanoparticles are their easy preparation, high water solubility, biocompatibility, and photoluminescence. The main aim of this research was to investigate the effect of orange carbon dots (o-CDs), synthesized from citric acid and o-phenylenediamine as precursors, on photosynthetic efficiency increase in maize (*Zea mays* L.), as a model plant and agricultural species. We applied o-CDs in three different concentrations (1, 5, and 10 mg/L) by adding to the hydroponic growth solution or foliarly. The photosynthesis parameters (photosynthetic rate, transpiration rate, water use efficiency) and content of photosynthetic pigments (chlorophylla and b, carotenoids) were recorded. The results showed that the photosynthetic parameters' values were higher for foliar than for solution application. Amount of 1 mg/L o-CDs applied foliarly and 5 mg/L in solution increased photosynthetic parameters in leaves. The photosynthetic pigments were enhanced after o-CDs treatments. Finding that o-CDs have photosynthesis enhancing potential without harming plants opens new opportunities in their use in agricultural applications, such as increasing plant productivity.

Keywords: *carbon dots, maize, nanoparticles, photosynthesis, photosynthetic pigments.*