عنوان مقاله:

Titanium dioxide nanoparticles uptake by aquatic plant Spirodela polyrrhiza and its effect onsome of physiological indices

محل انتشار:

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نویسندگان:

M Abedi - *Department of Plant Biology, Tabriz University, Tabriz, Iran*

A Movafeghi - *Department of Applied Chemistry, Tabriz University, Tabriz, Iran*

A.R Khataee - *cDepartment of Horticultural Science, Tabriz University, Tabriz, Iran*

F Vafaei

خلاصه مقاله:

TiO2 nanoparticles (NPs) are one of the most produced nanoparticles in the world. In this work, the toxicityof TiO2 nanoparticles on the aquatic plant species Spirodela polyrrhiza was studied, because of significant entrance ofthese nanoparticles into the environment, especially aquatic ecosystems. Characteristics of used TiO2 nanoparticles weredetermined by using x-ray diffraction and Brunauer–Emmett–Teller (BET) method. According to the previous reports,nanomaterials induce oxidative stress and cause producing reactive oxygen species (ROS). In the present study, some ofantioxidant enzymes, as well as, relative frond number (RFN) and photosynthesis pigments as physiological indices, wereassessed to explore the effects of TiO2 nanoparticles on S. polyrrhiza. Entrance of nanoparticles to plant was recognizedusing fluorescent microscopic images from plant roots. RFN, photosynthesis pigments content and the activity ofperoxidase was decreased after treatment of nanoparticles, however superoxide dismutase activity was increased andcatalase activity did not have significant difference with control plants. Enhance of superoxide dismutase activity couldbe explained as promoting antioxidant system to scavaiging the ROS. Reduced peroxidase activity could be attributed tothe either direct effect of these particles on the molecular structure of this enzyme or plant defense system damage dueROS.

کلمات کلیدی:

Nanomaterials, Titanium dioxide nanoparticles, Spirodela polyrrhiza, Antioxidant enzymes, Reactiveoxygen species