

## EDTA Assisted Phytoremediation of Cadmium by Enhancing Growth and Antioxidant Defense System in Brassica napus L.

**Authors :** Mujahid Farid, Shafaqat Ali, Muhammad Bilal Shakoor

**Abstract :** Heavy metals pollution of soil is a prevalent global problem and oilseed rape (*Brassica napus* L.) are considered useful for the restoration of metal contaminated soils. Phytoextraction is an in-situ environment-friendly technique for the clean-up of contaminated soils. Response to cadmium (Cd) toxicity in combination with a chelator, Ethylenediaminetetraacetic acid (EDTA) was studied in oilseed rape grown hydroponically in greenhouse conditions under three levels of Cd (0, 10, and 50  $\mu$ M) and two levels of EDTA (0 and 2.5 mM). Cd decreased plant growth, biomass and chlorophyll concentrations while the application of EDTA enhanced plant growth by reducing Cd-induced effects in Cd-stressed plants. Significant decrease in photosynthetic parameters was found by the Cd alone. Addition of EDTA improved the net photosynthetic and gas exchange capacity of plants under Cd stress. Cd at 10 and 50  $\mu$ M significantly increased electrolyte leakage, the production of hydrogen peroxidase (H<sub>2</sub>O<sub>2</sub>) and malondialdehyde (MDA) and a significant reduction was observed in the activities of catalase (CAT), guaiacol peroxidase (POD), ascorbate peroxidase (APX), and superoxide dismutase under Cd stress plants. Application of EDTA at the rate of 2.5 mM alone and with combination of Cd increased the antioxidant enzymes activities and reduced the electrolyte leakage and production of H<sub>2</sub>O<sub>2</sub> and MDA. Oilseed rape (*Brassica napus* L.) actively accumulated Cd in roots, stems and leaves and the addition of EDTA boosted the uptake and accumulation of Cd in oil seed rape by dissociating Cd in culture media. The present results suggest that under 8 weeks Cd-induced stress, application of EDTA significantly improve plant growth, chlorophyll content, photosynthetic, gas exchange capacity, improving enzymes activities and increased the metal uptake in roots, stems and leaves of oilseed rape (*Brassica napus* L.) respectively.

**Keywords :** antioxidant enzymes, cadmium, chelator, EDTA, growth, oilseed rape

**Conference Title :** ICBB 2015 : International Conference on Bioinformatics and Biomedicine

**Conference Location :** Istanbul, Türkiye

**Conference Dates :** May 21-22, 2015