

Growth of Nitella in Response to Cesium Exposure: Implication for Phytoremediation

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Abstract : Cesium (Cs) induced growth and stress response of Nitella were studied after exposure to four concentration of the metal; i.e. 0 (control), 0.001, 0.01, and 0.1 ppm Cs in growth media. Each treatment with three replicates were randomly allocated to 12 glass beakers in a complete randomize design and the experiment was continued for 30 days. At the end of the experiment, shoot length, cesium content, total chlorophyll, and plant stress response were compared. Anti-oxidant enzyme activities (peroxidase, catalase, and ascorbic peroxidase) and the concentration of H₂O₂ were measured to check plant stress. The longest shoot was found in control treatment (0 ppm Cs) and the shoot length of plants exposed to 0.001 ppm was statistically similar to that of control. Concentration of cesium in plants grown at 0.001, 0.01, and 0.1 ppm were significantly higher than those in control treatments. The antioxidant enzymes activities of plants exposed to cesium were significantly higher than those grown without any Cs (control). An elevated level of H₂O₂ concentration was also observed in former groups of plants. Further, the reduction in chlorophyll concentration and chlorophyll fluorescence in response to cesium exposure indicated the chronically damaged photosynthetic efficiency in cesium stressed Nitella.

Keywords : antioxidant enzymes, cesium, growth, Nitella, oxidative stress

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