Environmental Engineering and Management Journal *March 2012, Vol.11, No. 3, Supplement, S145*
http://omicron.ch.tuiasi.ro/EEMJ/

"Gheorghe Asachi" Technical University of Iasi, Romania

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BIOLOGICAL INDICATORS TO COPPER MEDIATED STRESS IN *Aspergillus flavus*

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Abstract

Fungi could be studied as model organisms for stress response and metal adaptation for both biotechnological and environmental purposes. The aim of this work was to evaluate the role of copper in oxidative stress for *Aspergillus flavus*, this brown rot fungus was used in an earlier study for its ability to degrade dyes in a textile waste water effluent. Gamma radiation was used to test the fungal stress sensitivity and was therefore used as a positive stress inducer. Copper sulfate was added in two concentrations, and some oxidative biomarkers were assessed as the antioxidative defence system to both copper and gamma radiation. The increase in stress resulted in superoxide dismutase induction and an increase in lipid peroxidation and protein carbonylation, on the other hand, catalase was inhibited by the addition of copper but increased upon exposure to gamma radiation. Both glutathione and glutathione peroxidase showed an inhibition in the presence of copper. Laccase was induced only with the addition of 10 mM copper and inhibited otherwise, while carotenoids were inhibited by all stress types. There was an increase in total endogenous carbohydrates, trehalose, being the tested sugar, showed a remarkable increase with stress. The addition of copper inhibited both growth and conidiospore formation of *A. flavus* at 100 mM copper. The main location of copper at the end of the incubation period seemed to reside in the cytosolic fraction of the fungus as detected by atomic absorption spectrometry. Oxidative stress response could be employed in the degradation of recalcitrant compounds based on the copper-Fenton like reaction which could cause arbitrary attack to aromatic compounds. The addition of copper would help in increasing the productivity of some oxidative stress response enzymes; this could be used for industrial enzyme production. *A. flavus* could also be used in copper removal, as indicated by uptake results.