

COMPARATIVE ASSESSMENT OF BIOSORPTION OF MALACHITE GREEN DYE FROM ITS AQUEOUS SOLUTION BY LIVING AND DEAD HYPHOMYCETOUS FUNGI

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Abstract: The dead biomass of *Aspergillus nidulans* Eidan and *Humicola grisea* Traaen was found to be quite effective in adsorbing the dye malachite green from its aqueous solutions. In most of the case, the dead (autoclaved) biomass proved to be more effective than the living biomass. Changes in surface properties, modification of binding sites and increase in surface area due to autoclaving may be the possible reasons for increase efficiency of dead biomass.

Keyword: Dye pollution, Biosorption, Malachite green, Dead fungal biomass

REFERENCES

- Abedin, R.M.A.** (2008). Decolorization and biodegradation of crystal violet and malachite green by *Fusarium solani* (martius) saccardo. A comparative study on biosorption of dyes by the dead fungal biomass. *Am. Euras. J. Bot.* **1**:17–31.
- Akar, T. and Tunali, S.** (2005). Biosorption performance of *Botrytis cinerea* fungal by-products for removal of Cd(II) and Cu(II) ions from aqueous solutions. *Miner. Eng.* **18**: 1099–1109
- Aksakal, O. and Ucun, H.** (2010). Equilibrium, kinetic and thermodynamic studies of the biosorption of textile dye (Reactive Red 195) onto *Pinus sylvestris* L. *J. Hazard. Mater.* **181**: 666–672.
- Aksu, Z. and Cagatay, S.S.** (2006). Investigation of biosorption of Gemazol Turquoise Blue–G reactive dye by dried *Rhizopus arrhizus* in batch and continuous systems. *Sep. Purif. Technol.* **48**: 24–35.
- Azhar, S.S., Liew, A.G., Suhardy, D., Hafiz, K.F. and Hatim, M.D.I.** (2005). Dye removal from aqueous solution by using adsorption on treated sugarcane bagasse. *Ameri. J. App. Sci.* **2**: 1499–1503.
- Bakshi, D.K., Gupta, K.G. and Sharma, P.** (1999). Enhanced biodecolorization of synthetic textile dye effluent by *Phanerochaete chrysosporium* under improved culture conditions. *World J. Microbiol. Biotechnol.* **15**: 507–509.
- Banat, I.M., Nigam, P., Singh, D. and Marchant, R.** (1996). Microbial decolorization of textile dyes containing effluents: a review. *Biores. Technol.* **58**: 217–227.
- Bhole, B.D., Ganguly, B., Madhuram, A., Deshpande, D. and Joshi, J.** (2004). Biosorption of methyl violet, basic fuchsin and their mixture using dead fungal biomass. *Curr. Sci.* **86**: 1641–1644.
- Chou, K.S., Tsai, J.C. and Lo, C.T.** (2001). The adsorption of Congo red and vacuum pump oil by rice hull ash. *Biores. Technol.* **78**: 217–219.
- Crusberg, T.C., Mark, S.S. and Dilorio, A.** (2004). Biominalisation of heavy metals. In “*Fungal Biotechnology in Agricultural, Food and Environmental Application*” (ed., Arora, D.K.) Marcel–Dekker, U.S.A. pp: 409–417.
- Fu, Y. Z. and Viraraghavan, T.** (2001a). Fungal decolorization of dye wastewaters: a review. *Biores. Technol.* **79**: 251–262.
- Gupta, M.A., Krishnan, L. and Gajbe, V.** (2004). Adsorption kinetics and column operation for the removal and recovery of malachite green from wastewater using bottom ash. *Sep. and Puri. Technol.* **40**: 87–96.
- Jain, R., Bhargava, M. and Sharma, N.** (2003). Treatment and decolorisation of an azo dye in industrial effluent. *J. Sci. Ind. Res.* **62**: 813–819.
- Kaushik, P. and Malik, A.** (2009). Fungal dye decolourisation: recent advances and future potential. *Environmental International* **35**, 127–141.
- Khataee, A.R., Zarei, M. and Pourhassan, M.** (2010). Bioremediation of Malachite Green from contaminated water by three microalgae. *Neural Network Modeling Clean* **38**: 96–103.
- Kiran, I., Ilhan, S., Caner, N., Iscen, C.F. and Yildiz, Z.** (2009). Biosorption properties of dried *Neurospora crassa* for the removal of Burazol Blue ED dye. *Desalination.* **249**: 273–278.
- Kumar, K.V., Ramamurthi, V., and Sivanesan, S.** (2006). Biosorption of malachite green, a cationic dye onto *Pithophora* sp. a fresh water algae. *Dyes Pigments* **69**: 102–107.
- Kumar, P.** (2011). *Studies on Certain Biotechnological Aspects of Microbe–Metal Interactions*. Ph.D. thesis, C.C.S. University, Meerut (INDIA).
- Kumar, P. and Charaya, M.U.** (2012). Effect of treatment with lead sulphate on soil mycobiota. *J. of Plant Development Sci.* **4**: 89–94.
- Kumar, P. and Charaya, M.U.** (2013). A comparative assessment of the efficiencies of living vs. dead biomass of *Aspergillus niger* Link to adsorb basic fuchsin from its aqueous solutions. *Plant Archives* **13**: 485–488.
- Mouthri, B. and Singara Charya, M.A.** (2009). Decolourisation of crystal violet and malachite green by fungi. *Sci. World J.* **4**: 28–33.
- Nanthakumar, K., Karthikeyan, K. and Lakshmanaperumalsamy, P.** (2009). Investigation on biosorption of reactive blue 140 by dead biomass

of *Aspergillus niger* HM11: Kinetics and isotherm studies. *Global J. Biotechnol. Biochem.* **4**: 169–178.

O'Mahony, T., Guibal, E. and Tobin, J.M. (2002). Reactive dye biosorption by *Rhizopus arrhizus* biomass. *Enzy. Microb. Technol.* **31**: 456–463.

Padmesh, T.V.N., Vijayaraghavan, K., Sekaran, G. and Velan, M. (2005). Batch and column studies

on biosorption of acid dyes on fresh water macro algae *Azolla filiculoides*. *J. Hazard. Mater.* **125**: 121–129.

Sadettin S. and Donmez, G. (2007). Simultaneous bioaccumulation of reactive dye and chromium (VI) by using *Phormidium thermophil* sp. *Enz. Microb. Technol.* **41**: 175–80.