

## EVALUATION OF MYCOBIOTA OF SOIL FUNGI ISOLATED FROM GARDEN SOIL AND FROM SOIL CONTAMINATED WITH PAPER MILL EFFLUENTS

Amit Kumar<sup>1\*</sup>, Sanjay Kumar<sup>1</sup>, Ashu Tyagi<sup>2</sup>, Raj Singh<sup>3</sup>, Permod Kumar<sup>4</sup> and M.U. Charaya<sup>5</sup>

Department of Botany, M.S. College Saharanpur  
 Department of Biotechnology, M.M.U. Mullana, Haryana  
 Email: [amitsaini.saini421@gmail.com](mailto:amitsaini.saini421@gmail.com)

Received-19.07.2021, Revised-13.08.2021, Accepted-24.08.2021

**Abstract:** The present communication deals with a comparison of the Mycobiota of garden soil with the soil contaminated by effluents of paper industry. A lesser number of fungal isolates were obtained from soils under the impact of pulp and paper mill effluents as compared to that from normal garden soil. The Shannon's diversity index of polluted soil was also lowest than that of garden soils. *Aspergillus terreus*, *Aspergillus flavus* and *Aspergillus niger* dominated the Mycobiota of polluted soils. These species can be utilized for *in situ* bioremediation of pulp and paper mill effluents. Alternatively, their biomass may be tried for developing –biosorption- based treatment plant for the effluents. Such under the impact of these effluents had higher pH than of garden soils.

**Keywords:** Garden Soil, Polluted Soil, Paper and Pulp mill Effluents, Shannon's Diversity Index, Soil Fungi

### REFERENCES

- Almeida, I.C.C., Fernandes, B.A., Júlio Neves, J.C.L., Ruiz, H.A., de Lima, T.L.B. and Hoogmoed, W. (2017). Soil Quality after Six Years of Paper Mill Industrial Wastewater Application. *Revista Brasileira de Ciência do Solo*, (4): article number: e0160017.
- Anonymous (2018). Pulp and paper Normalization Document and Monitoring and Verification Guidelines. Bureau of Energy Efficiency, Government of India.
- Anonymous (2020). Paper and Pulp Market To Reach USD 679.72 Billion By 2027 | Reports and Data. *Globe Newswire*, (March 16, 2020), New York.
- Camberato, J.J., Gagnon, B., Angers, D.A., Chantigny, M.H. and Pan, W. L. (2006). Pulp and paper mill by-products as soil amendments and plant nutrient sources. *Canadian Journal of Soil Science*, (86): 641-653.
- Chaudhry, S. and Paliwal, R. (2018). Techniques for Remediation of Paper and Pulp Mill Effluents: Processes and Constraints. In *Handbook of Environmental Materials Management* (Ed. Hussain C.) Springer, Cham. [https://doi.org/10.1007/978-3-319-58538-3\\_134-1](https://doi.org/10.1007/978-3-319-58538-3_134-1).
- Dhevagi, P. and Oblismani, G. (2008). Impact of paper mill effluent on groundnut soil microflora and soil enzymes. *Asian Journal of Microbiology, Biotechnology & Environmental Sciences Paper*, (10): 371-377.
- Emtiaz, G., Naghavi, N.S. and Bordbar, A.K. (2001). Biodegradation of lignocellulosic waste by *Aspergillus terreus*. *Biodegradation*, (12): 259-263.
- Gilman, J.C. (1957) *A Manual of Soil Fungi* (Revised 2nd Edn), Oxford & IBH Publishing Co., New Delhi, 392 pp
- Grainger, S., Fu, G.Y. and Hall, E.R. (2011). Biosorption of Colour-Imparting Substances in Biologically Treated Pulp Mill Effluent Using *Aspergillus niger* Fungal Biomass. *Water Air and Soil Pollution*, (217): 233-244.
- Harshini, T., Anusha, B., Saida, N.L. and Venkateswar Reddy, K. (2014). Influence of Paper And Pulp Industry Effluents On Physico-Chemical & Biological Properties Of Soil. *International Journal of Bioassays*, (3): 3408-3412.
- Kamali, M. and Khodaparast, Z. (2015). Review on recent developments on pulp and paper mill wastewater treatment. *Ecotoxicology and Environmental Safety*, (114): 326-342.
- Kannan, K. and Oblisami, G. (1998). Influence of irrigation with pulp and paper mill effluent on soil chemical and microbiological properties. *Biology and Fertility of Soil*, (10): 147-201.
- Kumar, V., Chopra A.K., Kumar, S., Singh, S. and Thakur, R.K. (2015). Effects of pulp and paper mill effluent disposal on soil characteristics in the vicinity of Uttaranchal Pulp and Paper Mill, Haridwar (Uttarakhand), India. *International Journal of Agricultural Science Research*, (4): 117-125.
- Lokeshwari, N., Sriniketh, G., Joshi, S.G., Inamdard, S., Srikanth, B., Bashirahmed and Sushma, L. (2013). Isolation of fungi for delignification of Pulp and Paper mill effluent. *International Journal of Current Engineering and Technology*, special issue, 124-128.
- Madan, S., Sachan, P. and Singh, U. (2018). A review on bioremediation of pulp and paper mill effluent – An alternative to conventional remedial technologies. *Journal of Applied and Natural Science*, (10): 367 – 374.
- Martin, P. (1998). River pollution in India: An Overview. *Employment News*, (82): 1-2.
- Nagamani, A., Kumar, I.K. and Manoharachary, C. (2006). Hand Book of Soil Fungi, I.K.

\*Corresponding Author

International Publishing House Pvt Ltd, New Delhi, India.

**Rameswara Reddy, N., Srinivas, G. and Rajakumar, R.** (2018). Isolation and identification of microorganism from pulp and paper mill effluent contaminated soil. *International journal of basic and applied research*, (8): 91-97.

**Reddy, K.V., Vijayalakshmi, T., Giri, A. and Bhavani, A.G.** (2013). Effect of Paper Industry Effluents on Physico-chemical and Biological Properties of Soil. *The International Journal of Innovative Research in Science Engineering and Technology*, (2): 3811-3815.

**Singh, S.K.** (2007). Effect of irrigation with paper mill effluent on the nutrient status of soil. *International Journal of Soil Science*, (2): 74-77.

**Singh, P.K., Ladwani, K. and Deshbhratar, P.B. and Ramteke, D.S.** (2012). Impact of paper mill wastewater on soil properties and crop yield through lysimeter studies. *Environmental technology*, (34): 599-606.

**Singhal, A., Jha, P.K. and Thakur, I.S.** (2016). Biosorption of pulp and paper mill effluent by *Emericella nidulans*: isotherms, kinetics and mechanism. *Desalination and water treatment*, (57): 22413-22428.

**Vara Saritha, V., Maruthit, Y.A. and Mukkanti, K.** (2010). Potential fungi for bioremediation of industrial effluents. *Bio Resources*, (5): 8-22.

**Waksman, S.A.** (1917). Is there any fungal flora of the soil? *Soil Sci.* (2): 103-155.