

Treatment of Industrial Effluent by Microbial Consortium

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ABSTRACT

Although industrial products are useful for the mankind, the wastes of the industries are causing much pollution to the biosphere. The industrial wastes are in different forms which are released into environment. There are different conventional methods which used by the industries, but it doesn't give the satisfied results. The present study is performed to treat industrial waste in order to reduce the COD by using mixed microbial consortium.

KEY WORDS: Industrial effluent, COD, Bioremediation, microbial consortium.

1. INTRODUCTION

Industries products are widely used by the mankind. The tremendous demand of these products globally increased which causes environmental contamination. The conventional treatment methods include huge labour requirement, high maintenance cost, low efficiency, huge equipments that are considered as disadvantages. To overcome this problem and to enhance the efficiency of effluent treatment procedures alternate methods involving bioremediation has been adopted. It is the process of using microorganisms to remove harmful chemicals in the environment. Microbes completely digest these chemicals and change them into non-toxic products such as water and carbon dioxide. *Pseudomonas sp.* was used for the remediation of the industrial effluent. A research work in India was done on textile effluent direct orange-102 utilizing *Pseudomonas fluorescens* for the degradation of dye which was obtained from National Chemical Laboratory, Pune, India as pure culture. The objective of the study is to reduce the Chemical Oxygen Demand level in the industrial effluent.

2. MATERIALS AND METHODS

The soil samples were collected from the industrial sites. Around five effluents were collected from various sites. The samples were collected in sterile plastic polythene bags and stored for further analysis. They were inoculated in a culture media for the isolation of microorganisms present in the effluents or sludges. The pure culture of microorganisms were developed and identified. To treat the industrial effluent, mixed microbial culture was used. COD estimation was done by Open Reflex Method. The study was done with and without treatment of mixed microbial culture.

3. RESULTS AND DISCUSSION

In this study, the effluent parameter, COD in the waste water released from the industries was reduced by using an alternative technology called bioremediation. After the collection of samples from the industry, the effluents were added to 100 ml of Nutrient media for the growth of native microbes. Figure 1 shows the effect of mixed culture on the treatment of industrial effluent by reducing COD level.

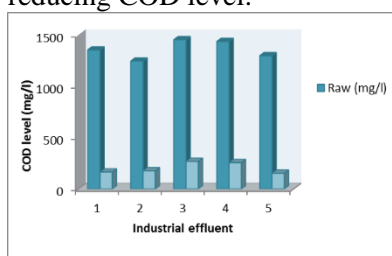


Figure.1. Bioremediation of raw and consortium treated effluents

As a result of microbial metabolism of the mixed microbial consortium, the COD levels after the treatment in sample 1, 2, 3, 4, 5 were reduced significantly.

4. CONCLUSION

In this work, the raw effluents collected from the various industrial sites and treated with mixed microbial culture and COD levels were measured. Then the results of raw and treated effluents were compared and have shown a significant reduction of COD level. The results have shown that bioremediation of effluent using microorganisms is an effective remedial tool that is efficient and less harmful.

REFERENCES

Analytical Methods Approved for Compliance Monitoring under the Ground Water Rule, The methods and monitoring requirements for these contaminants are specified in 40 CFR 141.402 and 141.403. 4500-Cl H Standard Methods for the Examination of Water and Wastewater, 21, 2005.

Bumpus JA, Brock BJ, Applied and Environmental Microbiology, 54, 1988, 1143-1150.

Chobchuenchom W, Mongkolsuk S, Bhumiratana A. World Journal of Microbiology and Biotechnology, 12, 1996, 607-614.

Das S, Das M.P, Das J, Fabrication of porous chitosan/silver nanocomposite film and its bactericidal efficacy against multi-drug resistant (MDR) clinical isolates, Journal of Pharmacy Research, 6(1), 2013, 11-15.

Kumar S.S, Karrunakaran C.M, Rao M.R.K, Balasubramanian M.P, Inhibitory effects of Indigofera aspalathoides on 20-methylcholanthrene- induced chemical carcinogenesis in rats, Journal of Carcinogenesis, 10, 2011.

Kumaravel A, Meetei O.N, An application of non-uniform cellular automata for efficient cryptography, 2013 IEEE Conference on Information and Communication Technologies, ICT, 2013,1200-1205.

Kumaravel A, Meetei O.N, An application of non-uniform cellular automata for efficient cryptography, Indian Journal of Science and Technology, 6(5), 2013, 4560-4566.

Langeswaran K, Gowthamkumar S, Vijayaprakash S, Revathy R, Balasubramanian M.P, Influence of limonin on Wnt signalling molecule in HepG2 cell lines, Journal of Natural Science, Biology and Medicine, 4(1), 2013, 126-133.

Leena Sankari S, Masthan K.M.K, Aravindh Babu N, Bhattacharjee T, Elumalai M, Apoptosis in cancer - an update, Asian Pacific Journal of Cancer Prevention, 13(10), 2012, 4873-4878.

Lydia Caroline M, Vasudevan S, Growth and characterization of l-phenylalanine nitric acid, a new organic nonlinear optical material, Materials Letters, 63(1), 2009, 41-44.

Lydia Caroline M, Vasudevan S, Growth and characterization of pure and doped bis thiourea zinc acetate, Semiorganic nonlinear optical single crystals, Current Applied Physics, 9(5), 2009, 1054-1061.

Nagarajan C, Madheswaran M, Experimental study and steady state stability analysis of CLL-T series parallel resonant converter with fuzzy controller using state space analysis, Iranian Journal of Electrical and Electronic Engineering, 8(3), 2012, 259-267.

Pandey BV, Upadhyay RS, International Society for Tropical Ecology, 2010, 397-403.

Parthasarathy R, Ilavarasan R, Karrunakaran C.M, Antidiabetic activity of Thespesia Populnea bark and leaf extract against streptozotocin induced diabetic rats, International Journal of PharmTech Research, 1(4), 2009, 1069-1072.

Saravanan T, Saritha G, Udayakumar R, A Robust H-infinity two degree of freedom control for electromagnetic suspension system, Middle - East Journal of Scientific Research, 18(12), 2013, 1827-1831.

Serane T.V, Zengeya S, Penford G, Cooke J, Khanna G, McGregor-Colman E, Once daily dose gentamicin in neonates - Is our dosing correct? Acta Paediatrica, International Journal of Paediatrics, 98(7), 2009, 1100-1105.

Sharmila S, Jeyanthi Rebecca L, Das M.P, Saduzzaman M, Isolation and partial purification of protease from plant leaves, Journal of Chemical and Pharmaceutical Research, 4(8), 2012, 3808-3812.

Sharmila S, Jeyanthi Rebecca L, Saduzzaman M, Biodegradation of domestic effluent using different solvent extracts of Murraya koenigii, Journal of Chemical and Pharmaceutical Research, 5(2), 2013, 279-282.

Tamilselvi N, Krishnamoorthy P, Dhamotharan R, Arumugam P, Sagadevan E, Analysis of total phenols, total tannins and screening of phytochemicals in Indigofera aspalathoides (Shivanar Vembu) Vahl EX DC, Journal of Chemical and Pharmaceutical Research, 4(6), 2012, 3259-3262.

Yatome C, Ogawa T, Matsui M, Journal of Environmental Science and Health, 26, 1992, 75-87.