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Treatment of Industrial Effluent using Microorganism

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Abstract - *Wastewater released from various industries is the major concern for environmentalists nowadays because industrial effluents contains various toxic metals, harmful gases, several organic and inorganic compounds. Due to the discharge of these toxic effluents , there has been a major loss in the ecological , social and economical perspective. These problems can be overcome by the use of biological treatment methods which are Eco-friendly as well as economic .The study includes the use of indigenous microbes which has to be identified and effectively utilized on treatment process .*

Key Words: Industrial effluent, Indigenous organisms, Biological Treatment, Eco-friendly.

1. INTRODUCTION

This work was designed to identify microorganisms capable of removing textile dyes, either by bio degradation or by bio absorption. This work was designed to identify microorganisms capable of removing textile dyes, either by bio degradation or by bio absorption.

This work was conducted to assess the physical, chemical (odour , pH ,COD and BOD) and biological (Microbial count) properties of effluent sample collected from Chennai industry. The different types of microorganisms that are present in the waste water (before and after treatment) namely bacteria and fungi are tested

1.1 Bio degradation

Biodegradation is the process of decaying or reduction of different organic materials and toxic metals to their non toxic form with the help of microorganisms. In this process complete mineralization of the starting compound to simpler ones like CO 2 , H 2 O, NO 3 and other inorganic compounds takes place .

1.2Bacteria and Structural Units

The micro-organisms have their own properties during waste water treatment and mainly focus on the process that is being applied.Heterotrophic bacteria play an important role in removing organic matters in waste water treatment system. These bacteria work during the waste water treatment in the clusters forms as floc, biofilm or granule

2. SAMPLING

The dye effluent was collected from the chrompet, chennai district Tamil nadu. The samples were collected by using sterile sample bottles and transported to the laboratory within 24 hrs of collection. The collected samples were stored at low temperature for further analysis.

Sample: Textile Dye Effluent

Color : Dark blue color

Odour : Alkali odour

Fig -1: Collected Effluent

2.1 ENUMERATION OF TOTAL AND DYE UTILIZING MICROBES IN THE DYE EFFLUENT SAMPLES

The count of total bacterial counts in dye effluent sample ranged from 4.14 X 10 3 CFUg -1 while in the fungal the counts ranged 1.96 X 10 3 CFUg -1 .

2.2 ISOLATION AND IDENTIFICATION OF BACTERIAL SAMPLE

The dye utilizing bacterial isolates were identified based on the Biochemical characterization. The species of Bacillus sp, and Pseudomonas sp, Acineto bacter, Legionella and Staphylococcus were more dominantly isolated among the bacteria respectively from the collected Industrial Effluent.

2.3 DEGRADATION ANALYZING

The isolated Bacterial samples Bacillus sp, Pseudomonas sp, Acineto bacter, Legionella and Staphylococcus was checked for the extent of dye degradation both in solid media plates as well as in liquid media. All the isolates gave maximum degradation. Visual degradation indicated that

degradation was higher in case of broth as compared to minimal media.

The overnight broth cultures (Bacillus sp, Pseudomonas sp, Acineto bacter, Legionella and Staphylococcus) with crude oil were centrifuged and resuspended in 10 ml of saline solution and 0.1ml of the inoculum was added to the broth containing crude oil and incubated at 37°C, 85 – 110 rpm for 24 hr.

Among the five isolated bacterial strains, Pseudomonas showed higher degradation than Bacillus.

Fig -2: Degradation of effluent in broth

3. TEST REPORT OF SAMPLE

The test was conducted for some days ,the value of before testing was taken on the first day of testing and the bacterial culture was grown on the Effluent and it treated the effluent by its own property and the values of treated water was taken after few days.

Parameters like COD, BOD and pH for each Bacteria was noted down before and after testing .The degradation percentage was calculated for each Bacteria. The values of report sample are given below.

S. NO	BACTERIAL STRAIN	PARAMETERS	UNITS	BEFORE TESTING	AFTER TEST-ING
1	Bacillus sp	Degradation	%	-	65
		COD	(mg/L)	945	695
		BOD	(mg/L)	45	26
		pH	No units	8.1	7.2
2	Psue-domonas sp	Degradation	%	-	73
		COD	(mg/L)	945	509
		BOD	(mg/L)	45	24
		pH	No units	8.1	7.6
3	Acineto Bacter	Degradation	%	-	52
		COD	(mg/L)	945	381
		BOD	(mg/L)	45	27
		pH	No units	8.1	7.3
4	Legionella	Degradation	%	-	45
		COD	(mg/L)	945	652
		BOD	(mg/L)	45	29
		pH	No units	8.1	7.4
5	Staphylo-coccus	Degradation	%	-	58
		COD	(mg/L)	945	639
		BOD	(mg/L)	45	32
		pH	No units	8.1	7.5

4. CONCLUSION

Decolorization proceeded gradually even up to few days in effluent-adapted bacterial treatment. The microbes utilized carbon, nitrogen and Sulfate found in effluent medium for their nutrition. Decolorization % will be further increased and prolonged by supplementing the effluent medium with other cheaper effective carbon or energy source such as sucrose, starch and hydrolyzed starch. Acineto bacter had high COD removal and pseudomonas sp had high BOD removal.

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REFERENCES

[1] Faryal,R., Hameed,A. 2005. Isolation and characterization of various fungal strains from textile effluent for their use in bioremediation. Pak.J.Bot.; 1003-1008.

[2] Khadijah,O., Lee,K.K., Mohd Faiz F., Abdullah. 2009. Isolation, screening and development of local bacterial consortia with azo dyes decolourising capability.

[3] Degradation and adsorption of industrial effluents by consortium of microbes isolated from agro forestry soil 1.S.Kulandaivel (sep 2014)

[4] Decolorization and Complete Degradation of Methyl Red by a Mixed Culture 1.P.P. VIJAYA ,2.S. SANDHYA (feb 2003)

[5] Performance and microbial diversity of a membrane bioreactor treating real textile dyeing wastewater 1.d.h.t seng et all (11 april 2007)culture 1.p.p. vijaya ,2.s. sandhya (feb 2003)

[6] Microflora involved in textile dye waste removal 1. WAFAA M. ABDEL RAHIM et all (17 oct 2002)

[7] Decolourisation of synthetic textile dyes by Phlebia tremellosa1.Niamh Kirby, 2.Roger Marchant, 3.Geoey McMullan (15 may 2000).

[8] F. Y. Cakir and M. K. Stenstrom, "Greenhouse gas production: A comparison between aerobic and anaerobic wastewater treatment technology," Water Research, vol. 39, no. 17, pp. 4197-4203, 2005.