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Research Article

A STUDY ON ROLE OF ALGAE AND COAGULANTS IN REDUCING EFFLUENT PARAMETERS

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ARTICLE INFO	ABSTRACT
	Due to rapid industrialisation and urbanisation, water pollution by the discharge of the effluent directly into the rivers and water bodies has been increasing day by day. Effluents like paper textile, pharma and leather industries have high polluting parameters like high BOD, COD, total suspended solids, colour, heavy metals etc. Due to high pollution load, effluent treatment has become very capital involvement process. In this studysome coagulants like alum and biological treatment using selected algae were given to industrial effluent to find out reduction in polluting parameters. In the biological treatment bioremediation and treatment with the algae (scenedesmusabundans) was given. It was observed that various polluting parameters could reduce in the range of 60 to 90 % by using combination of coagulants and biological treatments. Heavy metals also could be reduced significantly in this process.

INTRODUCTION

Nowadays water pollution is one of the major problem all around the world as various industries discharge there wastewater or effluent directly into water bodies .The main source of water pollution is the chemical industries .generally it contains organic and inorganics components which are highly toxic to the organisms and to the life of human beings(1) .Any liquid, solid and semisolid waste produced during the manufacturing of the chemical materials discharge from the chemical industries into the water bodies are considered as wastewater and called as effluent. Effluent contain impurities, contamination and various organic and inorganic components in it. Effluent generated from chemical industries like pulp paper industry, textile industry, leather industry, pharma industry etc have high pollution load in terms of high BOD,COD,colur, high TSS, TDS,heavy toxic metals etc(2). Due to industrialisation and urbanization water pollution has become a serious problem and there is alarm need to treat water pollution.As industries discharge huge tones, litres of wastewater directly into the water bodies(3). So the treatment is given with the help of algae and coagulants to treat the effluent thus reduced in the parameters has been noted down and analysed .In this Algae play a major role in the treatment of the water as these have tendency to degrade the contamination present in the wastewater. Algae it has been proved more effective in removing nitrates, phosphate and sulphide contents from the wastewater and in reducing the

hardness of the effluent.(4) In this study, treatment of wastewater is done with the use of algae (scenedesmusabundans) for 14 days and change in the parameters before and after the treatment wasanalysed. Coagulants like alum, polyacrylamides were also tried for treatment.

MATERIALS AND METHODS

Collection of sample – The effluent samples were collected from the chemical (paper industry andpharma industry

All the chemicals including coagulants (lime, alums, polyacrylamide) were procured from Merck german company. Methods- All the parameters like -pH, hardness, colour, conductivity, TDS, TS, TSS, BOD, COD, dissolved oxygen were determined as per standard methods given in the book of waste water treatment of American Public Health Association (APHA Book)(5).

Heavy metals were determined by using Atomic absorption spectrophotometer.

RESULT AND DISCUSSION

Biological Treatment

It is done by the help of the microalgae (scenedesmusabundans) upto 14 days of treatment has been given in the suitable conditions in which there is the reduction in the parameters of the effluent, results are shown in table-1.From the table-1 it can be concluded that by using biological (algae) treatment BOD is reduced about 50%, COD by 33%, TDS by 40% and hardness by about 25%. These treatments are

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also in the line of biological treatment done by Kshirsagar D ayodhya in 2013.(6)

Table 1 Effect of Algae on Reduction in parameters

S.no	Parameters	Before treatment (effluent)	After treatment (algae 14 days)	% Reduction
1.	Ph.	6.5	7.0	-
2.	Colour	Light brown	Light green	-
3.	Odour	Pungent smell	Lighter Pungent smell	considerable
4.	TDS	3500mg/l	2100mg/l	40
5.	TS	4000mg/l	3200mg/l	20
6.	COD	600mg/l	400mg/l	33
7.	BOD	120ppm	60ppm	50
8	Hardness	1200 ppm	900 ppm	25

Chemical Treatment

Chemical treatment has been done with the help of lime, alum and polyacrylamide in which lime of 1 gpl of 10ml, 2gpl of 20ml and polyacrylamide gave the best reduction in the parameters of the effluent, results are shown in table-2. By the chemical treatment it cab be observed that polyacrylamide is better coagulant for water treatment as compared to Lime and alum. By using polyacrylamide hardness could be reduced by about 80%, about 50 % by using lime and about 70 % by using alum.

Table 2 Effect of Chemicals on Reduction in parameters

PARAMETERS	Sample 1 (effluent 1)	Sample 2(Lime)	Sample 3(Alum)	Sample 4 (polyacrylamide)
Colour	Light black	Clear white	Light black	Light brown
Odour	Pungent smell	odourless	Odourless	odourless
pH	7.3	12	5.5	7.0
Hardness	1200ppm	600ppm	400ppm	200ppm
TDS	3500mg/l	1800mg/l	900mg/l	400mg/l

Heavy metal reduction was also studied by the Double AAS technique .In which it is found that the reduction in the ppm values of different heavy metals was also observed by suing Algae, lime alum and polyacrylamide.

Table 3 Heavy metals Analysis in Effluent

METALS	effluent	After Lime Treatment	Alum Treatment	Polyacrylamide Treatment	Algae (14 days of treatment)
cadmium	0.62	0.55	0.42	0.22	0.30
Iron	12.5	8.6	6.2	4.2	1.1
copper	0.56	0.32	0.22	0.14	0.41
cobalt	0.26	0.19	0.10	NK	0.12
Nickel	0.40	0.35	0.22	0.10	0.15
Zinc	1.8	1.2	1.0	0.52	0.26

CONCLUSION

By this study, it can be concluded that polyacrylamide treatment along with biological treatment using algae may be a better option to reduce the polluting parameters of effluent.

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