

# Stabilization of Municipal Sewage by Saline Water and Algae Treatment

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**Abstract**— As many research works are going on in the field of wastewater treatment, a newly developed wastewater treatment by algae and saline water is gaining much importance. Various parameters like Biological oxygen demand (BOD), Chemical oxygen demand (COD), and Chloride were observed after the treatment. Percentage reduction rate of 78.62(BOD), 54.12 (COD) were observed. This is an environmentally safe alternative for treating wastewater.

**Key words:** BOD, COD, Chloride

## I. INTRODUCTION

Waste water treatment is gaining much importance in recent years with the intension of reusing it. For the treatment of wastewater large amount of materials are to be supplemented. Nutrient rich wastewater instead of discharging into environment is supplemented for the growth of algae and saline water in the wastewater treatment. Thus nutrients can be reused and wastewater can be treated and thus reducing the negative impacts. As the algae takes up BOD and COD the wastewater can be treated with algae. This paper explains wastewater treatment by algae and Saline water.

## II. MATERIALS AND METHODS

### A. Selection of Wastewater

Waste water chosen was Municipal sewage which contains BOD and COD. Experiments were performed under laboratory based batch conditions since algae shows high growth rates over the batch growth period. The Municipal Sewage was collected for Karuvadikuppam, Pondicherry. The characteristics of Municipal sewage was given in table 1.

Characteristics	Value
pH	6.4 to 8.4
Temperature ( ° C )	23 to 31
Electro conductivity(Micromhos/cm)	1530 to 1904
Total Dissolved Solids ( mg / l )	978 to 1217
Total Suspended Solids ( mg / l )	194 to 401
Chloride ( mg / l )	855 to 889
Initial Dissolved Oxygen ( mg / l )	Absent
BOD ( 5 days at 20 ° C ) ( mg / l )	208 to 278
COD ( mg / l )	398 to 484

Table 1: Characteristics

### B. Selection of Algae

For the present study freshwater algae such as spirulina platensis was taken. Spirulina platensis was collected from Arovile, Pondicherry. Algae of suitable amount was collected in cans and washed thoroughly with tap water and placed in the respective set up for the experimental study.

### C. Procedure

The Municipal Sewage of about 1 liter was fed into the feed tank. The feed tank was operated at room temperature. Each

algae of initial dosage 5 to 50 g with 20ml saline water were fed to the tank. Then the operating parameters were varied to find the optimum condition.

### D. Optimization of number of days

The Municipal sewage was fed to the tank containing 5g to 50g of each algae. Then at each day samples were collected and analyzed for the various parameters like pH, TDS, BOD and COD.

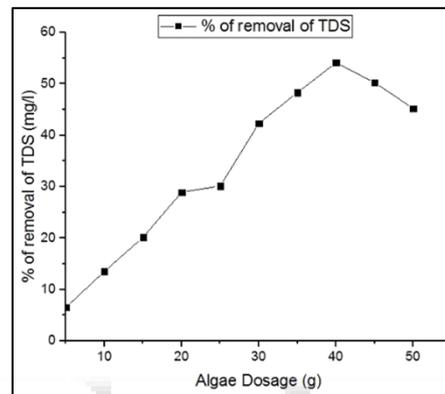


Fig. 1: TDS Removal Efficiencies adding Saline water and Algae

### E. Varying Algal Dosage

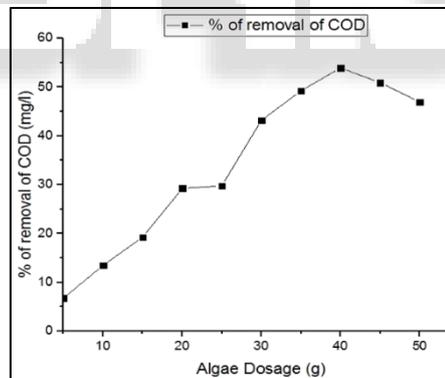


Fig. 2: COD Removal Efficiencies adding Saline water and Algae

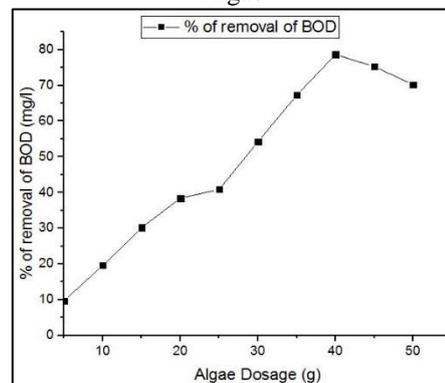


Fig. 3: BOD Removal Efficiencies adding Saline water and Algae

The Municipal sewage was treated with algal species of varying dosage after optimizing number of days. 5, 10, 15, 20, 25, 30, 35, 40, 45, and 50g of each algal species were taken for the study. The samples collected after treatment were analyzed for the various parameters.

### III. RESULTS AND DISCUSSION

The Municipal Sewage and saline water with algae was studied with varying conditions and the optimum has been finalized. Performance of *spirulina platensis* algae and 20 ml saline water for the treatment of Municipal Sewage was first carried out.

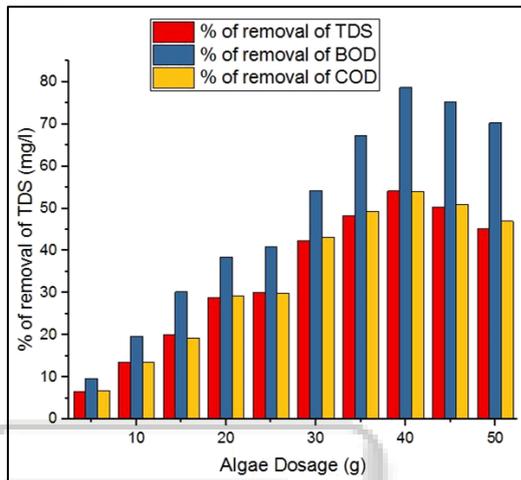


Fig. 4: Percentage removal of parameters in wastewater of retention time 7 days

% of Removal	% removal with varying dosage of % algae								
	5 g	10 g	15 g	20 g	25 g	30 g	35 g	40 g	45 g
TDS (mg/l)	0	14	20	29	35	48	48	54	50
BOD (mg/l)	7	20	30	38	47	78	67	78	75
COD (mg/l)	7	13	19	29	39	43	49	53	50

Table 1: Removal rate

### IV. CONCLUSION

As the 7 days get increased the removal efficiency of various characteristics also get increased. At seventh day the removal of TDS, COD, and BOD was found to be maximum. BOD removal of 78.62%, COD of 53.94%, and TDS of 54.12%, obtained at the sixth day and as the days goes on increasing, the removal capacity of algae decreases. After 7th day algae degradation starts and it may have caused a decrease in the removal rate.

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