

# Textile Waste Water Treatment by using Phytoremediation

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## Abstract -

The load on effluent treatment and disposal is increasing due to industries are growing day by day. The new treatment and reuse techniques are needed to be discovered as the condition is getting worst. The method of removal of toxic substances from soil and water was developed which is known as Phytoremediation. In this paper the effectiveness of *Canna Indica* for phytoremediation of textile waste was investigated. For this study the small scale model was constructed and consist various layers of naturally occurring materials. In optimum condition, the amount of BOD removal was around 93% and COD removal was around 63%. The values of pH, TS, TDS after treatment was within CPCB standards.

**Keywords-** BOD, COD, Phytoremediation, Reuse, Textile waste.

## I. INTRODUCTION

India's environment is becoming delicate issue in upcoming years due to rapid industrialization coupled with urbanization and population growth. The use of plants for remediation of soils and waters polluted with heavy metals has gained acceptance in the past two decades as a cost effective and invasive method [1]. Phytoremediation methods have been proved to be more potential and economical when compare to other treatment methods in treatment of the textile waste water. it is Green, Simple Concept and eco-friendly. Phytoremediation is the use of green plants to remove pollutants from the waste. The textile industry is one of the largest and most complicated industrial chains in manufacturing industry [2]. The textile industry is very water intensive, about 200 L of water are used to produce 1 kg of textile.

Textile waste water includes a large variety of dyes and chemicals addition that make the environmental challenge for textile industry not only as liquid waste but also in its chemical composition [3]. Textile waste water possess a high COD concentration, large amount of suspended solids, broadly fluctuating pH, strong color, high temperature which are harmful to the environment.

### I. Study area

Ichalkaranji is known for its exports of textile goods and textile manufacturing. The waste water generated at Laxmi processes, Ichalkaranji. The textile wastewater is treated by common effluent treatment plant located at Ichalkaranji. The majority of textile industries have their own effluent treatment plant and after treating the waste water they were discharging the effluent in open gutter. The treatment efficiency of individual ETP's are also poor. Also treatment cost is not affordable to these industries.

## II. Methodology

### A. Materials

The most commonly available plant *canna indica* is used for the present investigation of textile waste water by phytoremediation. The plastic tank is used as a phyto-bed. The filter media are brick bats, aggregates, sand and soil.

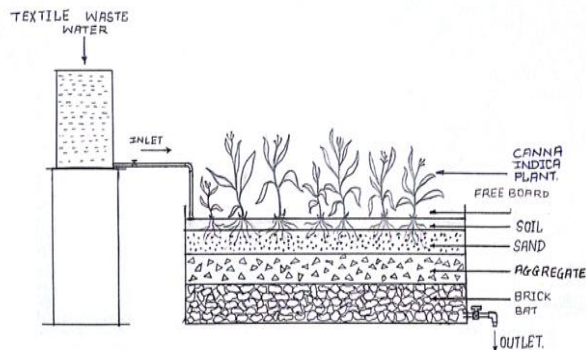


Fig. 1: Phytoremediation System.

Canna Indica is locally available plant of medium sized species green in colour. It is also called as “Kardal” in Marathi. The plant has singly stemmed with leaves. Canna Indica plant is growing about 0.5 to 2.5 m. It has also capacity to live on waste water, many researchers have found that the canna Indica have very effective to treat the waste water.



Fig. 2: Model of Phytoremediation System

### B. Method

The waste water was initially characterized for the basic Parameters: Color, pH, Temperature, Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), Total Dissolved solids (TDS). A stage wise treatment was undertaken.

The steps in this procedure are as follows:

- 1) A Phytoremediation Bed (Tank) was designed for proper settling and separation of waste water.
- 2) Plantation of the selected plants like Canna Indica was done.
- 3) The waste water flows at constant rate of 1 liter per hour.
- 4) After 24 Hours of detention time the treated water was collected.
- 5) Then the various basic tests were conducted.

### III. Results and Discussion

Table No.1: Characterized Waste water parameters before and after treatment

Sr. No.	Parameter	Untreated Influent	Treated Effluent(Tank)
1.	Color	Dark Grayish	Colorless
2.	Temperature	31°	27°
3.	pH	11.28	7.59
4.	COD (mg/l)	2668.7	878.78
5.	BOD (mg/l)	251.25	16.42
6.	TS (mg/l)	5700	591.87
7.	TDS (mg/l)	3987.5	961.87

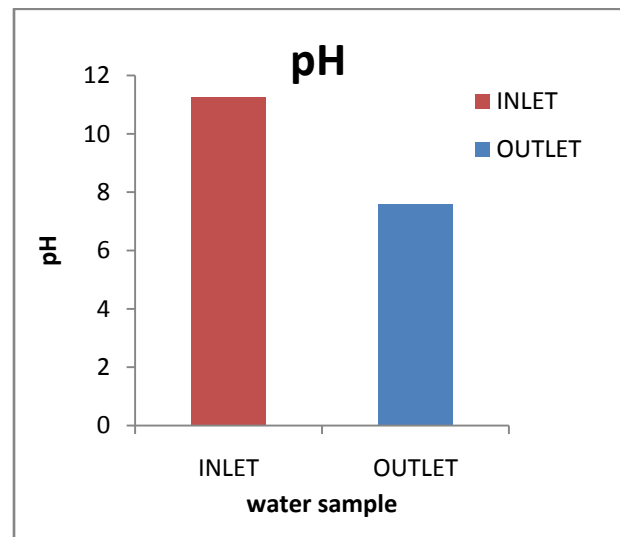


Fig. 4: Changes Observed in pH before and after Treatment

The initial pH of textile influent is 11.28 and after passing through Canna Indica bed outlet are 7.59. So the outlet pH range is within CPCB standards.

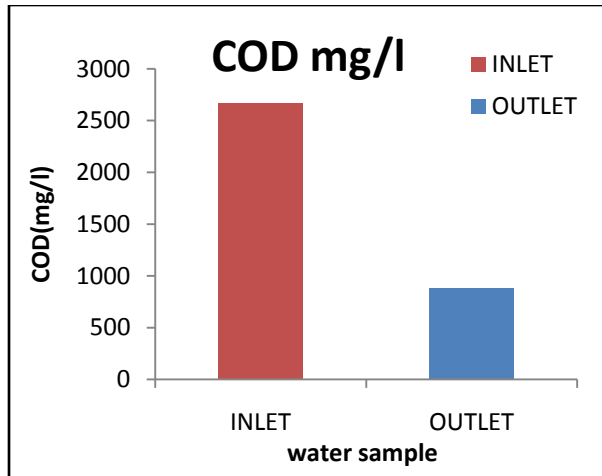


Fig. 5: Changes Observed in COD before and after Treatment

The COD range of effluent from Canna Indica bed for inlet is 2668.7(mg/l) and tank outlet is 878.78(mg/l). So the COD removal is around 63%.

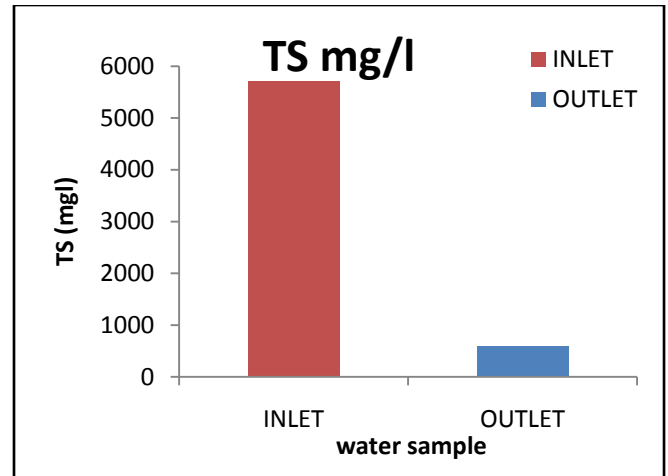


Fig. 7: Changes Observed in TS before and after Treatment

The TS range of effluent from Canna Indica bed for inlet is 5700 (mg/l) and tank outlet 591.87 (mg/l)

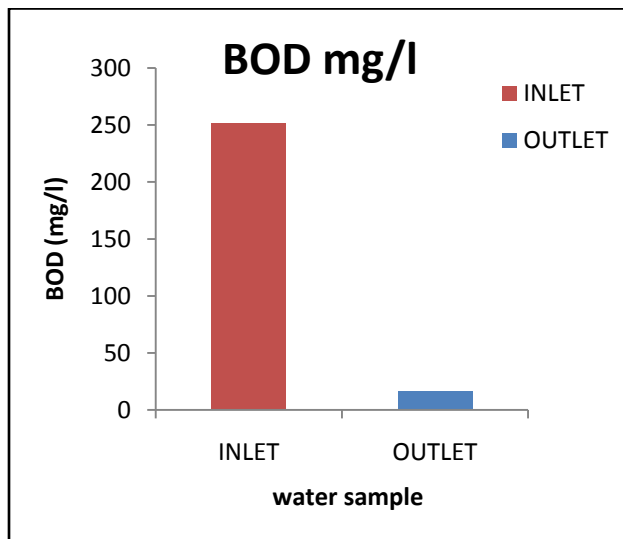


Fig. 6: Changes Observed in BOD before and after Treatment

The BOD range of effluent from Canna Indica bed for inlet is 251.25(mg/l) and tank outlet is 16.25(mg/l). So the COD removal is around 93%.

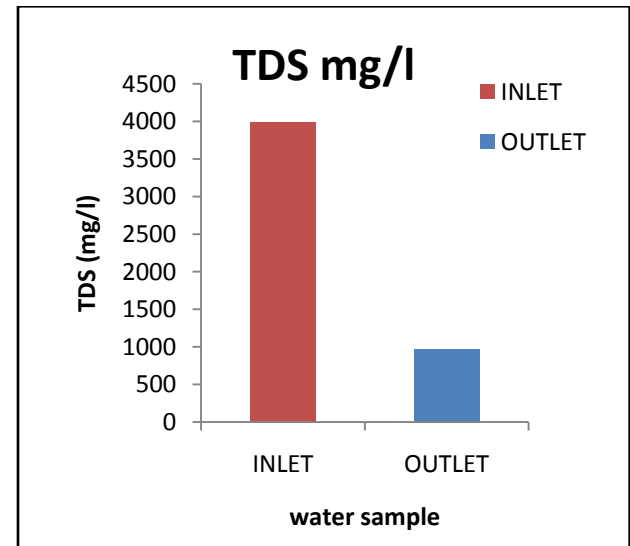


Fig. 8: Changes Observed in TDS before and after Treatment.

The TDS range of effluent from Canna Indica bed for inlet is 3987.5(mg/l) and tank outlet is 961.87(mg/l)

#### IV. CONCLUSION

The Phytoremediation is found eco-friendly and effective technology. The Canna Indica, plants are expected effectively reduce almost all the physical, chemical and biological parameter from the textile waste water. Canna Indica reduced 72% contaminants from the given textile waste water. The Canna Indica plant found very effective to reduce textile contaminants.

Contaminated Soils Using Canna Indica” Current World Environment Vol. 9(3), 780-784.

## V. FUTURE SCOPE

As our experimental investigation found to be successful, effective and economical than other common treatment methods of waste water treatment, in future the Phytoremediation technique is going to be implemented as common method of green treatment.

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