

# Removal of Dye Polluted Waste Water from Textile Processing Industry

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**Abstract**—Dyes are an important class of pollutants, and can even be identified by the human eye. Disposal of dyes in precious water resources must be avoided, however, and for that various treatment technologies are in use. Among various methods, adsorption occupies a prominent place in dye removal. The growing demand for efficient and low-cost treatment methods and the importance of adsorption has given rise to low-cost alternative adsorbents.

**Key words:** Textile Processing Industry, Removal of Dye Polluted Waste Water

## I. INTRODUCTION

Saving water to save the planet and to make the future of mankind safe is what we need now. With the growth of mankind, society, science, technology our world is reaching to new high horizons but the cost which we are paying or will pay in near future is surely going to be too high. Among the consequences of this rapid growth is environmental disorder with a big pollution problem. Anthropogenic activities have caused a great harm to the quality of our lifeline, i.e. water. Because of fast depletion of the freshwater resources, there seems to be a crisis of the same. Water pollution is a global concern and, it is the high time that we realize the gravity of the situation. Removing pollutants from water is the crying need of the hour and developing a cost effective and environmentally safe method to achieve the same is a challenging task for chemical engineers. After all, it is the future of mankind, which is at stake.

### A. Background of Present Research

Now-a-days, a large amount of waste water having color is generated by many industries like textile, leather, paper, printing, plastic. The presence of dye materials greatly influence the quality of water and the removal of this kind of pollutant is of prime importance. Owing to their complicated chemical structures dyes are difficult to treat with municipal waste treatment operations.

### B. State of Problem & Thesis' Objective

Several physical, chemical and biological de-colorization methods such as coagulation/flocculation treatment, biodegradation processes, oxidation methods, membrane filtration and adsorption have been reported to be investigated for the removal of dyes from industrial effluents. Among the studied methods, removal of dyes from adsorption is found to be the most competitive one because it does not need a high operating temperature and several colouring materials can be removed simultaneously. The versatility of adsorption is due to its high efficiency, economic feasibility and simplicity of design. As there are various parameters to effect adsorption process such as, charge density and structural stability of the adsorbent so, in the thrust of a comprehensive study, we have selected one basic dye (Crystal Violet) and one acidic dye (Coomassie Blue) for this present study.

## II. LITERATURE REVIEW

Adsorption is a process that occurs when a gas or liquid solute accumulates on the surface of a solid or a liquid, forming a molecular or atomic film. In other words, adsorption is the adhesion of atoms, ions, biomolecules or molecules of gas, liquid, or dissolved solids to a surface and this process creates a film of the adsorbate (the molecules or atoms being accumulated) on the surface of the adsorbent. The exact nature of the bonding depends on the details of the species involved, but the adsorption process is generally classified as follows: (1) Physisorption: It is a type of adsorption in which the adsorbate adheres to the surface through Van der Waals (weak intermolecular) interactions. (2) Chemisorption: It is a type of adsorption whereby a molecule adheres to a surface through the formation of a chemical bond.

### A. Methodology

#### 1) Data Collection

This might include the field site description, a description of the instruments I will use.

#### 2) Data Analysis

I will manipulate the data that I assembled to get at the information that I will use to answer my questions. It will include the statistical or other techniques and the tools that I will use in processing the data.

#### 3) Close Reading of the primary and secondary texts

#### 4) Interpretation

In this section I should indicate how the anticipated outcomes will be interpreted to answer the research questions.

#### 5) Library works

### B. Scope and relevance of this study

The scope and the purpose of this project is highly relevant in terms of the betterment of the present industrialization. This study will lead us to open out a new vistas of the Removal of Dyes using Conventional and Advanced Adsorbents with Agricultural Waste is high economical value. And with this process the nation of both present and future generation will be valued highly and positively.

## III. CONCLUSIONS AND FUTURE WORKS:

This thesis work focused on liquid phase adsorptive removal of organic dyes viz. Crystal violet and Coomassie brilliant blue where they represent the class of a basic and an acid dye respectively. The major future endeavors which can be proposed based on this present work are: (a) Development of a continuous process including dye degradation setup coupled with membrane filtration module to recover the catalysts for reuse. (b) Experimenting degradation profiles in artificial lights (like Hg vapor lamps) to study the removal efficiencies. (c) Synthesizing mixed matrix of suitable adsorbents to exploit various alternatives.

REFERENCES

- [1] Abo-Farha, S. A. 2010. Photocatalytic Degradation of monoazo and diazo dyes in wastewater on nanometer-sized TiO<sub>2</sub>. *J. Ame. Sci.* 6: 130-142
- [2] Adedayo, O., S. Javadpour, C. Taylor, W. A. Anderson and M. Moo-Young. 2004.
- [3] Decolourization and detoxification of Methyl Red by aerobic bacteria from a wastewater treatment plant. *World J. Microbiol. Biotechnol.* 20: 545-550.
- [4] Ahmed, I., A. Yokota and T. Fujiwara. 2007. A novel highly boron-tolerant bacterium, *Bacillus boroniphilus* sp. nov., isolated from soil that requires boron for its growth. *Extremophiles.* 11: 217-224.
- [5] Alaton, A., I. A. Balcioglu, and D. W. Bahnemann. 2002. Advanced Oxidation of a Reactive Dyebath Effluent: Comparison of O<sub>3</sub>, H<sub>2</sub>O<sub>2</sub>/UV-C and TiO<sub>2</sub>/UV-A Processes. *Wat. Res.* 36: 1143-1154.
- [6] Ali, N., A. Hameed and S. Ahmed. 2008. Decolorization of structurally different textile dyes by *Aspergillus niger* SA1. *World J. Microbiol. Biotechnol.* 24: 1067-1072.

