

EFFLUENT TREATMENT – PART II

REF: TT/ APRIL 2021/ WK 1

Effluent Treatment Processes

The textile dyeing industry consumes large quantities of water and produces large volumes of wastewater from different steps in the dyeing and finishing processes. Wastewater from printing and dyeing units contains huge amount of dyes and chemicals, such as complex components, high COD and BOD concentration and materials which are difficult to degrade. Various types of synthetic dyes are used in the industry and discharge large amounts of colored wastewater due to presence of unfixed dyes, which goes into water during washing-off processes.

Property	Standard	Cotton	Synthetic	Wool
pH	5.5-9.0	8-12	7-9	3-10
BOD(mg/l)	30-350	150-750	150-200	5000 -8000
COD (mg/l)	250	200-2400	400-650	10,000-20,000
TDS (mg/l)	2100	2100-7700	1060-1080	10,000-13,000

Fig 1.1 Properties of waste water or effluents

Ref: researchgate.net

Note – Standard refers to standard effluents from textile processing plants

Properties of Textile processing Water

pH – 6.9

BOD – 30 PPM

COD – 250 PPM

TDS - 2000 PPM

Ref: ijert.org

Since the effluents discharged from textile plants are a mixture of dyes, metals and other pollutants; there is no single treatment method is suitable for its treatment. Therefore, the treatment of wastewater is done by various methods, which include physical, chemical and biological or hybrid treatment depending on pollution load.

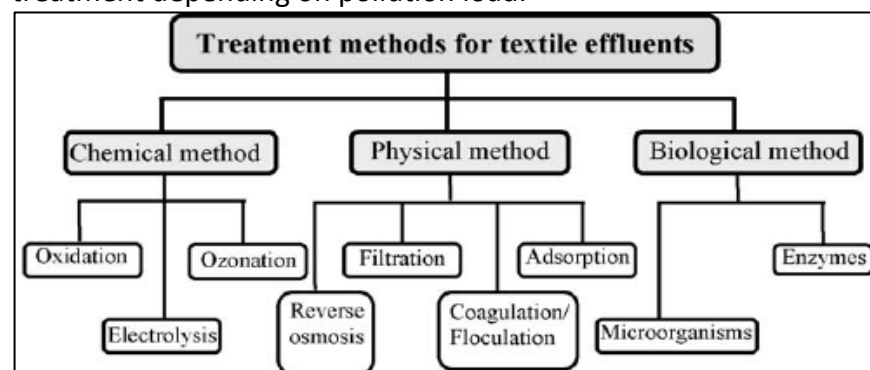


Fig 1.2 Effluent treatment methods Ref: researchgate.net



1. **Oxidation Method** – Oxidation method is the widely used method for degradation of dyes by chemical way. The application of this method is simple. This process degrades dyes and chemicals either partly or completely under ambient conditions. Chemical oxidation methods use oxidizing agents like O₃ and H₂O₂. Degradation of the dye is also possible by the combined treatment of UV light and the H₂O₂.
2. **Biological Method** - The biological method removes only the dissolved matter in textile wastewater. The efficiency of biological methods for degradation depends on the adaptability of the selected microbes and the activity of enzymes. A wide range of microorganisms such as bacteria, fungi and algae are able to degrade a wide variety of dyes present in the textile wastewater. White rot fungal cultures are used for the removal of azo dyes. Algae are easily available and used considerably for the degradation of textile wastewater

This method has several benefits like

- a. Its eco-friendly
 - b. Cost effective
 - c. Less sludge production
 - d. Less consumption of water
3. **Physical Method** – Coagulation/flocculation based physical methods are useful for the decolorization of wastewater containing disperse dyes. They have low decolorization efficiency for the wastewater having reactive and vat dyes. These techniques also generate large amount of sludge. However, adsorption method has greater decolorization efficiency for wastewater containing a variety of dyes. High affinity and adsorbent regeneration ability* are the main characteristics to be considered during the selection of an adsorbent for color removal.

***Adsorbent regeneration ability** - Organic pollutants adsorbed onto the adsorbent surface can be converted into harmless compounds such as carbon dioxide and water. According to this process, adsorbents can be regenerated and recover their original adsorption capacities.

References:

1. <https://core.ac.uk/>
2. <https://www.fibre2fashion.com/>
3. <https://www.sciencedirect.com/>
4. <https://www.ijert.org/>

.....To be continued.....

UNSCRAMBLE THE JUMBLE WORDS
MENTTREAT
ICALLOGBIO
GIFUN
DGESLU

Last week`s Answers: 1) EFFLUENT 2) WASTE 3) BIOLOGICAL OXYGEN DEMAND 4) REUSABLE

Wishing you a great week ahead!

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