# A Study on Review of Literatures of Treatment on Paper Plant Effluent

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**Abstract-** The present era shows a greater sustainability for water. The major sources of water are lake, river, sea etc, the availability of these water is in insufficient range. Thus these water are in greater need to be get treated. In this paper an attempt has to study the review of literature concerned mainly with treatment of wastewater from paper pulp effluent. The various authors suggestion for treatment of effluent paper mill concluded that mechanical filters were most suitable. An addition to this a major concern was given to biological materials for eco-friendly effluent treatment.

*Keywords*- Waste water treatment, paper plant effluent, filter, Eco friendly

### I. INTRODUCTION

In the present era of intensive industrialization and extensive urbanization the generation of waste effluents also happen in parallel rains has the outcome of multi various physical, chemical and biological process involved. Most of this effluents generated originate from domestic usage of water or industrial consumption or agricultural irrigation and drainage needs. The effluents generated contain noxious ingredients that are deleterious to the environment in accelerating atmospheric pollution and geo hydrospheric contaminations, if not properly treated. Paper plants to contribute significant proportions of waste by products realizes as the solid or semi solid and viscous pulpy matter or the liquid effluents comprising suspended and dissolved pollutants.

The present era of converting any sort of waste material into a beneficial specific purpose product, filtration units are mandatory as a part of treating waste water effluents generated from multiple sources such as domestic, industrial and agricultural. Since the present investigation is affiliated to the arena of agricultural engineering where in the waste products are expected to be transformed into beneficial manures are irrigable waters. The present investigation has been set to explore the possibilities if creating a representative filter model that can segregate the paper plant effluents into solid manures or irrigable waters. Hence, it becomes

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imperative to collect data and information alongside established experimentation results that are available in publications of scientific articles in reputed journals. Following is a compendium furnishing and overview of chronologically sequenced and categorize in sub topics that are relevant to the objectives of the present investigation in developing a dynamic bio mechanical filter.

## **II. REVIEW OF LITERATURE**

**Deepak kumaryadav et al., (2009)** carried out a study on "Treatment of paper and pulp mill effluent by coagulation method" how to remove the paper and pulp mill effluents in eco-friendly manner by the coagulation method and he also suggested the use of ozone in bleaching process instead of chlorine, which reduces the waste water discharge loadings of BOD and color of bleach plant. The author also indicated that the use of coagulation method for the purpose of treatment. From the study it was suggested that it is one of the low cost ecofirndly method and the effluents were treated in an efficient manner.

**Chaudhari PK, et al.,(2010)** studied on "Treatment of paper and pulp mill effluent by coagulation". This paper reveals that the removal of COD and colour of the paper effluents were treated using the coagulation method. The utilization of poly aluminium chloride and copper sulphate, tremendously decrease the colour and COD. In addition to that pH of the effluent was also decreased. From this it was concluded that this is an efficient way of treating the waste water effluents.

**K.Selvam et al.,(2011)** studied on "Bio remediation of pulp and paper mills effluent by newly isolated white rot fungi from western Ghats area of south India". This paper revealed that bioremediation process of treating the effluent from the paper and pulp industry using the fungi. Several strains of white rot fungi which is to be found in decolorize the waste water and in reduction of AOX (absorbable organic halides) and COD this can be achieved by the absorption or oxidative degradation by enzymes. It was seen that the COD was reduced to 42.1% by Phellinus sp.., maximum decolourization of 66.2% was achieved by Polyporushirsutus. From this paper

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it was concluded that the paper mill effluent colour and COD was removed in an eco friendly manner.

**Praveen Kumar et al., (2011)** studied on "Advanced oxidation of pulp and paper industry effluent". This paper evidenced that the advanced photo catalytic oxidation of the pulp and paper industry has been studied with UV/TiO<sub>2</sub> and UV/TIO<sub>2</sub>/H<sub>2</sub>O<sub>2</sub> treatment process for the purpose of environmental load reduction. The performance of photo oxidation experiment was carried out in an UV radiation in the slurry type of reactor with optimized treatment condition. The major study of this method was carried utilizing solar radiation for the photo catalytic degradation of pulp and paper mill effluent. The author founded that, the organic load of primary clarified effluent 57.95% in COD ,42.9% in BOD, 89.25% in color and bio treated effluent by 74.8% in color reduction.

Shanthi J et al., (2012) studied on "Characterization and isolation of paper mill effluent degrading microorganisms". This paper evaluated the characterization and isolation of paper mill effluents regarding microorganisms. The paper mill effluents contains seven prominent bacteria species like Bascillus pseudomonas, enterobacter spp., bacillus subtilis, citrobacterfreundi, alcaligenes and burkhoideria which was discussed. The Effective floc formation with the possible permutation and combination of all four strains enhanced the settling process was attained better in *Pseudomonas alkaligenes and Enterbactor spp*. This was followed with the combination of *Citrobacterfreundi and bascillussubtillis*. The author achieved a complete removal of colour, pollutants and COD from the paper mill effluents.

**V.P. Kesalkar et al., (2012)** studied on the "Physico-chemical characteristics of waste water from paper industry". This paper analysed the physical and chemical properties of waste water. The waste water sample was collected from the inlet and outlet of the effluent treatment plant in the paper mill. The samples were examined and compared with the effluent discharge of Indian standards. Thus from this study it was concluded that waste water consisted of high concentrations of TSS, BOD, SS and COD with reference to IS standards.

**Arshad Aliet al.,(2013)** carried out an investigation on "Treatment of paper mill effluent- A review". This paper revealed about the various treatment techniques used for the treatment of the paper plant effluent, the treatment techniques were economically beneficial, the treatment techniques includes reverse osmosis, ozonation, aerated lagoon, activated sludge process, anaerobic process are used for the treatment of paper plant effluent, by the way the high toxic pollutants ,BOD, COD, AOX are removed by the physcio-chemical techniques, whereas anaerobic process and activated carbon

are efficient in treating the paper plant effluent. From this study, indicated that the use of ultra filtration in combination with the dissolved air flotation was very effective in removing the heavy metals from the effluent.

JayashreeDhote et al., (2014) carried out study on "Review on waste water treatment technologies". This paper reviewed the use of waste water treatment technologies to remove the contaminants from the waste water such as halogenated carbon, heavy metals, dyes and other organic pollutants. From the study it was suggested that the necessity of treating the industrial waste water and there by utilizing the water in an efficient way, by using the low cost technology and the reduction is carried with modern mechanization which reduces the risk of malfunction.

**Virendrakumar et al.,(2014)** studied on "Biological approach for the treatment of pulp and paper industry effluent in sequence batch reactor". This paper examined about the sequential batch reactor which was used for removal of pollutants from the waste water of paper mill by using bacterial consortium (klebsiella sp., Alcaligens sp., and cronobactor sp.,). The Bio remediation experiment resulted in reduction of chemical and bio chemical oxygen demand upto 72.3% and 91.1% respectively and also it reduces the colour absorbable organic halides and TSS and TDS. It was concluded that the use of bacteria group consortium has a high potential in reducing the high toxic organic effluents.

**Damodhar J garkal et al.**, (2015) studied on the "Domestic waste water treatment by bio-filtration" the effluents is removed by using bio-filters, which indicates the use of aerobic treatment and applied filtration technique called vermifiltration, where as earth worm works as a bio-filter and extends microbial metabolism, discovered that vermifiltration has a high efficient in removing COD&BOD, nitrogen and phosphorus. It was one of the biological ways of treating the waste water. The main advantage of this method was that many organic pollutants were removed whereas earthworm degrades waste water by the enzymatic action. It was concluded that the odour of the waste water was also controlled in this method, by the way the nitrogen, potassium, phosphorus, calcium was converted through microbial action into more soluble and biologically available to plants.

**Mariasubhasini et al., (2015)** studied on "Biological treatment process of pulp and paper industry waste water". This paper revealed about the bio filtration method of treating the effluents using the bio firm reactors, this method was only used for the waste water containing low BOD concentration due to the clogging problems, and it was the economic efficient method of treating the effluent from the paper plant.

The removable of biodegradable organic substances; both soluble and finely dispersed was accomplished by biological oxidation with the help of microbial consortia principally bacteria. It was concluded that the biological filtration was suitable for treating low pollution loading, energy generated through aerobic digestion process can help to reduce the demand for fossil fuels.

Kaizerhossain et al., (2015) studied on "Bioremediation and detoxification of pulp and paper mill effluent". This paper revealed that the biological treatment of removing the toxic effluents from the waste water. This method utilizes the microorganisms including fungi, bacteria, and algae, enzymes as a single step treatment or in combination with other physical or chemical methods. Compared to the physio chemical way, the biological method treatment was considered to be cost benefit, eco-friendly and suitable for reduction of BOD and COD. It also denotes that bioremediation process was a pollution control technology where there was an use of biological systems to catalyze the degradation or transformation of various toxic chemicals. From the study it was noted that the performance of treating the waste water by this method has a higher efficiency and eco-friendly.

Priyanka et al.,(2016) studied on "Anaerobic treatment of pulp and paper mill waste water using up flow anaerobic sludge blanket reactor". This paper revealed that the effluent from the paper mill consist of lignin, resin, tannin, chlorophenolic compounds resistant to biodegradation, this effluents causes the slime growth, thermal impacts, scum formation and colour formation. This study has been designed mainly to assess paper plant effluent treated using the up flow blanket reactor where the organic matter was reduced by bacteria inside the sludge bed, the up flow blanket reactor was designed depending on the total solid content and COD removal. The UASB reactor which has a high efficient in removing the toxic effluents. The maximum effluent of COD removal was achieved about 87% and when the reactor was operating at an OLR rate of 0.71kgCOD/m<sup>3</sup>day. The outcome showed that it is one of the cost efficient methods of treating the waste water effluents from the paper industry.

**Meena.V.sanas et al., (2016)** studied on "Fly ash used in waste water treatment". This paper reviewed that use of fly ash in the waste water treatment which reduces the COD, BOD, TSS and alkalinity, turbidity and thereby filtering the heavy metals from the waste water. After the treatment of waste water with fly ash the TSS level is reduced up to 69.02%, COD level is reduced up to 66.59% and BOD level reduced up to 71.48%. From this it is suggested that Fly ash filter bed is most economical, efficient and eco-friendly way of treating the waste water.

**S.S.Wong et al .,( 2016)** studied on "Treatment of pulp and paper mill waste water by polyacrylamide in polymer induced flocculation". This paper reveals about the reduction of turbidity and COD and the removal efficiency of TSS have been done by using C-Pam and A-Pam as a flocculants in treating pulp and paper industry. It can be achieved 95% of turbidity reduction, 98% of TSS removal and 93% of COD reduction. The C-Pam produces compacted and dense flocs that can settle faster. This paper resulted in the utilization of single polymer system which can be used alone (without combination with in organic coagulant) in coagulation-flocculation process since efficiency of poly acrylamide was remarkable. It was concluded that the use of polyacrylamide has a higher efficiency in the coagulation method.

#### **III. CONCLUSION**

The treatment of waste water is a vital research area. A review of literature was framed with 15 research papers describing different types of treatment of paper mill effluents. This literatures gave an exposure towards various types of treatment of waste water, biological and mechanical filters used in the paper plant, some literature gave an additional study of microorganisms which are used to treat the paper mill effluents in an economical manner. Thus concluding that Mechanical filter is more economical and has a higher efficiency.

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