

TREATMENT OF WASTE WATER USING LOCALLY AVAILABLE NATURAL MATERIALS

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ABSTRACT:

Water is an essential requirement for the establishment and maintenance of diverse human activities. Water pollution affects wildlife, ecosystem, human health etc. The degree of wastewater treatment varies in most developing countries. This project deals with treatment of waste water by using locally available materials like sugarcane waste, charcoal and coconut shell by filtration. The effluent of wastewater is a high chemical leather tannery effluent collected from a leather tannery near Chennai. Before carrying out the treatment the important parameters like Ph, turbidity, Chloride, total dissolved solids, hardness were tested. Finally, the treated water is once again checked for changes in parameters.

Keywords: cost effective, natural materials, treatment process

1.INTRODUCTION:

Tanning industry is one of the oldest industry in the world. It is considered as pollution generating industry which produce toxic chemicals. These toxic chemicals create threats to environment. Water is used in tanning process of which 90% of water is discharged as effluent. The parameters like salinity, COD, BOD, Inorganic matter, dissolved solids, suspended solids, ammonia and heavy metals are discharged with high range of toxicity. During the Chrometanning process 40% of chromium salts are usually discharged in the final effluent causing a serious threat to the environment. Exposure to toxic pollutants increase the risk of dermatitis, ulcer, nasal septum perforation and lung cancer. But tannery industries are not much concerned about human health and environmental safety. The process depends on several factors like efficiency cost effective and environmental capability.

2.MATERIALS ANDMETHODS

2.1. Study area

A Tannery industry near Chennai was selected for collecting effluent samples. The tannery produces semi-finished tanned leathers.

2.2. Sample Collection

The water sample for the present evaluation was gathered from this tannery in plastic containers of about 5ltrs. Then the sample was shifted to the laboratory for examination.

2.3. Treatment Process

The treatment process involves stagnation and filtration of waste water in various beds made of natural products.

2.3.1. Alum treatment

Alum treatment turns the water into nontoxic substance or floc. This treated water is then passed to the further layers of treatment.

2.3.2. Sugarcane Layer

Bagasse was collected from a locally available juice shop. The collected bagasse was dried in oven to remove the moisture content completely. Oven dried bagasse were then grinded to powder form. It was then spread over a width of 2.5cm. The

alum treated water was made stagnant on this layer for 24 hours. Which is then passed to next layer.



2.3.4 CharcoalLayer

Charcoal is commonly used in water treatment to remove contaminants from the waste water. It has a excellent absorbent capacity. Charcoal is the Ideal water filter because it removes toxins from water without stripping the water of salts and important minerals. Here the water is made to stay for more than 24 hours to obtain better quality of filtered water. Then it is passed to the next layer.



2.3.1.Coconut ShellLayer

Coconut shells were collected and were broken into small sizes of aggregates. And spread as a thick layer which helps in aerating the treated water.



3.CHARACTERISTICS

concentration of a solution and it is thus a measure of whether a liquid is acid or alkaline. Acceptable limits for the discharge of waste water to both surface water and sewer vary, ranging between from pH 5.5 to 10. If the surface water pH shifts too far either away from the pH range of 6.5 to 7.5. Sensitive fish and plant life are susceptible to loss.

3.1 Colour

Color of the waste water is one of the most important indicators of water pollution as it is aesthetically displeasing and can greatly damage the receiving water bodies. Tannery wastewater contains organic and inorganic complex constituents and exhibit high color concentrations which are not typically reduced through conventional treatment technologies.

3.2 Odour

Out of these the NH_3 and H_2S both are toxic gases which are the responsible for the odour in the tannery. The NH_3 having strong pungent and H_2S having fouling smell both giving an odour in and around the tannery environment

3.3 Hardness

It is a bulk parameter. It is analyzed by titration using EDTA. Hardness is a natural characteristic of water which can enhance its palatability and consumer acceptability for drinking purposes. Health studies in several countries in recent years indicate that mortality rates from heart diseases are lower in areas with hard water. It includes temporary and permanent hardness. If it exceeds beyond 200mg/l then it leads to blockage of pipes and reduction in boiler efficiency

3.5 ph

It is a physical parameter. It is analysed by using electrodes. pH is the negative algorithm of the hydrogen ion

3.4 Chloride

It is a chemical parameter. It is analyzed by titration method. Its origin is from industrial effluent, treatment processes chlorinated sewage and other effluents. Water supplies are disinfected to destroy or deactivate microorganisms which can produce diseases such as cholera, typhoid and so on, and the process is the most important in water treatment. Disinfection maybe achieved in various ways but the vast majority of supplies are treated with chlorine which is a powerful oxidizing agent and an extremely efficient disinfectant. It is relatively easy to handle and is also cost-effective, hence its almost universal use. No direct significance at the relatively tiny levels used in water treatment processes.

3.5 Total dissolved solids

It is a bulk parameter. It is analyzed by settlement in Inhofe cone. In case of health significance, no direct implications, but in water is an indicator of gross pollution. Its main use is in the assessment of treatment plant performance

CONCLUSION

The study showed that the untreated tannery effluent contained extremely high values of parameters these values were far above standard prescribed limits for ISW-BDS results suggest that the leather industrial effluents were not suitable for discharging into water bodies which causes health issues. This study illustrates the filtration process could reduce certain pollution level. Which would make the water less harmful to let into water bodies

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