

Research Paper :

Assessment of leather tannery effluent using multiple indicators

■D. SARALA THAMBAVANI AND V. PRATHIPA

See end of the paper for authors' affiliations

Correspondence to:

**D. SARALA
THAMBAVANI**

Department of Chemistry,
Sri Meenakshi Govt. Arts
College for Women,
MADURAI (T.N.)
Email : sarala_dr@yahoo.in

ABSTRACT

In the present study physico chemical parameters such as Temperature, pH, Total dissolved solids, Total suspended solids, Electrical Conductivity, Calcium, Magnesium, Total Hardness, Chloride, Sulphate, Phosphate, Nitrate, Nitrite, Biological Oxygen Demand, Chemical Oxygen Demand and Dissolved oxygen were analyzed in the leather tannery of Dindigul, Tamil Nadu. All the parameters were found to be above the standard limit. The tannery effluent was alkaline with high BOD and COD, along with higher concentration of Total dissolved solids and Total Suspended solids, Sodium adsorption ratio and high amount of sodium having water quality class C3S1. A systematic statistical analysis showed correlation between water quality parameters. Water quality index minimum (WQI minimum) calculated using Temperature, pH, Electrical conductivity, DO and Total suspended solids which showed that effluent belonged to bad water class. Water quality index (WQI) calculated using all the 16 physico-chemical parameters showed that effluent belonged to very bad water class. The total dissolved solid present in the effluent is maximum hence effluent is unfit for irrigation and for any use. The discharge of leather tannery effluent is leading to the contamination of ground water to the surrounding area and highly polluting the environment. It can thus be concluded that waste effluent from leather tannery is unfit for agricultural use and it may have deleterious effect on soils when used for irrigation purposes causing salinity and sodicity problems unless proper management techniques are adopted.

KEY WORDS : Waste water effluents, Water quality index(WQI), Physico - chemical parameter, Tannery, Correlation, Water quality parameters, Sodium adsorption ratio (SAR), Water pollution limit, Threshold hazard of waste water and normalization factors

How to cite this paper : Thambavani, D. Sarala and Prathipa, V. (2011). Assessment of leather tannery effluent using multiple indicators. *Asian J. Exp. Chem.*, 6 (2): 47-57.

Received : 11.05.2011; **Revised :** 02.08.2011; **Accepted :** 02.10.2011

Human civilization originated, developed and thrived in places within easy reach of fresh water sources. Amongst global resources, water is emerging as perhaps the most critical but misused natural resource (Saleemi, 1993). Water is the elixir of life without which no biota could survive in the biosphere. The industrial growth in Dindigul though solving economic problem, also add upto environmental pollution as waste water effluents from tanneries are discharged into water bodies deteriorating the water quality (Faisal and Husnain, 2004; Qureshi and Barrett – lennard, 1998). The discharge of industrial effluents, besides increasing the dissolved residues, which increase the total amount of sediments, also bring about chemical transformation in soils continuously irrigated by polluted waters (Faisal and Husnain, 2004). As a result of this, serious biological and ecological instability may occur as more and more industrial wastes are thrown out

into the bodies of water.

Industrial pollution is a global concern. Among the major different industries, the tanning industry is a notorious polluter of the environment. The tannery effluent pollutes soil and ground water if washed into the river. Tannery effluent is the untreated waste water of tanneries. It appears as dull grey colour with the odour of the hydrogen sulphide. It contains the preliminary hairs of animals. Pollutants are blood, fat, pieces of flesh, soil particles of other biological origin. In the tanning process, various inorganic and organic chemicals like Chloride,

Sulphides, Tanoloin (16 % Chromium), titanium dioxides are used (Manivasakam 1987). The tannery effluents contain high concentration of metallic ion like Chromium, Potassium, Sodium and Magnesium and organic pollutants like oil and grease, tannin and lignin (Manonmani *et al.*, 1991). Tannery is one of the major