



## Physico - Chemical Analysis of Tannery Effluents And Its Impact on The Grazing Sheep in Manpura Machedi Area of Jaipur District

## KEYWORDS

Allergies, Chemical Oxygen Demand, Effluents, Gastrointestinal, Neoplasia

\* Dr. Meenu Mangal

Department of Chemistry, Poddar International College, Mansarovar, Jaipur, Rajasthan, 302020  
\* Corresponding Author

Dr. Girijashankar Tailor

Department of Chemistry, Poddar International College, Mansarovar, Jaipur, Rajasthan, 302020

**ABSTRACT** The survey was conducted in Manpura Mchedi leather industries to study the impact of discharged effluents on the environment. The waste water of a tannery in Manpura Mchedi, Rajasthan was highly acidic (pH=4.04) with high values of conductivity Total Dissolved Solid (TDS) and Total solids(TS). The sample had high Chemical Oxygen Demand (COD) value of 2200 mg/L and high compared to the parameters tested of surrounding bore well and hand pump samples. Effect of the effluents on grazing sheep (12-15 months) revealed a sharp decline in their health. A Significant reduction in body weight (by 67.2%) was observed. Other complications included body weakness, skin ailments, allergies, neoplasia, reduced milk production and gastrointestinal complications.

## Introduction

The industrial growth in India has though accelerated our economic development, also added up to the environmental pollution as the waste water effluents from tanneries are discharged in to waste bodies deteriorating the water quality (Faisal and husnain, 2004; Qureshi and Barrett -Lennard, 1998). These Industries are potential sources of inorganic as well as organic toxicants including heavy metals (Timmsina, 1988; EISP, 1987; miyoshi, 1987). The industrial discharge of effluents increase the dissolved residues and bring about chemical transformation in the soils. The release of tannery effluent in to grazing pastures results in long term effect on sheep population. Therefore, an attempt has been made to analyze the chemical composition of the effluents of a leather industry and study its impact on the health of the grazing sheep.

## Materials and Methods

Effluents samples of a tannery in Manpura Mchedi were collected from the main out fall in the plastic cans. The name of the tannery is deliberately omitted to protect the privacy of the industry. Industrial effluents were analyzed for physico-chemical parameters following rain water and thatcher (1960) and APHA (1976). These were compared to ground water samples (Hand pump and Bore well) from the surrounding areas.

The waste water was greenish black in colour and contained a number of solid waste material. The data on the body weight of 250 Sonadi sheep (aged 12-15 months) maintained by 24

Shepards in the area, was recorded. It was compared to that of control. Also, a questionnaire was prepared with expert advice regarding health of sheep grazing on pastures in that area regularly and was compared to control.

**Table - 1 : Analysis of physico- Chemical parameters of tannery effluents and that of groundwater samples ( Handpump= HP, Borewell sample = BW)**

Parameter	Tannery Effluent	BW	HP
Colour	Greenish Black	Transparent	Transparent
pH	4.04	6.97	7.25
conductivity	1.000	0.343	0.530
Temperature (°C)	38 °C	34 °C	34.5 °C

TS (mg /l)	49300	1200	700
TDS ( mg \ l)	28600	700	600
Total Acidity ( mg\l)	1500	500	1000
Calcium (mg\ L)	160.32	80.16	80.00
OD (mg\l)	0	3.5	3.0
COD (mg\l)	2200	0	10
Chloride (mg\l)	4600	600	520

**Table - 2 : Effect of tannery discharge on 250 grazing sheep ( aged- 12-15 months )**

Parameter	No. of affected sheep	% of affected sheep
Weight (Kg)	168	67.2
Body Weakness	89	35.6
Skin Aliment	54	21.6
Allergies	48	19.2
Neoplasia	32	12.8
Reduced milk production	39	15.6
Gastrointestinal Complications	52	20.8

Body weight of Control

Sheep (Kgs) – 22.53 ± 0.88

## Result And Discussion

Environment is under increasing pressure from solid and liquid waste emanating from the leather industry. Liquid wastes discharged into sewage systems and pastures cause significant pollution and is extremely hazardous to the environment. Tannery effluents have more pronounced toxic effects than other related industries.

The present investigation reveals low pH and significant high conductivity, acidity, total solids and salinity.

COD was very high (2200 mg/l) indicating high degree of toxicity (Table-1). Heavy metal chromium is used in processing of hide to form leather. The tanning industry discharge different types of wastes primarily of liquid effluents containing organic matter, chromium sulphide, ammonium pentachlorophenol and other salts which not only affect the quality of environment, but also are toxic for flora and fauna (Bevenue and Beckman, 1987).

Sheep grazing regularly in the pastures around the tannery showed sharp decline in the health. Apart from significant reduction in the weight (by 67.2%) compared to control, general weakness was observed. Shepherds complaint about reduction in milk production, skin ailments, allergies and sudden death was also a common feature. Neoplasia or malignant transformation was also observed. USEPA regards all chromium compounds of both Cr (VI) and Cr (III) have induced developmental effects in experimental animals that include neural defects, malformation, cancer

and foetal death (Beyersmann and Koster, 1987). High acidity of effluent might be responsible for gastrointestinal complications due to corrosion of intestinal mucosa. It has also been reported that heavy metals bind to sulphydryl groups of amino acids, inhibiting essential enzyme function (Jerome and Ferguson, 1972).

Thus, the present investigation has clearly shown that tannery effluents are highly toxic and pose severe environmental problems. Efforts should be made to minimize the toxicity of effluents before discharging them in the environment.

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