

## LEATHER AND ENVIRONMENT

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### **ABSTRACT:**

*Leather has globalization position in the world business. Tanning is continuous processes which have various steps in making leather through raw hides and skins. While tanning operation, leather left their waste materials which have no use after it. These wastages are collected in a large quantity every year and environment makes the use of behavioral tests in the detection of toxicity almost imperative. These chemical wastes are drained through pipes lines into rivers, ponds and canals. Leather craft depend upon the physical equipments such as building, machinery, and equipments and partly upon the methods of work. This paper will focused on condition and impact of these wastages on the environment. It will also focus on working condition of labour in an unhygienic atmosphere. It also shows how the leather factories treat with these waste materials in India.*

**Keyword:** *Leather, Environment, Working condition, Wastage, Pollution, Atmosphere.*

### **INTRODUCTION**

Leather is a hide or skin prepared from the pelts of domestic and wild animals by processing with either the bark or fruits of certain trees and shrubs, or some mineral salt, or some chemicals process. These agents are called tanning material. Leather is a durable and flexible material produced at manufacturing scales ranging from cottage to large industry. Tanning is the process of treating skins and hides with either vegetable or chemical process to produced leather. Tanning industry is one of the oldest industries in India. Tanning and leather industries have established a large export market for its products abroad. The entire leather tanning process involves chemical and organic compounds that can have a harmful effect on the atmosphere. Tanning agents such as chromium, vegetable tannins and aldehydes, are used in the tanning step of the process. Chemicals used in tanned leather production increase the levels of chemical oxygen demand and total dissolved solids in water when not disposed off responsibly. These processes also use large quantities of water and produce a large amount of

waste which causes pollution. This waste material are contamination in the air, water and soil have caused a variety of diseases in the people who lived nearby the tanneries. Many of the health problems include asthma, eyesight problems, and skins have emerged in living being. Chromium is not solely responsible for these health problems but methyl isothiazolionone which is used for microbiological protection (fungal or bacterial growth) causes problems with eyes and skins, anthracene which is used as a leather tanning agent, can cause problems in the kidneys and liver and is also considered a carcinogens, formaldehyde and arsenic which are used for leather finishing cause health problems in the eyes, lungs, liver, kidneys, skin, and lymphatic system. The waste from leather tanneries is harmful to environment and the people who live in it.

India is a tropical country and tropical; countries have some specific problem due to the climatic condition. Leather industry is a very big exporting industry of India, but no attention has been paid on health of the workers and environment. Tanneries are significant in terms of India export and employment opportunities for economically weaker population. Sustenance of tanneries, particularly of small factories is becoming increasingly difficult because of alarming level of environmental population caused by various tanning operation and practices. The small and cottage tanneries in villages and outskirts of towns, and owing to lack of facilities for proper disposal of tannery effluent, serious water pollution and acute insanitary conditions in these regions have taken place. The stagnation of untreated waste water, as it is being done in most of the cases, give rise to nuisance, unsightly appearance besides creating ground water and surface water pollution. The growing demand for cleaner environment, especially in context of increasing population necessitates early measures for control of pollution from tanneries. In Kanpur city of Uttar Pradesh, a large no. of tanneries situated at the bank of River Ganges. These tanneries waste material can negatively affect health and ecosystem. About 80 percent of the waste water is untreated and dumped straight into Kanpur main water source, the River Ganges. Farmland is swamped with blue-tinted water, poisoned with chromium III, lead and arsenic.

## **OBJECTIVES**

1. To know the relation between leather and environment.
2. To know how the leather waste material put impact on environment.
3. To know how the leather waste material put impact on human health.

## **LEATHER WASTE IMPACT ON ENVIRONMENT**

Leather tanning industry is one of the major consumers of water and most of the water is discharged as waste water. Liquid wastes are produced in sufficient quantities from soaking, liming, deliming, and pickling, bating,

tanning and finishing operation. Usually soaked water, lime water and spent vegetable tan liquor is discharged irregularly. Spent delimiting and bating liquors are discharged once in a day. Washing after every operation, added to the volume of total effluent coming out of a tannery.

The quantity of soak liquor discharged vary between 2500 and 4000 litres per 1000 kg of hides and skins tanned; the quantity of spent liquor in liming discharged vary between 6500 and 10000 litres per 1000 kg of hides and skins tanned; while in fleshing and unhairing operation is usually continuous and contains mostly hair and fatty and fleshy matter in it; the quantity of waste discharged in delimiting vary between 7000 and 8000 litres per 1000 kg of hides and skins tanned; the quantity of effluent in chrome tanning discharged vary between 4000 and 5000 litres per 1000 kg of hides and skins tanned; the pollutant coming out from the tannery includes such as constituents of raw-hides or skins, which should be removed during leather processing like hair substance, fat from hides and skins, non-collagenous protein and salt used for preservation, pollutants arising out of washing use and chemicals used in the processes.

At the national level, the effluent released from the industry are causing considerable damage and concern for our environment. Vegetable tanning effluent which is dark brown in colour is very rich in organic matter, tannin and total dissolved solids, predominant among which are chlorides. In mixed tanning industry, chromium forms additional pollutants in the waste water. One estimate of the carbon footprint of leather goods is 0.51 kg of carbon dioxide released, one tone of hides or skins generally produced 20 to 80 cube metres of waste water including chromium, sulfide, fat and other solid wastes. With these solid wastes representing up to 70% of the wet weight of the original hides. While one tone raw hides or skins are tanned, it gives only 200 kg finished leather during the operations and rest of 800 kg are waste material released. According to govt. survey, the volumes of waste waters released from the tannery form every 1000 kg of hides or skins tanned in the following ranges are available below:

- Soaking.....2000-4000 litres.
- Liming.....6500-10000 litres.
- Delimiting.....7000-8000 litres.
- Vegetable Tanning.....2000-4000 litres.
- Pickling.....2000-3000 litres.
- Chrome Tanning.....4000-5000 litres.
- Washing.....30000-35000 litres.

This waste material are in many forms and it would be impact on environment. The following table shows chemical inputs and waste produced during leather tanning processes:

**Table 1**

S. no.	Chemical Inputs	Process Stage	Liquid effluent	Solid Wastes
1.	Salt	Curing	-	Trimming
2.	Lime	Soaking Unhairing Fleshing	Soluble protein Degraded Hair Sulfide & Lime	Sludge Lime & Protein Fat & Flesh
3.	Ammonium Salt Enzymes Acids & Salts	Deliming Bating Pickling	Ammonium Salts Grease Acid Brine	- - -
4.	Chromium Sulfate	Chrome tanning Splitting Shaving	Chromium III, salts and acids -	- Very thin split Chrome shaving
5.	Tanning agents Dyes Lubricants	Retannage Dyeing Lubrication	Liquor containing spent process chemicals in low concentration	- - -
6.	Water and solvent based polymers, pigments	Finishing	Solvent vapour	Buffing dust and leather trimmings.

**Source:** Alexander, K., & Donohue, V. (1990). Cleaner Technologies in the Tanning Industry. In *Proceeding of the International Conference on Pollution Prevention* (pp. 10-13), p. 22.

The effluent emanating from vegetable tanning industry are highly polluting in nature and polluted the different environment media like stream, land, sewers, etc. The surface water of lakes, streams and rivers receiving tanning effluents, developed persistent colour, brackishness, and putrefactive tendencies. The suspended solids reduced the recreational value of the water and these solids kill the fish and aquatic animals by causing injuries by clogging the gills and respiratory passage of the fish. Chromate is also hazardous to fauna and flora in natural aquatic ecosystem produces lung tumor when inhaled and induced skin sensitization; the disposal of untreated tannery effluent into sewers enhanced the anaerobic conditions and increases the production of carbon dioxide which combined with the lime present in the effluent and form calcium carbonate in large quantities. These deposits of calcium carbonate, hair and flesh are difficult to dislodge during sewer cleaning operation and become sewer choke problem in many places; the suspended organic solids in untreated tannery effluent clog the pores of the soil, decay there and cause soil sickness. Chlorides in waste water causes chlorosis in the plants i.e.,

destruction of the plant tissues especially leaves. Thus irrigation with tannery effluents impairs the soil productivity and can cause even complete infertility of the soil.

## **LEATHER WASTE IMPACT ON HUMAN HEALTH**

The issue of occupational health is generally subsumed under the broad theme of environmental pollution and it is assumed that controlling industrial pollution automatically takes care of human health. The quality of leather products exported has a lot to do with the quality of tanning – the most polluting, hazardous but the most labour-intensive component of the leather industry. Leather industry as such consists of three different operations, namely, leather tanning, finishing, and products. The first two operations are totally banned in developed countries, on the account of environment pollution and human health. But in India, it provides employment to the large number of people. It can be noted that the leather industry has been designated as a ‘hazardous industry’ under the Factories act, 1948. This factories act provides every factory should be kept clean and free from effluvium arising from drains and also provides that all the factories should be well sanitary and clean. According to Raga committee (1944-46), while considering the working conditions in general under the three main points i.e., ventilation, temperature and lighting, expressed its dissatisfaction with the situation then prevailing in the country.

While the tanning process, a large number of chemicals used which give a large quantity of leather waste material in the form of liquid and solid. During the process, some chemicals are dangerous for human health i.e., sodium sulfide, sulfuric acid, ammonia, acetic acid, chromium, formaldehyde, etc. when these chemicals are submersed in land, air and water and prolonged contact with human being leads to many problems and diseases i.e., dermatitis, conjunctivitis, nervous disorder, itching of skin, throat, mucous membranes, chest pain, asthma, bronchitis, ulcer, fissures in arms, nose, mouth, feet, etc.

Leather waste material i.e., mostly chromium puts much impact on human health. The workers on exposure to leather dust, which contains chromium in the protein-bound form, exhibited a higher mean concentration of urinary and blood chromium turn the reference values. The higher biological values of chromium among the tanners could be explained by atmosphere pollution caused by the liberated leather dust at the work place. The prevalence of occupational allergic contact dermatitis might be impact of leather waste in human health. There is another prevalence of eyestrain in the working children of leather footwear industry was found in a large number and some other health problems found in the working children of leather industry i.e., leather waste affecting the skeletal system, nervous system mainly in dizziness and tingling in palm and fingers, etc. A shoe leather softener

is a combination of two aromatic hydrocarbon solvents i.e., benzene and toluene. These waste are react with human body resulted nausea, vomiting, ataxia, and visual disturbance, etc.

## TREATMENT AND DISPOSAL OF LEATHER WASTE

There are some steps to reduce and recycle the leather waste material as given below:

- Better housekeeping.
- Alteration of processes and low float systems to use less water.
- Separation of cleaner fraction of the waste for direct reuse without treatment.
- Recycle after complete or partial treatment.
- Replacement of chromium.
- More effective use of chemicals and chromium.
- Sulfide free unhairing, possibly with hair recovery.
- Utilization of wastes.
- Re-use of water.
- Odour control and solvent free finishing and nitrogen free deliming, etc.

## CONCLUSION

Leather industry is a very important industry in India but besides this, it also produced a large quantity of waste material which puts harmful effect on environment and human health. It can be said that the govt. took many steps and policies to reduce these waste or recycle it. Rather than, leather waste is very dangerous for human being and environment and it puts negative impact on environment and human health.

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