

Impact of Leather tanning

In addition to the other environmental impacts of leather, the production processes have a high environmental impact, most notably due to:

- the heavy use of polluting chemicals in the tanning process
- air pollution due to the transformation process (hydrogen sulfide during dehairing and ammonia during deliming, solvent vapours).

One tonne of hide or skin generally leads to the production of 20 to 80 m³ of turbid and foul-smelling wastewater, including chromium levels of 100–400 mg/L, sulfide levels of 200–800 mg/L and high levels of fat and other solid wastes, as well as notable pathogen contamination. Pesticides are also often added for hide conservation during transport. With solid wastes representing up to 70% of the wet weight of the original hides, the tanning process comes at a considerable strain on water treatment installations.^[7]

Tanning is especially polluting in countries where environmental norms are lax, such as in India - the world's 3rd largest producer and exporter of leather. To give an example of an efficient pollution prevention system, chromium loads per produced tonne are generally abated from 8 kg to 1.5 kg. VOC emissions are typically reduced from 30 kg/t to 2 kg/t in a properly managed facility. Very clearly, the process remains highly polluting all the same. A review of the total pollution load decrease achievable according to the United Nations Industrial Development Organization ^[8] posts precise data on the abatement achievable through industrially proven low-waste advanced methods, while noting that « Even though the chrome pollution load can be decreased by 94% on introducing advanced technologies, the minimum residual load 0.15 kg/t raw hide can still cause difficulties when using landfills and composting sludge from wastewater treatment on account of the regulations currently in force in some countries. »

In Kanpur, the self-proclaimed "Leather City of World" and a city of 3 million people on the banks of the river Ganges, pollution levels were so high that, despite an industry crisis, the pollution control board has decided to seal 49 high-polluting tanneries out of 404 in July 2009.^[9] In 2003 for instance, the main tannery's effluent disposal unit was dumping 22 tonnes of chromium-laden solid waste per day in the open.^[10]

Environmental impacts

Converting hides into leather is a heavily chemical intensive process utilizing roughly 130 chemicals. The main chemicals used in the various processing stages include sodium sulfide, lime powder, ammonium sulfate, sodium chloride, sulfuric acid, chromium sulfate, sulphonated and sulfated oils, formaldehyde, pigments, dyes and anti-fungus agents. The processing stages are pretanning (soaking, unhairing and liming, fleshing, deliming, washing, bating and degreasing), tanning (pickling, chrome tanning, wet-blue storage, sorting, splitting and shaving), wet finishing (wet back, neutralization, retanning, washing, fat liquoring, dyeing and washing), dry machine process (sammying/setting, drying, stacking/toggling, shaving, trimming and pressing), and finishing (buffing, spraying/coating, drying and glazing/polishing).

Pollution or wastes resulting from these processes are air, solid and primarily liquid. Hydrogen sulfide and ammonia are the major gases released into the atmosphere. However, laboratory results showed emissions lower than the national environmental quality standards.

Most of the solid wastes are recycled. The drums, cartons and chemical bags are procured for reuse. Fleshing, raw trimming and buffing dust is bought by leather board or poultry feed manufacturers. These solid wastes contain chromium residues which are known to cause perforations and bronchiogenic carcinoma to humans who are continuously exposed. Chicken feeds prepared from proteins containing tanneries solid wastes is likely to cause direct entry of chromium into the food chain. Leather shavings are used as cheap fuel in kilns causing the release of chromium into the environment. The remaining solid wastes are usually illegally dumped around the factory area on unutilized lands. These solid wastes include metal contents, such as chromium, aluminum and zirconium, which have a detrimental effect on plant growth.

In the course of processing of hides into leather, roughly 50-150 liters of water were used per one kilogram of converted leather. Thus effluents discharged from tanneries are voluminous, highly colored, contain a heavy sediment load including toxic metallic compounds, chemicals, biologically oxidizable materials and large quantities of putrefying suspended matter. Tannery effluents, without any pretreatment, are discharged indiscriminately into water bodies or open land, resulting in contamination of surface as well as sub-surface water. The lack of effective implementation of legislative control, poor processing practices and use of unrefined conventional leather processing methods have further aggravated the pollution problem caused by the tanning industry.

As in the case of textile effluents, the low pH of tannery effluents cause corrosion of the water-carrying system. Large pH fluctuations and the high BOD value, caused by tannery effluents, can kill all natural life in an affected water-body. Studies have revealed that the water of river Ganges at Kanpur and the sub-surface water of the Palar river basin of India have been

significantly polluted by tannery wastes. Hydrogen sulfide formed due to the presence of sulfide in the effluent and chromium is highly toxic to many forms of life.

In the Punjab and the Palar river basin in India, tanneries are directly contaminating prime agriculture land. Research has shown that the crop-yield has been adversely affected and also of course the food is contaminated. Most of the tanneries in Punjab located in residential neighborhoods which causes a direct threat to the health of the urban population. These include the overgrazing by cattle, the smell of rotting flesh near the tanneries, the odor of sulfide emissions from the dehairing and the ammonia emissions and flue gas. The ammonia emissions during the deliming cause irritation of the respiratory tracts. Other negative effects of the ammonia emissions include the loss of land productivity, retardation of the germination of plants and seeds, headaches, stomachaches, dizziness, night blindness, leprosy, dermatitis and other skin disorders. Leather dust results in allergies and cancers that injure the locals around the tanneries.