

## NEW TREND IN POLLUTION FREE TANNING

- Let's make Ecofriendly Leathers

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Leather Industry occupies a place of prominence in the Indian economy in view of its massive potential for employment, growth and exports. Chronologically the birth of Leather in India dates back to 3,000 years B.C. The innate strengths, innovative technology and marketing strategies have converted the comparative advantage of India into a commercial success making the country a cynosure of Leather and Tanning in the Global Leather Map. Leather makes a contribution to the quality of everyday life and has done so for centuries. Virtually everyone wears or uses one or more leather products on a regular basis. The leather industry utilizes hides and skins which would, if the industry did not exist to process them, create an enormous waste disposal problem with the attendant health hazards.

Though tanning Industries plays a crucial role in the world economy some of the elements of the tanning industry make it easy for our opponents to attack us. Tanning industry is one of the oldest industries of the world and the problem of treatment and disposal of these wastes is probably as old as the industry itself. The leather sector is well known for its effluent problems. While most tanners do the right thing when it comes to the environment others continues to dump untreated effluent straight in the river. Certain chemicals used in traditional leather processing generate considerable amount of pollution. A considerable part of this is discharged into the effluent. Percolation of this saline water has the risk of contaminating soil and ground water posing problems for ensuring a safe environment.

In order to reach a position of sustainability and to compete with the international standards, the industry must aim to reduce the consumption of chemical, water and energy resources. The need for use of alternative to chemical methods to combat pollution problem have become necessary to protect the industry and to comply with the environmental norms. In particular, the implementation of increasingly stringent standards for the discharge waste and Hazardous chemical free Leather products has necessitated the need for the development of alternative processes for the production of finished leather from the raw material stage and treatment of disposal of wastes. Ultimately objective of the processes can be achieved by widely accepted environmental strategy called 4R's i.e., Reduce, Reuse, Recycle and Recover.

Reduction in risk is possible by the technologies based on enzyme offer an excellent scope for the reduction of pollution in leather processing. Enzyme systems that can minimise the effluent burden and replace chemicals which have an undesirable environmental profile will become of increasing interest.

Enzymatic systems fall between the two traditional categories of chemical and biological processes, since they involve chemical reactions based on the action of biological catalysts. Enzymes can also offer a number of advantages over conventional chemical processes. Chemicals used in the leather processing such as Soaking, Bating, Unhairing, Degreasing, etc can be replaced by Enzymes. The advantage of Enzyme application is sulphide free process. Enzymes can also be used for effluent treatment. Biodiesel can be produced from the animal fat extracted from the Leather Industry residual fleshing with the help of Enzymes.

Hydrolytic and oxidoreduction enzymes are used in Effluent treatment. Among these enzymes, oxidoreductases, laccases, and peroxidases have great potential in targeting a wide spectrum of organic pollutants. These enzymes convert a range of substrates into less toxic insoluble compounds, which can be easily removed from waste water. Enzyme laccase has been widely used and explored in wastewater treatment systems to treat specific pollutants. Enzymes had also been used in pre-treatment of wastewater, in particular in wastewater rich in lipids and fat. Pancreatic lipase was used for hydrolysis and to reduce the size of fat particles in slaughterhouse wastewater and for hydrolysis of wastewater from dairy industries. Consortium of enzymes used to improve the quality of the Industrial waste water. This Enzyme based Effluent treatment system

1. Reduces BOD, COD, Colour and odour of the Effluent
2. Improves Waste degradation of specific target compounds like cellulose, phenol and aromatic pollutant, chemical dye, etc..
3. Environmental friendly, biodegradable component for broader activity spectrum.
4. Improves floc settling formation, thus prevent bulking sludge.
5. Enable to absorb the shock of toxic influent
6. Enhances the stability of industrial waste water treatment systems.

Conclusion:

Thus Enzymes have been employed in numerous fields primarily for their immense catalytic potential. Enzymes play a crucial role like

- (1) Aid in the efficient use of raw materials
- (2) Improve the quality and reduce the quantities of waste for disposal, and
- (3)Catalyze the transformation of waste compounds into value added products to give Pollution free Environment.

The biological origin of enzymes reduces their adverse impact on the environment thereby making enzymatic wastewater treatment an ecologically sustainable technique. During our visit to Brazil most of the tanneries following the enzymatic wastewater treatment simultaneously treated water have been reused in tanning operation and for irrigation. The

major limitation of using Enzyme Technology is their loss of activity due to inappropriate storage. Though some of the tanners are started to use Enzymes in tanning process, most of them don't have the knowledge and Technology to handle the Enzymes. Based on the origin and Specificity of Enzymes, they can act in narrow range of pH and Temperature. But they will lose its activity if it is stored in the high temperature for prolonged time



Effluent Treatment plant in Brazil Tanneries.

Recommendations:

To avoid the loss of activity enzyme should be stored in cool (20° C) and dry place and should not be stored with other chemicals to avoid contamination. To avail the whole benefits of the Enzymes, Tanneries should establish a modern clean room Storage system for Enzyme storage.



Clean Room Warehouse with controlled Atmosphere to stock Enzymes

M/s Caprienzymes, Promoting the Concentrated Enzymes with high activity for various industries like Leather, Detergent, paper, Food and Dietary Supplement industries and focussing on the development of Enzyme system for the Effluent treatment. They are Associated with European enzyme Manufacturers for importing Enzymes and Technical support with their efficient team. They can supply Formulated Enzymes also according to the industrial needs. They likely to install 3000 Sq.ft of clean room Warehouse to stock around 50-100 tonnes of concentrated enzymes in addition to that the firm have the facilities of R& D lab and Institution to train the students as well as Industrial persons in Bioprocess technology. The requiring Industries can purchase even in the smaller quantity of conc.Enzymes or ready to use enzyme product directly from their Warehouse

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