Chrome – an immortal disappearing friend!

Chromium tanning

Chrome tanning is the vastly used method by leather manufacturers today. It uses a solution of chemicals, acids and salts to tan the hide. All though the advantages of chrome tanned leathers are quick and easy to produce, soft and supple, stable color and high degree of thermal resistance, it is still considered to be a threat for the human life and the environment.

Sometimes leather manufacturers claim that they don't use the toxic form of chromium in tanning (the toxic form is called chromium VI or hexavalent chromium). And that is correct. Chromium tanned leathers use chromium III salts (also called trivalent chromium) in the form of chromium sulfate. This form of chromium is found naturally in the environment and is a necessary nutrient for the human body. However, the leather manufacturers fail to explain that chromium III oxidizes into chromium VI in the presence of oxygen combined with other factors, such as pH. This happens during the tanning process. Chromium (whether III or VI) cannot be destroyed and will always be in the environment. Incineration, composting and gasification will not eliminate chromium. Therefore, the European Union (EU) has set 2015 deadline for the use of chromium VI in tanning.

Simple Alternate

Vegetable tanning is a simple replacement for the chrome for barks or plant tannins. But there are about 250 chemicals used in tanning. The replacement of chromium for plant tannins, without addressing the other chemicals used is a drop in the bucket. Hence, not much effect was observed in replacing the chrome with plant tannins.

"Chrome-free" leather

Aldehyde tanning is the main type of leather tanning referred to as *"chrome-free"*, and is used in automobiles and baby's shoes. Aldehyde tanning is often referred to as *"wet white"* due to the pale cream color it imparts to the skins. But Aldehyde tanning essentially uses formaldehyde, which is highly toxic to all animals. Formaldehyde reacts with proteins in the leather to prevent putrefication. Globally, a maximum of 200 ppm of formaldehyde for articles in general use is accepted. Also, aluminium salts have been suggested as an alternate to chrome. The use of aluminium has been found to be less toxic and has reduced the usage of colorants.

Chrome or Vegetable or Aldehyde?

Various studies were conducted to evaluate the various tanning chemicals, to see if there was an environmentally preferable choice between chrome, vegetable and aldehyde based processes. The result showed no significant differences between the three. All had different environmental impacts to the same degree, with the least being vegetable tanning.

Enzyme based tanning methods

Off late enzymes have been making their presence in the tanneries for replacing the chemicals in most of the processes in tanning. Processes such as soaking, dehairing, bating, liming, pickling and degreasing have been carried out in the presence of enzymes such as protease, lipase, amylase and carbohydrase. These enzymes have been producing good articles and are pollution free. They are eco friendly and bring a significant reduction in the use and wastage of water.

Conclusion

Overall, when you see the performance of the above tanning processes, it is the chrome tanning that stands tall compared to any other tanning process. Its unique performance properties cannot be matched by any other method. Industrialists claim that the current state-of-the-art chromium tanning technology is safe and sustainable from the environment point of view. Nevertheless, the oxidation of chromium III during the tanning process has become unavoidable and that chromium VI is still causing problems for the environment. It has been advised that the chromium concentration in the final effluent should be less than 1 ppm. But that level has been hard to maintain which makes people hypersensitive about chromium.

Coming to a conclusion, it is now clear that we cannot put an end to the usage of chromium in tanning. Therefore, it is now up to the manufacturers to show concern and responsibility over the human life and environment. They have to take steps forward to reduce the use of other chemicals used in the production process by shifting towards the use of enzymes. By doing so, the magnitude of harmful effluents will decrease gradually and will have a huge impact globally. Apart from this, tanneries must coordinate amongst themselves to fix a common effluent release point and look to discard their waste at this common arena. This can then be treated in efficient ways to decompose in to organic matter.

We, Caprienzymes, thrive on this motto to eradicate the usage of other salts and chemicals in leather manufacturing so as to bring down the degree of pollution gradually. And with the development of modern tools and technologies, we are looking to build strategies to number the chrome tanned leathers.

You can peruse our website www.caprienzymes.com and email us at caprienzyme@gmail.com for any queries.