

Ecological tanning follows the below step:

a) Curing: The temporary preservation of hides is known curing. The procedure is followed by drying, salting and freezing. The hides are dried naturally. Solid salt is used for salting. Then freezing is done in controlled temperature.

b) Soaking: The soaking of the hides is done in big drums filled with water. The soaking period is normally between 8 and 16 hours. The soak water removes the salt, some proteins, some loose fat, blood, dirt and manure from the cow hides.

c) Liming: This procedure is carried out to remove the hair from the hides. In this step, the hides are treated with sodium sulphide and lime (Calcium hydroxide) water. Following this procedure, the hair is quickly removed by the strong alkaline reducing conditions.

d) Trimming and fleshing: The trimming is carried out by hand to remove any portion of the hide that could interfere with the subsequent machine procedure. Then the fleshing is done on a multi roller machine that pulls the hide over a rotating blade, likewise a rolling machine that cuts off the flesh from the inside of the hide.

e) Splitting: In this step, the hides are cut to the desired thickness with a horizontal belt knife.

f) De-liming: The limed hides have a pH around 12. Because, tanning is done at a pH between 2 and 4, the lime must be removed for pH adjustment. In this step, ammonium salts and acids are used. The acid neutralizes the lime and adjust the pH to the expected level. The ammonium salts have two functions: buffer the solution to a require pH for bating and to form calcium ammonium complexes. The acidity and the

complexes' formation solubilize the calcium and serve to bring the hide to the desired pH.

g) Bating: This step is a part of the de-liming step in cattle hide leather production. The hides contain some elastin proteins which are very inert to the action of acids and bases and react with tanning ingredients in a limited manner if the elastin is not broken down sufficiently. The leather may be firm and stiff for the desired use, and the grain may not be as smooth as desired. The bating enzymes and the PH adjustment disperse much of the degradation products from the un-hairing. The resulting hides are clean and flaccid.

h) Pickling: This term is used for acidification of the hides. The desired pH is about 2.0 for tanning. Thus, the hides are placed in a solution of salt and acid. Once pickled, the hides can be drained and stored indefinitely. There is possibility of the damage of hides either by bacteria or mould. However, the hides can be traded in the world market under proper pickling and storage.

i) Ecological Tanning: The natural extract of plant materials is used to tan the leathers in ecological tanning. The natural extracts from the certain plant parts such as woods, barks, fruits pods, leaves etc. are used. The most common natural tannins are obtained from Chestnut wood, Tara pods, Catechu, Chinese gallnut, Turkish gullnut, Oak wood, Valonia Oak etc.

