

# CLEAN TECHNOLOGY presenting challenges for tanneries

India's A\$10 billion leather industry is using Australian expertise to tackle its environmental problems. Robin Taylor reports

**T**he leather industry in Australia has come a long way in terms of its environmental credentials. India is now adopting some of the same methods, thanks to innovative researchers and an ACIAR project. Salinity in tannery effluents is a critical problem in many countries, including India, where the leather industry employs 2.5 million people and is worth about A\$10 billion.

About 60 per cent of tanning occurs in the southern state of Tamil Nadu, where, in 1996, the Indian Supreme Court ordered the closure of more than 500 tanneries for environmental non-compliance.

Salt has continued to contaminate effluent and to enter rivers and groundwater. The aim of the ACIAR project, a collaboration between India's Central Leather Research Institute (CLRI) and CSIRO Leather Research Centre, was to develop and apply methods to eliminate, or at least significantly reduce, salt use in hide and skin preservation and processing.

The leader of the project, CSIRO's Catherine Money, a world leader in leather processing research for better environmental outcomes, could see the opportunity to drastically reduce the amount of salt and other additives without affecting leather quality.

"The high salinity of tannery effluents is an enormous problem in India, threatening a lot of the tanneries in Tamil Nadu with closure," explains Mrs Money. "Over the three years since the project started, the situation has worsened and the tanneries are getting

pretty desperate about what to do."

In the rigorous conditions of southern India, where temperatures of 40°C and high humidity are common, some of the short-term preservation systems used by leather processors in Australia are not suitable.

The four major areas where Mrs Money and her colleagues, the Indian project leader, CLRI Director Dr T Ramasami and project coordinator Mr N. K Chandrababu, thought they could have an impact were: reducing the amount of salt used in the hide and skin curing process; short-term hide preservation by chilling; pickle liquor recycling; and direct chrome liquor recycling.

In India, fresh skins are preserved ready for tanning by covering them with salt. Goat skins are salted with between 50 and 100 per cent salt by weight and cattle hides with 40 to 50 per cent. In Tamil Nadu, the effluent from the soaking of salted skins is required to be evaporated in solar pans, but this system is usually inefficient and little salt is removed from the site.

Low-salt systems, which could reduce salt use three- to four-fold, have given promising results and are being trialled commercially with goat skins. Because the amount of waste salt is significantly reduced, all the evaporated salt should be able to be reused or used as a fertiliser for coconut palms.

"It is feasible for unopened goat skins to be salted as usual, but with about 20 per cent salt by weight," says Mrs Money. "Collection



In India, fresh skins are preserved for tanning by covering with salt (left). Above, the skins are turned flesh-side out for a second salting at Mumbai salt works.

PHOTOS: RITA SIEKRIS

centres, often already controlled or influenced by tanners, will supply the salt pre-mixed with suitable additives to small operators and also do salting themselves.”

In Australia, chilling has been widely used for many years as a method of preserving hides. Chilled hides are usually kept for only a few days, but they may be kept for more than a week at low temperatures. Initially, chilling was thought to be too difficult for Indian conditions, but it now appears that it may be viable for some hides and skins.

“Chilling is increasingly being used for food storage and transport in India and CLRI has completed trials and costings which are very encouraging,” says Mrs Money.

CLRI has developed a mobile chilling unit for industry trials and demonstrations, which will be used for chilling hides in Kerala and transport to Erode. “Eventually, we expect that chillers will be set up in Kerala and Erode and that insulated trucks will be used to transport the chilled hides,” she says.

The hides are collected from small dealers and hung in the chiller, where they will keep for seven days without the need to preserve them with salt. In Australia, where conditions are more favourable, hides will keep for longer.

“It is much more difficult to implement in India, where you are working with many small operators and in hotter conditions,” says Mrs Money. She believes that training people to use the chiller properly will be difficult.

After the hides are thoroughly chilled (about one hour), because they are well-insulated they can be transported to the tannery in crates in insulated trucks.

“The tannery that we have done a great deal of work with is KSKSK Leather Processors. They are innovative and willing to listen and make changes,” she says. “They will install chillers if the trial results are good.” KSKSK Director Mr Rafiq is championing the chilling technology.

The third recommendation introduced by the project is pickle

liquor recycling. Pickling is the process that readies the skins or hides for tanning. The pickle liquor (water, acid and salt) is added to the prepared hides or skins to prepare them for the tanning chemicals. In Australia, tanners used to discard pickle liquor after 10 or 20 uses, until CSIRO research showed that it could be used indefinitely. An Australian collaborating woolskin tanner has recycled commercial pickle liquors for more than 250 cycles. Amazingly, in India the pickle liquor was not being reused at all.

Pickle liquor contains a lot of salt, which was being discarded after each use and required evaporation and disposal. In trials at Tamil Nadu, pickle liquor was successfully reused 15 times and it was still working effectively.

“It’s hard getting people to mentally accept that you can go on using it more, but that is the next stage,” says Mrs Money.

The final recommendation of the project involved recycling the chrome liquor used in the tanning process to stabilise hides. Recycling is widely accepted in the Australian industry and reduces the use of both sodium chloride and chrome powder. In India, the normal practice is to recover chrome from the liquor, but all the salt that is used goes to the evaporation ponds.

“It is far more efficient to just keep reusing that chrome liquor and top it up with salt and chrome,” explains Mrs Money. “Initially the Indians weren’t interested, but we have carried out successful commercial trials in India and shown that it does work and that leather quality is maintained, contrary to their expectations.”

The project has been extended in order to get the recommendations more widely adopted through the tanning industry.

While the proposed low-salt preservation will entail little change for first handlers of skins, greater care will be required to ensure even salt application.

One option that may bring about change is if tanners were to pay more for skins with less salt and good preservation and less for skins with excess salt. The collaborating tanners will be the champions of the new technologies. ◀