

## **2016 IULTCS/IUR – Young Leather Scientist Grant**

### **A novel method to preserve goat skin with indigenous plant extract to reduce chloride load in the effluent**

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#### **Description of the Research**

Hide/skin, the outer coverings of animals, used as basic raw material for the tanning industry. After flaying hide/skin is susceptible to bacterial attack which starts within 5-6 hours after the animal death (Balada et al. 2008). Bacteria either in native or derive from the air or soil, putrefy the proteins and make hide/skin inapt for the production of quality leather (Vijayalakshmi et al. 2009). Animal death causes a dramatic metabolic change in hide/skin due to not supplying oxygen and nutritional components. As a result accumulation of toxic substance leads to causes inactivation of some coenzymes; autolysis starts to decompose the protein to peptide and finally amino acids. Autolysis products are further broken down by the secondary process by the action of putrefactive bacteria (Bienkiewickz 1983).

To stop the decomposition of hide/skin protein after flaying two possible options are available i) instantly start tanning process and ii) properly preservation. The first option is not possible and even in some cases impossible because lot of hide/skin are slaughter in the remote where there is no tanning facility as well as a large number of hide/skin is collected especial occasion during Eid-Ul-Azha (Muslim Festival) period which cannot processed at the collection time. Therefore proper preservation is the best option to save the hide/skin before transport to the tanning industry.

In tropical countries like Bangladesh conventionally fresh hide/skin are preserved by wet-salting method where 40-50% common salt (NaCl) is applied immediately after flaying (Vankar and Dwivedi 2009). Dual actions of common salt i) its dehydrating and ii) bacteriostatic properties are being exploited in this method (Babu et al. 2009).

Although it is the cost effective, easy to practice and NaCl is available in Bangladesh but the method suffers heavily from the environmental perspective. It is reported that only after soaking 70% TDS of the entire leather processing is released in the effluent as chloride ion (Selvi et al. 2015). Conventional wet-salting process contributes about 350-450 kg of salt per ton of leather processing of chloride ions in the wastewater. Chlorides remain a burden to the environment because of being highly soluble and stable which is not affected by effluent treatment. The high amount of salt contained in the effluent will increase surface salinity, thus reducing the fertility of soil resulting in the poor yield of crops (Preethi et al. 2006).

In the last few decades numerous works have been carried out with various curing agents efficiently to preserve the hide/skin to reduce chloride load from the final effluent. Unfortunately they are not commercially accepted because of limitations. An ecofriendly preservation of raw hide/skin has become great challenge for the researchers and scientists. It has been receiving much attention all over the world where large-scale processing of raw hide/skin is undertaken.

We would like to use indigenous plant extract which has the curing potentiality which is available in Bangladesh. An attempt has been made to preserve the goat skin with the extracted oil. The oil was extracted from the seed of *Aphanamixis polystachya* was applied on the flesh side in different concentrations. The daily observation of hair slip, odor and moisture content of the preserved skin shows good preservation of goat skin more than 50 days. The *Aphanamixis polystachya* oil gives a promising preservation compare to the traditional preservation method.

As this is preliminary stage of our research, it is necessary to assess the method for bacterial count, total nitrogen content, shrinkage temperature, release of hydroxyproline content and SEM analysis periodically for conformation of the preservation. Further small scale preservation of hide/skin will be performed then pollution load generated in soaking will be determined. The leather produced from the preserved goat skin will be tested for the physical strength properties.

The study program is more or less described in the above. Final details would be worked out by discussion with the advisor and as per facilities available. We are very much optimistic that our research study proposal will be fruitful. We are expecting that the outcome of this research will be very effective in the economy of our country as well as environmental friendly.

## References

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