



## MINISTRY OF JIHAD-E-AGRICULTURE

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### **Utilization of bentonite for skin preservation**

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#### **Abstract**

Common salt (sodium chloride) is usually introduced in large quantities for the preservation of hides/skin (curing process). About 50% w/w NaCl preserves goat skin efficiently due to its remarkable dehydrating and bacteriostatic properties. The ill-effects of sodium chloride on the environment and eco-system need no emphasis. The environmental impact of the tanning industry is generally significant with outputs of wastes, i.e. high concentrations of organics, salts and heavy metals, both in solid and liquid form, as a result. In order to bring the tanning industry more in line with present environmental thinking, various methods have been devised to reduce impacts. Being highly soluble and stable, the used common salt is unaffected by effluent treatment and nature and, thus, remains as a burden on the environment. Therefore various investigation which, are more eco-friendly for the preservation of skins, have been involved in alternative salt curing systems. Bentonite is an industrial mineral, are produced from a layered aluminum and silicate mineral. The adsorption capacity of bentonite is considerable, even at low humidity levels, and increases with increasing relative humidity. With this view, an attempt has been made to evolve a less – salt (with different percentage of sodium and calcium bentonite) and salt-less (sodium and calcium bentonite only) as compared with conventional salt curing system. The preservation efficacy of the methods was assessed by various parameters such as moisture content, total extractable nitrogen, bacterial count and skin leather characteristics. The spent liquid from the soaking operation was collected and analyzed for pollution parameters using standard analytical procedures. The present value approach was used to evaluate the economic feasibility of the modified method. There have been found that raw skins can be stored without the appearance of no sign of deterioration for at least two weeks in temperature ambient. There were not significant different among treatments for moisture content, total extractable nitrogen, bacterial count ( $P<0.05$ ). The skin were preserved by a less– salt with different percentage of sodium and calcium bentonite) and salt-less (sodium and calcium bentonite only) had higher tensile strength and lower percentage extension as compared with conventional salt curing (control group). Leather from control group have lower single edge tear load with different treatments but there were not significantly. The lowest double edge tear load related to leather from control group ( $P<0.05$ ). The results are expressed in mg per liter of the soaking effluent. The totally amounts of samples

for TOC were between (701 to 4764 mg/l), BOD (684 to 889 mg/l). COD (3500 to 15000 mg/l), TDS (6.9 to 55.2 mg/l), pH (6.4 to 8.5), EC (13.5 to 52.4 mhos/cm) and Turbidity (545 to 8955 NTU). It has been observed that differences existing from TOC, BOD and COD of experimental treatment and control influent were not significant. However, the modified method reduced the environmental impact of TDS by 24 to 55 % and EC was reduced by 26 to 55 %. As well as Cl which was reduced by 37 to 100 %. A financial assessment of values demonstrated that the proposed new system is more economic than the traditional one. Therefore, in an effort to eliminate the salt use, it was suggested to replace sodium chloride with sodium and calcium bentonite as clean preservation and practical method.

**Keywords:** Dehydrating agent, Deterioration, Economic cost, Environmental pollution, Leather physical and mechanical characteristics, Short-term preservation, Raw goat skin, Wastewater.