CHAPTER – V

➢ CONCLUSION AND FURTHER SCOPE OF WORK

CHAPTER-V

V.1 Conclusion

The present study is very much informative and relevant for tanning industry regarding the economization and economic use of water in leather manufacturing process and also the reduction of pollution load due to salinity from the composite waste water of tannery effluent. Water can dissolve common salt nearly one third of its weight, thus soak liquor can be reused for the same purpose up to near saturation point, which is the prime objective of the study. The process followed for soaking in this study has not been implemented yet, as found from the review of literature. Through the study, it has been found that by following the reuse of soaking water it is possible to save fresh water consumption, quantitatively the requirement of fresh water may be reduced by 25 to 33 percent. Presently Indian leather industry consumes nearly 0.7-million ton raw hides and skins per year for process, thus an estimated of around 2.5-million m^3 fresh water per year can be saved following the proposed soaking process. Further, the present study reveals that the salinity of lime liquor at the level around 30g/L does not affect the parameters like swelling, un-haring, loosening of adipose tissue etc. which are very important for pelt in liming operation. Physical and chemical characteristics of leathers produced by following the proposed method and conventional method has been compared and it has been found that by following the proposed method characteristics of leather produced is no way inferior on the contrary some of the properties are even better as is evident from Table-B.14 in Appendix-B. It has been found from the table that most of the physical properties of samples prepared by the proposed method are better than those of

the samples prepared by following the conventional method, particularly shrinkage temperature, water vapour permeability, water absorption, dry-rub and wet-rub colour fastness and apparent density. Other physical properties viz: different strengths like- tensile, stitch-tear, grain-crack and ball-bursting are found more or less same for both the samples. On the other hand different chemical content like- chloride, sulphate, chromium and also ash (i.e. total inorganic materials) of samples prepared by following the proposed method have been found greater than those of the samples prepared by following the conventional soaking method. Only the volatile matter content of samples prepared by following the proposed method has been found lesser than those of the samples prepared by following the conventional method. All these differences in both physical and chemical properties are solely for the higher salinity of experimental samples than conventional samples, due to recycling of soak liquor for the soaking of experimental samples. The detail discussion in this regards has been presented in Chapter-IV.

As a result of reuse of soak water a highly turbid, muddy soak-liquor with high value of TDS, BOD_5^{20}, COD and Salinity has been obtained. This final soak liquor has been treated by alum solution to remove the suspended materials and through this the turbidity of the soak liquor reduces to 0 NTU after filtration. The weight of the filtrate materials that are arrested by the filter paper has been found to be around 77 g/L. This filtrate material may be treated as a solid waste possibly can be used as manure as the material is rich in coagulating protein; however detailed study on this is necessary before this can be used practically. The filtered solution is mainly a solution of common salt, containing about 292gms per liter. By means of solar evaporation the total salt could be recovered. The detail procedure of salt recovery from soak liquor has been described in

Chapter-III.D. This recovered common salt may be used for further preservation of raw hides and skins or in the pickling operation. There is scope for further study in this area.

It is thus evident that the proposed method will be beneficial for the leather industry in particular and the society in general as it will help conserving the natural resource water in this case and also preservation of the environment because of reduced pollution load.

The expected benefits are as enumerated below.

1. Reduced water consumption in the process,
2. Reduction of pollution load in composite wastewater,
3. Recovery of common salt crystal from soak liquor.
4. Demonstration of commitment towards the corporate responsibility to the society.

The method of soaking followed in the study for the production of medium-soft type of leather has given very much encouraging results. Thus, the study needs a supplementary back up to put into practice the proposed soaking method for other varieties of leather also, to take advantage of the proposed soaking operation method.

V.2 Scope of further work

The proposed soaking method has certain definite advantages but it will be worthwhile to carry out a plant scale study before implementing the process in the industry. Further in the present study only lining leather has been produced, production of other variety of leather adopting the proposed soaking method can be tried. The process of salt recovery from the soak liquor using solar power requires an in-depth study to make the process universally acceptable.

The scope of further work in this field is enumerated below.

1. The proposed soaking method has been tried only on processing of medium-soft lining-type of leather in this study. The detail description of method of soaking has been described in the chapter III under section III.3.4. There is scope for further work on the application of the proposed soaking method for processing of other types of leather.
2. Salt recovered from the final soak liquor can be used for preservation of raw hides and skins and also in pickling operation of leather processing. The detail description regarding recovery of salt has been done in chapter III under section III.6. It is possible to carry out a study to make the recovered common salt to be used in other industrial processes.
3. The filtrate of final soak liquor, which is mostly coagulated protein rich matter, may be used as organic manure, poultry feed etc. Detailed investigation in this area is worth studying.
4. The proposed method of salt recovery needs refinement and there is scope for further work in this area as well, a schematic of the process has been described in described in chapter III under section III.6.3.