CIRCULAR TECHNOLOGIES FOR LEATHER PROCESSING

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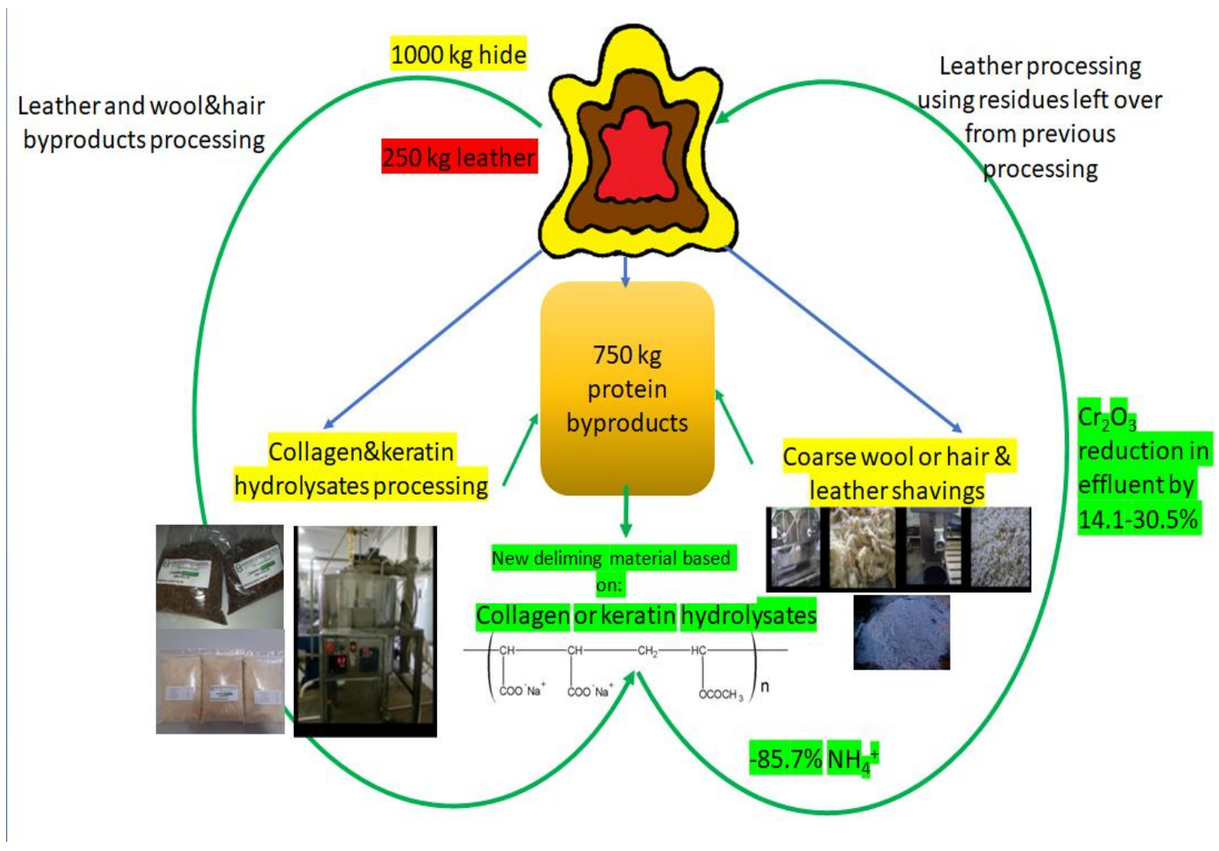
ABSTRACT

The challenge of the present time is production without waste generation through the circular economy concept. The leather industry capitalizes on a by-product of the meat industry and generates other valuable by-products which can represent around 80% of raw material. Collagen and keratin are the main proteins which can be recovered and functionalized for different applications. The extraction of collagen and keratin from protein by-products and their recirculation still represents a challenge for quality leather processing and management of waste generated by leather industry.

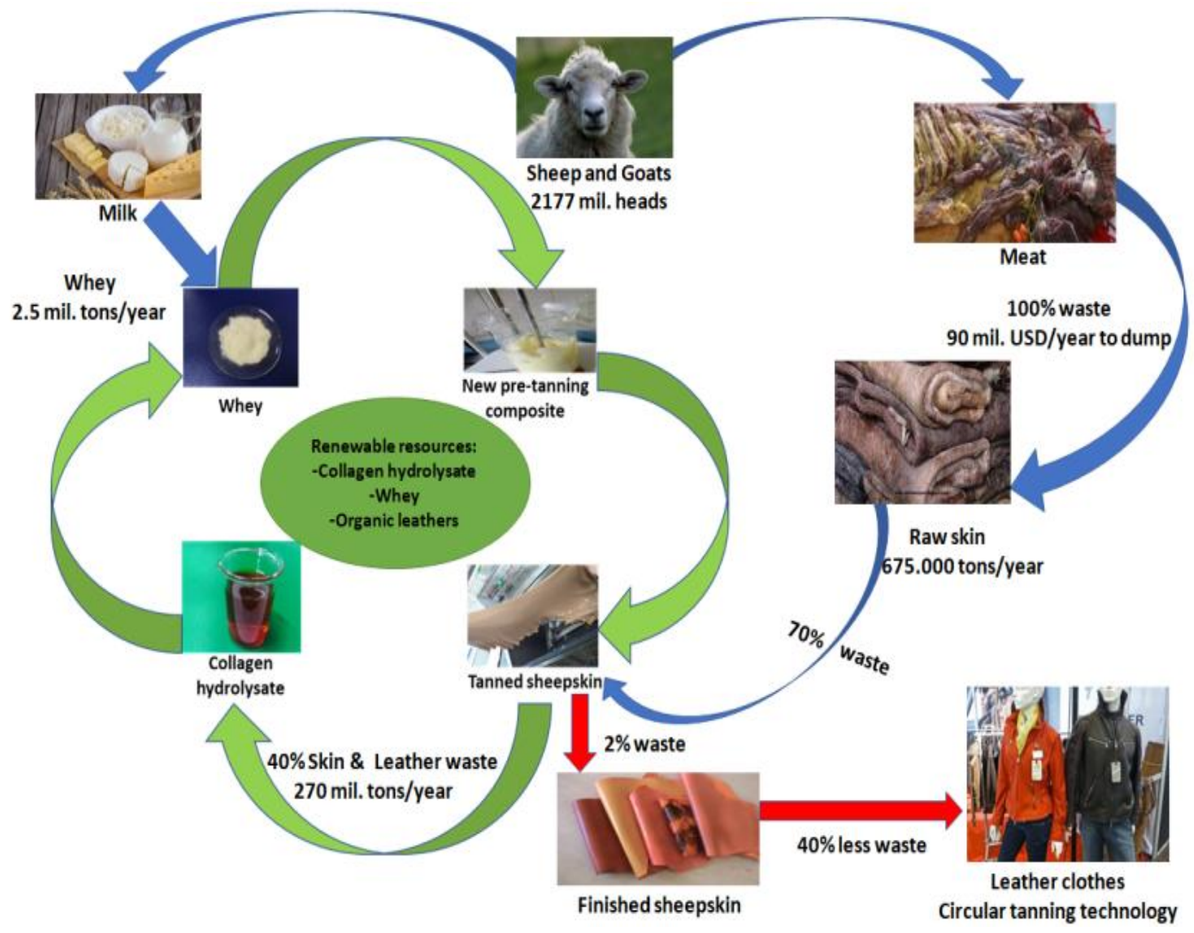
The present research shows the potential of these recovered proteins to be reintroduced in bovine or sheepskin processing technologies with effect on ammonium and chromium salts reduction or elimination. In view of designing new deliming products, leather shavings and coarse wool were hydrolysed by alkaline and alkaline-enzymatic hydrolyses and conditioned at pH value for deliming of bovine pelts. Combinations of protein hydrolysate and maleic copolymers enabled the reduction of ammonium salts by 85.7%, with beneficial effect on improved chromium exhaustion in tanning process by 14.1-30.5%, as compared to classical process based on ammonium salts. Basic chromium sulphate in sheepskin tanning was completely replaced by using a new composite of collagen hydrolysate, whey and mimosa or tara extracts. Pre-tanned sheepskins presented 68^{0}C hydrothermal stability and good ability for interaction with anionic retanning auxiliaries. The organic pre-tanned and retanned sheepskin leathers were evaluated and showed standard characteristics in terms of physical-chemical and physical-mechanical properties.

RESULTS

Two circular technologies were proposed for the main sensitive processing steps of leather technologies: deliming (Scheme 1) and pre-tanning (Scheme 2).



Scheme 1- Circular technology for bovine pelt deliming



Scheme 2- Circular technology for sheepskin pre-tanning

CONCLUSION

The main sensitive technological stages of bovine and sheepskin leather processing were approached from the circular point of view and two new technologies were proposed as a step forward to circular concept of economy.

ACKNOWLEDGEMENTS

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