RECOVERY AND ENZYMATIC HYDROLYSIS OF WASTE PROTEINS FROM A TANNERY

LÓPEZ, Laura María Isabel; CORTIZO, Lorena Valeria
Centro de Investigación en Tecnología del Cuero & Instituto de Ciencias de la Salud, Universidad Nacional Arturo Jauretche. Buenos Aires, Argentina.

INTRODUCTION

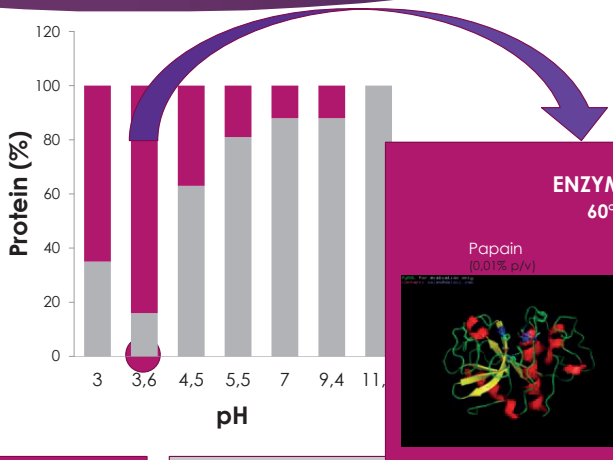
Unhairing is one of the most polluting processes carried out in tanneries. Soluble proteins represent an important part of the contaminant load of unhairing effluents, so the recovery of the proteins would considerably reduce pollution.

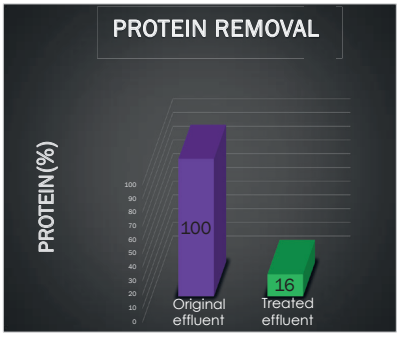
OBJETIVES

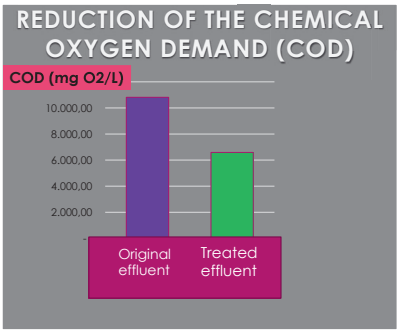
- Recover the effluent proteins
- Reduce the COD of the effluent
- Hydrolyze the recovered proteins

MATERIALS AND METHODS

Starting material: effluent from the unhairing stage with previous oxidation of sulphides, free of chromium.
Protein recovery: precipitation by adding hydrochloric acid up to different pH values (9.4-3.0). The precipitates were separated by centrifugation, redissolved and analyzed for protein content by the Bradford method.







CHARACTERIZATION OF RECOVERED PROTEINS

The recovered fraction was subjected to SDS-PAGE using 7.5% gels



The main bands (A and B) were identified through the determination of its peptide fingerprint



ENZYMATIC HYDROLYSIS

60°C 120 min

Papain (0.01% p/v)

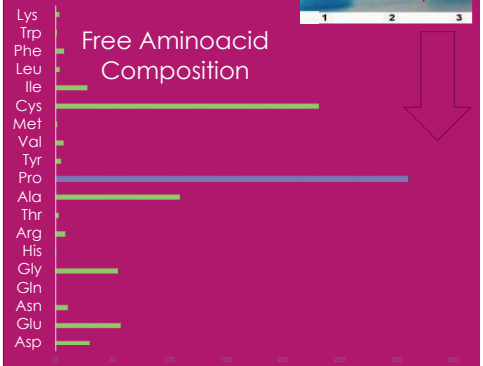
The hydrolysates of recovered proteins were generated using a vegetable protease (papain) obtained in our laboratory from the latex of *Carica papaya* L.

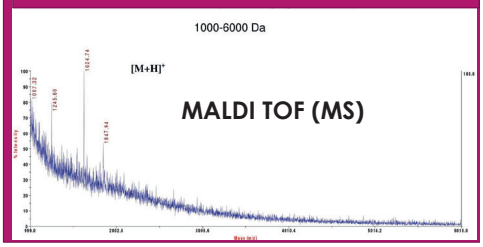
CHARACTERIZATION OF HYDROLYZED PROTEINS

- Electrophoresis at 12% (SDS-PAGE)
- Composition in free amino acids.
- Mass spectrometry (MALDI TOF-MS)

SDS-PAGE







CONCLUSIONS

The application of the precipitation process at pH 3.6 decreased the content of soluble proteins and the COD of the original effluent by 84% and 40%, respectively. The designed process makes it possible to obtain a much less polluting effluent and generates a valuable product that contains collagen as the main protein. This product was completely hydrolyzed using papain at 0.01% (w/v) for 120 minutes at 60°C, showing a mixture of amino acids with biostimulant potential that could be used in sustainable plant production practices.

Acknowledgments
L. M. I. López is researcher from the National Scientific and Technical Research Council (CONICET) of Argentina and L. V. Cortizo is research support professional from the Comisión de Investigaciones Científicas de la Provincia de Buenos Aires, Argentina. Supported by PICT-CABBIO 2018-1616 and Universidad Nacional Arturo Jauretche, Argentina.