Diminution of Toxicity of Beamhouse Operations by Precipitation of Solubilized Proteins

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Abstract: According to bibliography, for each 100 kg of raw hides, 15 kg of solubilized protein, which contain nearly 18% of nitrogen, will end up in waste water in the early stages of the process of transforming hides into leather. In this work, the diminution of the pollution of beamhouse waste waters by precipitation of the solubilized proteins at their isoelectric point is presented. A comparative study of this pollution diminution between a hair recovery process and a hair-pulping process is carried out. The work comprises several steps: characterization (COD, total nitrogen, ammonium nitrogen, total soluble nitrogen, particulate nitrogen, organic nitrogen and protein) of the wastewaters of the different beamhouse operations of hides (soaking, unhairing-liming, washing, conditioning, deliming, bating, washing and pickling) before/after protein precipitation; evaluation of the pollution (oxidable matter, soluble salts and nitrogen) and toxicity (Photobacterium Phosphoreum) diminution; characterization of the protein fraction precipitates (humidity, proteins, free amino acids, fats and other matter soluble in dichloromethane and ash); determination of the content in heavy metals, calcium, magnesium, potassium and sodium and the determination of the composition in total amino acids with prior acid hydrolysis of the protein fraction with 6N hydrochloric acid.
Key words: protein recovery; beamhouse; characterization; pollution diminution

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