

Effect of Hyaluronic Acid on the Properties of Chrome-Tanned Leather

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In conventional beamhouse operations, the elimination of hyaluronic acid from hides takes place in the soaking stage in the presence of a neutral salt. The impact of sodium chloride and sodium silicate (sodium metasilicate salt)-cured hides along with green hides were investigated in terms of removal of hyaluronic acid. Throughout beamhouse operations, the opening up of fibre structure was investigated by scanning electron microscope (SEM). The residual hyaluronic acid in hide and pelt samples taken after each beamhouse operation was analysed through bio-chemical analysis assisted by UV-visible spectrophotometry. The interaction of residual hyaluronic acid with chromium (III) was investigated in terms of deposition of chromium(III) in cross-sectional layers of chrome-tanned leather through scanning electron microscope – energy dispersive x-ray spectroscopy (SEM-EDX). The hydrothermal stability of chrome tanned leather was investigated by differential scanning calorimetry (DSC). It was found that sodium chloride can remove hyaluronic acid completely in the soaking operation and facilitate good opening and splitting up of fibre structure, which enables good penetration and fixation of chromium(III) species with the purified collagen. In contrast, in the absence of a neutral salt, residual hyaluronic acid existed throughout the beamhouse operations which resulted in poor opening and splitting up of fibre bundles and later inhibited the penetration of chromium(III) species in cross-sectional layers. As a result, comparatively lower hydrothermal stability was observed. Sodium silicate-cured hides did not provide satisfactory results in terms of removing the hyaluronic acid present in the hide, poor opening and splitting up of fibre structure were observed and residual hyaluronic acid was identified even at pickle stage. As a result, the distribution of chromium(III) species at the cross-sectional layers varied widely and poor hydrothermal stability of tanned leather was observed after chrome tanning.