

Quality Evaluation of Leathers Manufactured from Goat Skin with Selected Vegetable Tanning Materials

Jayarathna G.L.L.M., Fernando P.R.M.K., Gamage A.T.H.¹, Sujanthan S.¹,
Vidanarachchi J. K. and Himali S.M.C.*

Department of Animal Science,
Faculty of Agriculture, University of Peradeniya, Peradeniya, Sri Lanka

This study was conducted to determine the properties of tanned leather from goat skin using locally available plant materials: *Sweietenia macrophylla* (Mahogany), *Garcinia spp* (*Goaraka*), *Pinus caribaea* (Pine), *Camellia sinensis* (Refused tea) and commercially available vegetable tanning materials (Mimosa powder and Black Wattle solid) in Sri Lanka. Tannins from plant materials were extracted using high pressure water extraction, and the amounts of tannin were measured by ultraviolet spectrophotometry. Leather tanning was conducted manually, and the re-tanning was not conducted. The physical properties of the leather were evaluated using the IULTCS (International Union of Leather Technologists and Chemists Scarcities) official methods of analysis for leather. The sensory evaluation was done using a three-point hedonic scale. High pressure water extraction method resulted 6.04±0.12%, 3.34±0.06%, 2.98±0.01%, 3.47±0.11% tannins, from Mahogany, *Goraka*, Pine, and refused tea respectively. Significantly higher tannin absorption levels were achieved by *Goraka*-tanned goat skin. The physical properties of leathers produced with different tanning materials not differed significantly (P <0.05). The highest thickness (2.68±0.19 mm) was obtained in wattle-tanned leather. The highest apparent density (0.75±0.12 g/cm³), tensile strength parallel to the backbone (29.61±8.77 N/mm²) and perpendicular to the backbone (30.01±14.93 N/mm²) were obtained by Tea-tanned leather. The highest elongation at break parallel to the backbone (19.70±1.39%) was obtained by Mimosa-tanned leather. Wattle-tanned leather had the greatest elongation at the break perpendicular to the backbone (23.33±3.44%). Water absorption percentage/day (171.33±33.42%) was highest in Mimosa-tanned leather. *Goraka*, Mimosa and Wattle tanned leathers tolerated 10,000 flexes compared to others. *Goraka*-tanned leathers had the highest overall preference in sensory evaluation. In International Commission of Illumination (CIELAB) color space, lightness was highest in Mimosa-tanned leathers, and redness and yellowness were highest in Mahogany-tanned leather. In conclusion, all the vegetable tanning materials tested resulted leathers with different favorable properties, and they can all be industrially used to produce various specific products.

Keywords: *Garcinia spp*, Mahogany, *Mimosa*, Pine, Refused tea

¹S.A. Perera & company, Wewalduwa road, Kelaniya, Sri Lanka

*smchimali@agri.pdn.ac.lk