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Suitability of selected vegetable tannins traditionally used in leather making in Tanzania

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Abstract

The use of chromium salt has dominated in tanning industry worldwide due to its high versatility in quality leather production. However, Environmental concerns of chromium have shifted the interest of current research to chrome-free and greener chemical processing options. Vegetable tannins, especially when used in combination with some benign metals, have been proven to be environmentally safe and manageable, while producing good quality leather with similar shrinkage temperature as that of chromium tanned. As such, shortage of vegetable tannin supply necessitates characterization of non-commercialized sources locally available to feed cottage tanneries. In the present work, extracts from *Acacia mearnsii*, *Acacia xanthophloea*, *Euclea divinorum* and *Euclea racemosa*, leached by simple technique at 30–80 °C temperature range were characterized for extract yield, tannin, total flavonoid and phenolic contents, crosslinking ability as well as properties of tanned leather. Results indicate that at 50 °C extraction temperature, *A. xanthophloea* bark gave extract with properties similar to that of *A. mearnsii* (commercialized source of tannin). Extract from *E. divinorum* bark contain fairly less extract yield, tannin, total flavonoid and phenolic contents than that of *A. mearnsii*, but had good crosslinking ability and tanning performance similar to that of *A. mearnsii* when used in combination with Aluminium Sulphate [Al₂(SO₄)₃]. The 2% Aluminium Oxide (Al₂O₃) equivalent was established to be optimal dose of Al₂(SO₄)₃ for extract pre-treatment. *E. racemosa* barks have high extract yield, but very low crosslinking ability, making it not suitable as a tannin source. This work provides useful information on the potential source of tannins for cottage leather industries in Tanzanian and beyond.

Keywords

Leather industry; Cottage tanneries; Combination tanning; Plant extract; Hydrothermal stability