Suitability of vegetable tannins from selected local plant barks and their application in leather making in Tanzania

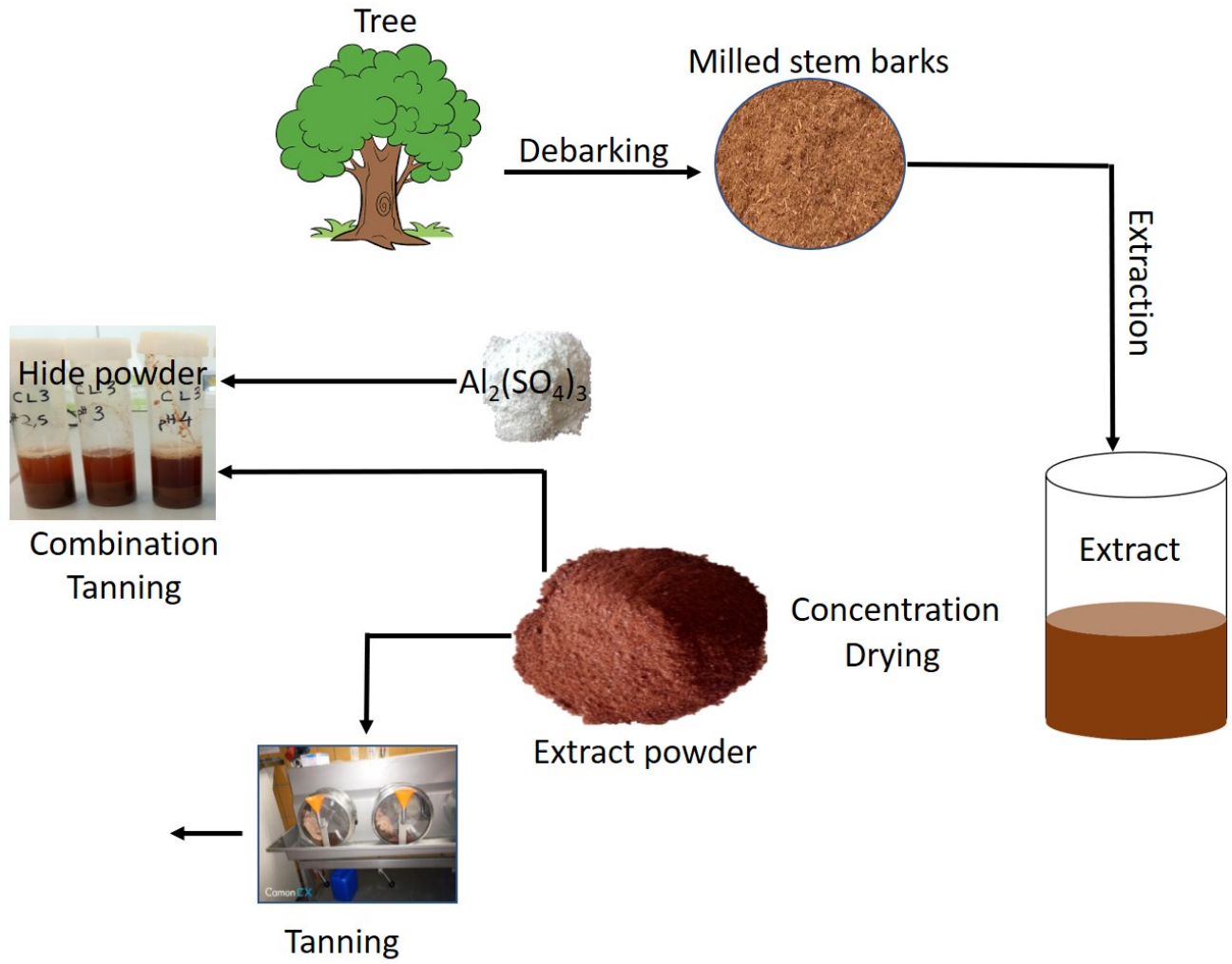
C. R. China[1, 4], A. Hilonga[1], K. N. Njau[1], S. S. Nyandoro[2], S. V. Kanth[3], M. Meyer[4], M. Schroepfer[4]

[1] *The Nelson Mandela African Institute of Science and Technology (NM-AIST), Materials Science and Engineering, Arusha, United Republic of Tanzania*
[2] *University of Dar es Salaam, Natural products, Dar es Salaam, United Republic of Tanzania*
[3] *CSIR-Central Leather Research Institute, Centre for Human & Organisational Resources Development Central Leather Research Institute, Chennai, India*
[4] *Forschungsinstitut für Leder und Kunststoffbahnen FILK, Freiberg, Saxony, Germany*

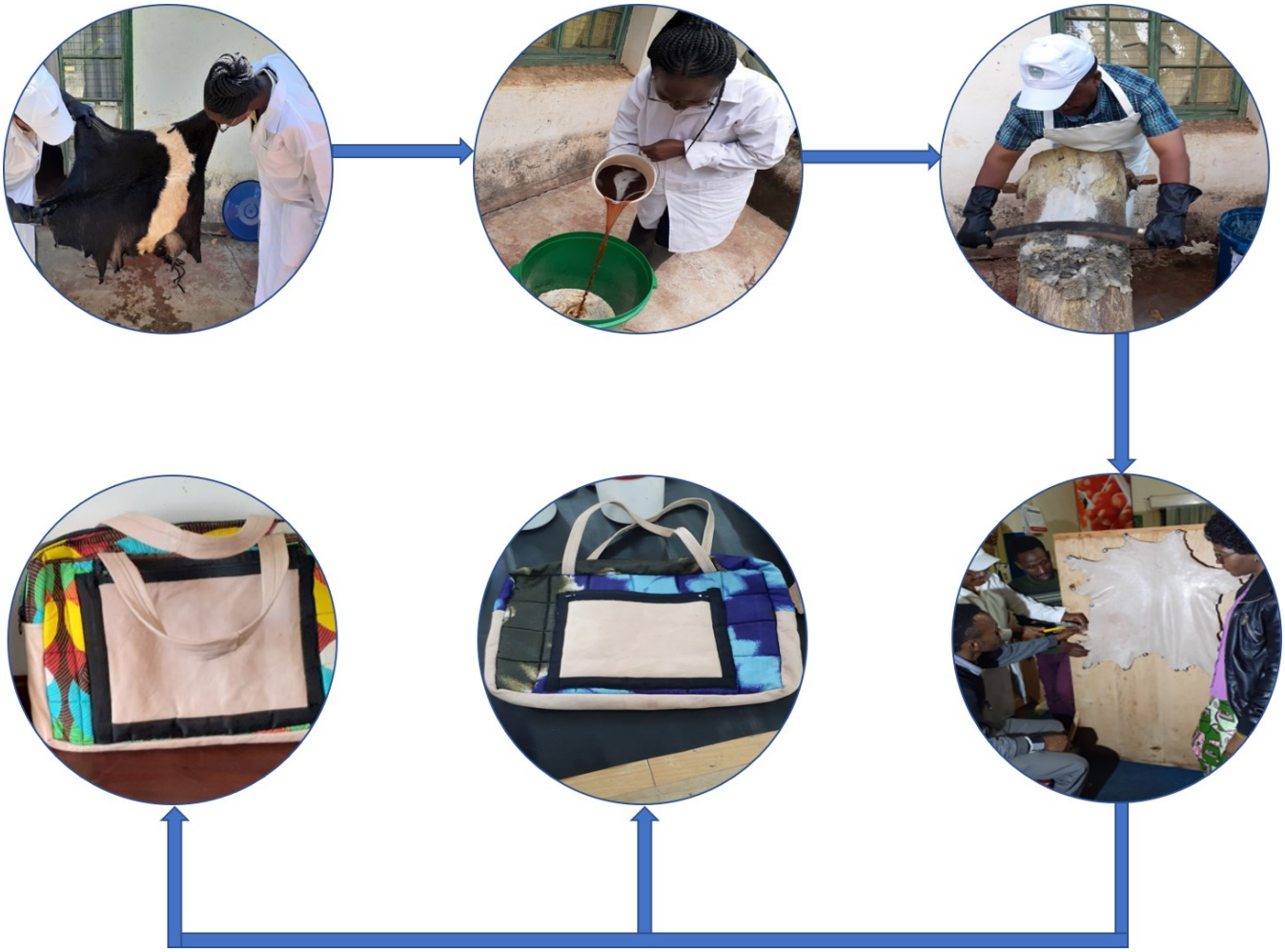
Content

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 have proved to be environmentally safe and manageable, while producing good quality leather. As such, shortage of vegetable tannin supply necessitates characterization of non-commercialized sources locally available to feed cottage tanneries. In the present work, vegetable tannins from *Acacia mearnsii, Acacia xanthophloea, Euclea divinorum* and *Euclea racemosa* (Largely available in Tanzania with scarce utilization) were extracted by simple technique at 30-50ºC temperature range, characterized for extract yield, tannin content, total flavonoid and phenolic contents, crosslinking ability as well as properties of tanned leather. Results indicate that at 50 ºC extraction temperature, *A. xanthophloea* bark gave extract with properties similar to that of *Acacia mearnsii* (commercialized source of vegetable tannins). Extract from *E. divinorum* bark contain fairly less extract yield, tannin content, 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 [$Al_2(SO_4)_3$]. The 2% Aluminium Oxide (Al_2O_3) equivalent was established as an optimal dose of $Al_2(SO_4)_3$ for extract pre-treatment. *E. racemosa* barks have high extract yield, but very low crosslinking ability, making it not suitable as a tannin source (Fig. 1). All samples preparation and tests were done in Germany. Later pilot production of leather was carried out in Tanzania, where home-based process was designed and leather was produced from goat skin and ultimately some leather products (Fig. 2). This work provides useful information on the potential source of tannins for cottage leather industries in Tanzanian and beyond.

Email: ceciliac@nm-aist.ac.tz
Web: www.nm-aist.ac.tz



Extraction and characterization of tannins from four plant barks grown in Tanzania
Plant barks from four trees abundantly available in Tanzania were used to obtain tannins. The latter were characterized and tested for their suitability in leather processing.



Home based leather processing and products production using tannins from local plants
Home based leather processing unit was designed. Goat skin was processed to finished leather using one of plant bark harvested from trees abundantly grown in Tanzania. Resultant leather was mixed with African prints to make two laptop bags that was taken to the market

Keyword
Leather industry, Cottage tanneries, Vegetable tannins