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Natural dyes from *Bidens macroptera* (Adey Ababa) flower and *Eucalyptus camaldulensis* leaves and their application for leather dyeing

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Tatural dyes have gained importance due to the growing environmental awareness and implementation of stringent N regulations in production and use of synthetic dyes. This scenario necessitated the present investigation on bio-dyes. Therefore, to address some of these issues a study was conducted to produce natural dye and evaluate the efficiency of dying on sheep crust. Flower of B. macroptera and leaves of E. camaldulensis were extracted with n-hexane, n-hexane: chloroform 1:1, methanol: chloroform 1:1 and methanol. The dye produced from B. macroptera and E. camaldulensis were analyzed by TLC, FTIR, Column Chromatography, UV-Visible spectrophotometer, and GC-MS. The color coordinates, (L*a*b* Chroma, and ΔE), as well as wash, light, rub and perspiration fastness values, were determined. The results of the study revealed that methanol extract showed good yields of 34.3% and 32.9% for B. macroptera and E. camaldulensis, respectively. The Rf values for both plant extracts were 54.4 and 52.2 for novocol dye. The FTIR result showed primary amine C-N stretching group in plant extract as well as in synthetic dye. Spectrophotometrically, the extracted dye, and novocol dye showed yellow color with the absorption spectrum of 436nm, 449nm, 450nm for novocol, E. camaldulensis and B. macroptera, respectively. Color bearing compounds such as ellagic acid, quercetin and gallic acid (Benzoic acid, 3.4.5-trihydroxy) obtained from E. camaldulensis and lutein from B. macroptera while 6-Amino.1,4-diazo anthraquinone obtained from the novocol dye. The dyed leather from plant extract were showed better coloring properties with the following fastness ratings (R); for dry rubbing (5R), wet rubbing (4/5R), perspiration on test pieces (4R), washing (4R), and light (5R) for B. macroptera and (5R), for dry and wet rubbing, (4/5R) perspiration test pieces, (4/5R) for washing and (4/5R) lightness property for *E. camaldulensis*. The results showed that natural dye from Eucalyptus leaf and B. macroptera flowers extract have potential applications for leather dyeing.

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