CHARACTERIZATION AND ANALYSIS OF SOME NATURAL DYES FROM SELECTED PLANTS IN UGANDA

BY

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DECLARATION

I declare that the work presented in this thesis is my own and that it has not been submitted for any degree in this or any other University of Higher Institution of Learning. All the information in this thesis is based on my own findings except in literature citations.

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APPROVAL BY SUPERVISORS:

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ABSTRACT

Forty different plant species with potential to yield natural dyes were collected from different parts of Uganda between 2004 and 2008. Extraction of the plant materials was done using distilled water after heating for 30 minutes and cooling the contents of the beaker, after which dyeing of 100% cotton pieces of fabrics was carried out using crude extracts from each selected plant species. The colours developed on each fabric sample varied from plant to plant depending on the nature, structure and composition of the colour components found in each crude plant extract, the geographical location of the plants, the mordant used, the fabric support and the liquor ratio employed during the dyeing process.

Colour was evaluated using spectral reflectance values measured by the Datacolour SF600 spectral reflectance spectrophotometer. The colour developed on some of the dyed cotton fabrics was evaluated for colour fastness and colour characterization using the CIELab colour order system. The shade variation was mordant dependent and the values of the hue angle correlated between the colour appearance of the dyed fabric samples and the phenolic composition of the plant extracts. The surface colour yield on cotton fabrics of some of the natural dyes investigated was determined using the Kubelka-Munk equation and was found to vary from plant to plant. Some of the natural dyes notably *Albizia coriaria, Vitellaria paradoxa, Morinda lucida, Syzygium cordatum* and *Mangifera indica* were evaluated and exhibited good colour fastness properties, had no adverse effects on test animals, occupied mainly the yellow-red quadrant of the colour space diagram and contained in their molecular structures characteristic colour moieties capable of dyeing textile materials as potential alternatives to synthetic dyes.