

**CHEMICAL STRUCTURE AND PROPERTIES OF ANTHOCYANINS FROM
SELECTED UGANDAN PLANT SPECIES TOWARDS
NUTRACETICAL DEVELOPMENT**

By

Adaku Christopher

ABSTRACT

Noncommunicable diseases pose national and global threat to public health and hence there is a need for appropriate intervention. Ingestion of nutraceuticals rich in anthocyanin phytochemicals is associated with reduced risk of noncommunicable diseases. However, sources of anthocyanins with appropriate qualities for nutraceutical development are limited. Therefore, in this study the chemical structure and properties of anthocyanins from plants were investigated with a view of identifying anthocyanins suitable for application as nutraceutical ingredients, functional foods and natural food colourants. Anthocyanins from *Hemigraphis colorata* leaves, *Erlangea tomentosa* flowers, *Cordyline terminalis* flowers, *Dissotis brazzae* leaves and *Cyphostemma adenocaula* fruits were isolated and analysed by a combination of methods which included maceration, solvent partition, TLC, column chromatography, preparative HPLC, analytical HPLC, NMR, UV-Vis, ESI-MS, chemical analysis and DPPH radical scavenging. The isolated and identified compounds included 3-*O*-methylated anthocyanidin (erlangidin) derivatives, 5-*O*-methylated anthocyanidin derivatives, dietary acylated delphinidin and cyanidin anthocyanins which are novel compounds. Others were cyanidin 3, 5-*O*- β -glucopyranoside, peonidin 3, 5-*O*- β -glucopyranoside, acylated cyanidin derivatives, acylated peonidin derivative, cyanidin 3-*O*- β -glucopyranoside, and cyanidin 3-*O*- α -rhamnopyranoside which are known compounds. The novel compounds exhibited some unique and desirable properties with regard to stability and equilibrium transformations. The compounds showed remarkable antioxidant activity which is indicative of their potential beneficial health effects. Highly acylated dietary anthocyanins from *Cyphostemma adenocaula* occurred throughout the development stages of the fruit in high amounts. Therefore, in this study new anthocyanins with nutraceutical, functional food and colorant potential were isolated and identified from new plant sources. *Cyphostemma adenocaula* fruits may be considered for commercial exploitation.