

Study of the Use of Natural Pigments Extracted from *Nephelium lappaceum* (Rambutan) Peel and *Melastoma malabathricum* (Maha Bovitiya) Seeds as an Alternative to Synthetic Acid-Base Indicators

K.K.D.C.S. Weeraratne and R.L. Samaraweera*

Department of Science and Technology, Uva Wellassa University, Badulla, Sri Lanka

Acid-base indicators are widely used for visual detection of the endpoint of an acid-base titration. Most of these indicators are organic dyes of synthetic origin. These are hazardous, expensive, and harmful to the environment. Natural pigments in plant extracts such as Anthocyanin are highly colored substances that can change color at certain intervals of *pH*. This study was designed to examine the indicator activity of methanolic fruit extract rich in Anthocyanin as an alternative to synthetic indicators. Extracts from the selected plants prepared using a sonication technique were screened for their use in acid-base titrations. They performed promisingly in the strong acid-strong base, strong acid-Weak base, and strong base-weak acid titrations. Sharp and clear color change from reddish-brown to yellow for the *Nephelium lappaceum* peel extract and blue to red for the *Melastoma malabathricum* extract were observed. The indicator dissociation constant values that were determined using a spectrophotometric method for *Nephelium lappaceum* and *Melastoma malabathricum* were about 6.22 ± 0.06 and 4.22 ± 0.05 , respectively. These values indicate that the *pH* ranges for the pigments investigated in this study are comparable to that of the synthetic indicators. These extracts were cost-effective, easy to extract, and eco-friendly yet performed exceptionally in acid-base titrations. Thus, studied natural pigments would be a potential candidate to replace the commercial synthetic indicators that are used in laboratories. Further, there is no commercial value for the peel of *Nephelium lappaceum* and *Melastoma malabathricum* seeds. This study exhibits the potential of converting these readily available materials into many useful value-added products.

Keywords: Natural pigments, Indicator, Low-cost, Value-addition, Titrimetry