

# UV-VIS SPECTROSCOPIC STUDY OF NATURAL DYES WITH ALUM AS A MORDANT

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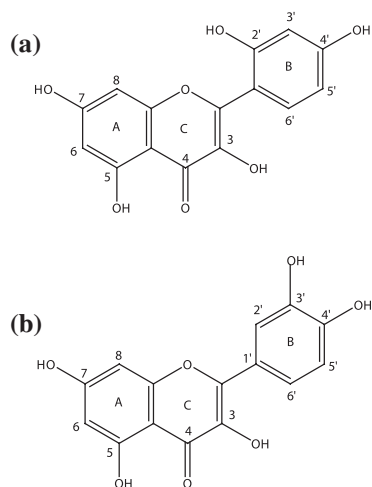
## Abstract

The formation of complexes between alum with morin and quercetin in aqueous solution with and without pH control have been studied by UV-visible spectroscopy. The stoichiometries of the complexes were evaluated using the molar ratio method. The association ratio of alum with morin and quercetin without pH control were 3 : 2 and 1 : 1, respectively. In the buffer system pH 4.5, the stoichiometry of alum with morin and quercetin were 1 : 1 and 1 : 1, respectively. The heats of formation of complex, obtained by semi-empirical PM3 method, indicated that the proposed complexes can be favorably formed.

**Keywords:** Morin, quercetin, spectroscopic, complexation, alum

## Introduction

Flavonoids, polyphenolic pigments are widely present in plants. Morin (3,5,7,2',4'-pentahydroxyflavone) and quercetin (3,3',4',5,7-pentahydroxyflavone) are phenolic compounds derived from hydroxyl substitutions on the flavone chromophore. Figures 1(a) and 1(b) show the chemical structure of morin and quercetin, respectively. The flavone-based compounds are known to form stable complexes with metal cations. *Maclura cochinchinensis* (Lour.) Corner is widely used by villagers, especially in the northeast of Thailand, for dyeing fibres which yield a beautiful yellow colour (Moeyes, 1993). The flavonoid yellow colouring substance in the wood is morin, which is a major component of the heartwood of this



**Figure 1.** Chemical structure of (a) morin and (b) quercetin

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