

## ABSTRACT

Kratom, known as *Mitragyna speciosa* (Korth.) Havil., is an indigenous Southeast Asian plant, mainly in Thailand, Malaysia, and Indonesia. The plant is recognized as traditional herbal medicine and used by brewing the dried leaves as a treatment for cough, cold, fever, general weakness, diabetes, hypertension, rheumatism, opium substitute, etc. Nowadays, *M. Speciosa* venation was sold via the Internet and marketed with different effect properties for each venation. However, the plant is also known as a recreational drug due to its opioid and psychoactive activities and has been banned in various countries. In Indonesia, the Indonesian FDA wants it banned by 2022, although recent development shows otherwise with the Indonesian Ministry of Agriculture classified kratom as a medicinal plant. This uncertainty in legal status made it clear that a reliable analytical method is needed for identification and forensic purposes.

Attempts on developing analytical methods of *M. speciosa* have been made but most suffer from reference dependence, tedious sample preparation, advanced instrument dependence, time-consuming, or complicated analytical system. Selectivity and sensitivity also need to be improved for counterfeit identification.

This research attempt to develop characterization and an analytical method for *M.speciosa* and mitragynine by combining the traditional methods of FTIR, TLC, and HPLC with the PCA method. The results are a quick and easy characterization method via direct FTIR that can be used as a screening method. While a more detailed analysis can be done via TLC and HPLC methods, this could be a way to overcome mitragynine reference dependence as a three-way analysis has been done to verify the sample identity and venation.

**Keywords: extraction optimization, LC-MS/MS, principal component analysis, chemometrics**