Authenticating Thai Agricultural Products Using Advanced Chemical Analysis

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ABSTRACT:
Thailand has a long reputation as "the kitchen of the world" due to its presence of various types of foods and agricultural products. Nevertheless, there have been ongoing challenges to the values of these products and innovative measures are highly sought after to effectively sustain the products' values. Among these, geographical indication, a type of intellectual properties, can be an effective tool to increase and sustain the value of local products. In order to further leverage on this tool, effective authentication methods that can unbiasedly classify various products would be of tremendous utility. Herein, we showcased a series of studies that employed various analytical instrumentations and chemical knowledge, in combination with chemometrics, to classify Thai agricultural products. Key highlight studies will be covered in this presentation. First, the use of paper spray mass spectrometry (PS-MS) to analyze coffees grown in various geographical locations in Thailand will be discussed. With the power of principle component analysis (PCA) and Linear Discriminant Analysis (LDA), our method was able to discriminate coffee based on types (Arabica vs Robusta), countries of origin, and even locations within Thailand at good to excellent accuracies (80 – 100%). Second, fatty acid profiles from durian pulps were analyzed by gas chromatography – mass spectrometry (GC-MS). Together with chemometric analyses including LDA and self-organizing map (SOM), this method was able to discriminate durians based on cultivars and origins with great performance (>94% accuracy and >80% sensitivity). Importantly, this method is based on the analysis of pulp, which is connected directly to the quality that consumers can perceive. Hence, it can be viewed as a more practical and reliable method. Overall, this approach confirms the practicality in using chemical analysis to promote and facilitate the registration and utilization of geographical indication, which could in turn uplift and revolutionize foods and agriculture industries of Thailand in a sustainable manner.

KEYWORDS:
geographical indication, mass spectrometry, gas chromatography, chemometrics