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Aromatic Thai Rice Identification by Near-Infrared Reflectance Spectroscopy

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Abstract

Several varieties of aromatic rice have been released in Thailand. A rapid and high accuracy technique to identify each variety of these groups of rice is not available. Therefore, it is urgent need to both research and industry scale to verify their varieties. Based on cooking properties, aromatic Thai rice varieties show differences in their physicochemical properties. These rice properties could be determined by near-infrared (NIR) spectroscopy. The aim of this study was to determine the feasibility of using NIRS to identify aromatic Thai rice varieties.

Five selected aromatic Thai rice varieties have been milled and their qualities were determined at the Postharvest Technology Institute, Chiang Mai University, Thailand. Whole grains were scanned (1100–2500nm) in reflectance mode by spinning module. There was a satisfied result, since the NIRS spectrum could obviously identify var. Pathumthani 1 (PTN1) and var. KDML105 from other varieties by applying principle component analysis (PCA). Principle Component (PC) 1 and 3 showed better results in separating rice varieties than PC2. The PCA score plots were clear to identify differences in quality of RD15, PTN1 and KDML105. However, var. Khlongluang1 (KL1) and var. Homsuphan (HSP) showed similar values which means that KL1 and HSP varieties had similar physicochemical qualities. However, after transformation with Multiplicative scatter correction (MSC) and second derivative, the spectrum showed 2 peaks at the wavelength of 1432 and 1914 nm. These wavelengths are related to starch physiochemical properties in each variety. Therefore, it can be concluded that the PCA technique alone cannot be used to identify aromatic Thai rice varieties as calibration equations are needed. Nevertheless, the NIR technique can be used to identify aromatic Thai rice varieties when combined with the starch properties of each variety.

Keywords: Identification, rice, near-infrared