Applications of electronic nose to determine the maturity of sapodilla using pattern recognition system

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Abstract

Sapodilla is a tropical fruit that has a distinctive taste preferred by most people. Determination of fruit maturity with nondestructive method for sapodilla has not been commercially practiced. The purpose of this study was to identify the aroma of sapodilla fruit at different levels of ripeness, as well as to assess the effect of calcium carbide (CaC_2) concentration on the ripening of the fruit. Sapodilla fruit samples were stored in a 30°C incubator under the following treatments: 0.1%CaC_2, 0.2% CaC_2, and control. Fruit aroma was measured by electronic nose using four sensors (TGS222, TGS 825, TGS826, and TGS2602), every day for 8 days during the ripening process. Data recorded were the voltage changes of electronic nose readings. The level of fruit hardness, and total soluble solids were also measured, and a sensory test was carried out for comparison. The recorded data were further used as the basis for pattern recognition system on artificial neural networks (ANN). Results that had been trained by ANN were then tested to identify the level of ripeness for other sapodilla fruits. The aroma data were then analyzed using Principle Component Analysis (PCA). The goal was to classify the fruits based on the level of sapodilla ripeness. The results indicated that the ANN was able to recognize the fruit ripeness with a level of accuracy of 90.11%. PCA was also able to identify the ripeness of sapodilla fruit quite well.