Evaluation of banana ripeness, investigated using gas chromatography-mass spectrometry (GC-MS) and a low cost electronic nose ((lc)e-nose), developed with conductive polymer ultrathin film

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Estimation of the degree of maturity of fruit at harvest is of great importance because physiologically immature fruits have not completed their growth, while fruit harvested at a far more advanced stage toward or after maturity are more susceptible to disease and deteriorate rapidly. Assessment and monitoring of food quality, during both production and storage is of prime importance to enhance its quality at the point of sale. The objective of this study was investigate the volatile organic compounds (VOCs) emission of banana (Musa cavendish) at different stages of ripening using an electronic nose that consists an array of conducting polymers sensors and monitor the change using gas chromatography-mass spectrometry (GC-MS) with headspace solid-phase microextraction (HS-SPME). The experiments using (lc)e-nose and GC-MS were made simultaneously for 4 days, and made three chromatographic runs per day. The electronic nose-sensors response was an overall profile of the various chemical species present in the VOCs emitted during the banana ripeness, including ethylene. With this system was possible obtained a distinct temporal pattern, taken as a signature (fingerprint) that can be used to monitor banana ripeness. This profile indicates the initial maturation stage, characterized by a low production of carbon dioxide or oxygen absorption, the plateau showing ethylene production up to the 58 h and, after this, the final stage of declining signal. The results obtained by GC-MS were correlated with the profile obtained with the (lc)e-nose-sensors, determined qualitatively the VOCs in each period of ripening of fruit. The investigation between the signal of the e-nose and GC-MS will be conducted.