Development of multichannel artificial lipid-polymer membrane sensor for phytomedicine application

Quality control of herbal medicines remain a challenging issue towards integrating phytomedicine into the primary health care system. As medicinal plants is a complicated system of mixtures, a rapid and cost-effective evaluation method to characterize the chemical fingerprint of the plant without performing laborious sample preparation procedure is reported. A novel research methodology based on an in-house fabricated multichannel sensor incorporating an array of artificial lipid-polymer membrane as a fingerprinting device for quality evaluation of a highly sought after herbal medicine in the Asean Region namely Eurycoma longifolia (Tongkat Ali). The sensor array is based on the principle of the bioelectronic tongue that mimics the human gustatory system through the incorporation of artificial lipid material as sensing element. The eight non-specific sensors have partially overlapping selectivity and cross-sensitivity towards the targeted analyte. Hence, electrical potential response represented by radar plot is used to characterize extracts from different parts of plant, age, batch-to-batch variation and mode of extraction of E. longifolia through the obtained potentiometric fingerprint profile. Classification model was also developed classifying various E. longifolia extracts with the aid of chemometric pattern recognition tools namely hierarchical cluster analysis (HCA) and principal component analysis (PCA). The sensor seems to be a promising analytical device for quality control based on potentiometric fingerprint analysis of phytomedicine.