Rapid Identification Method of Aerobic Bacteria in Diabetic Foot Ulcers Using Electronic Nose

Abstract

Diabetic foot ulcer (DFU) is an infection, ulcer or destruction of deep tissue associated with neurological abnormalities, musculoskeletal deformities and various degrees of peripheral vascular disease of lower limb. In this study, an electronic nose is proposed to recognize types of bacteria in the diabetic foot ulcer on patients with the aid of data analysis using PCA (Principal Component Analysis) and LDA (Linear Discriminant Analysis) as the first step for feature extraction. Bacteria classification is also enhanced by pattern analysis using FFBP (Feed Forward Back Propagation) and SOM (Self Organizing Map) of ANN (Artificial Neural Network). Experimental results show that the use of electronic nose in identifying bacteria on diabetic foot ulcers works effectively as the high accuracy obtained for the bacteria classification.