

Distinguishing edible oil using dielectric spectroscopy at microwave frequencies of 8.2–12.1 GHz

ABSTRACT

The study focused on application of spectral permittivity technique subjected to high frequency range of 8.2-12.1 GHz at the temperature of 25°C to identify animal fats from vegetable oils. Analysis of Variance (ANOVA) technique was used as a statistical data analysis to determine whether the samples are statistically distinctive. Principal Component Analysis (PCA) was used to classify animal fats and vegetable oils on their permittivity spectral. ANOVA analysis results showed that there is a significant difference between animal fats and vegetable oils with respect to their spectral permittivity at different frequencies. PCA classification plots showed that vegetable oil could be grouped into different clusters from the animal fats. From the results obtained in this study, spectral permittivity technique could be used to distinguish animal fats and vegetable oils.

Keyword: Analysis of Variance (ANOVA); Edible oil discrimination; Principal component analysis (PCA); Spectral permittivity