Capacitive sensor probe to assess frying oil degradation

ABSTRACT

The repeated usage of frying oil has been proven hazardous due to the degradation process by chemical reactions that lead to changes in the quality of the oil. Currently, the degree of frying oil degradation is indicated by the percentage of its total polar compounds (TPC). In this study, a capacitive sensor was designed to assess frying oil degradation at several heating time intervals by measuring changes on its electrical capacitance. The sensor was designed using interdigitated electrode structure. A total of 30 samples of 130 ml palm oil were heated at 180 °C up to 30 h. For each one hour interval, one sample was moved out from the laboratory oven. The electrical capacitance, total polar compound (TPC) and viscosity of the samples were measured for analysis. Preliminary results demonstrated significant correlation between oil electrical capacitance with TPC and viscosity with R2 ranged from 0.83 to 0.90. The designed sensor has good potential for simple and inexpensive way of determining frying oil quality.

Keyword: Capacitance sensor; Frying oil quality; Heating