Finite difference analysis of an open-ended, coaxial sensor made of semi- rigid coaxial cable for determination of moisture in Tenera oil palm fruit

ABSTRACT

In this paper, the use of the Finite Difference Method (FDM) is proposed to determine the reflection coefficient of an open-ended coaxial sensor for determining the moisture content of oil palm fruit. Semirigid open-ended coaxial sensor is used in conjunction with Vector Network Analyzer for reflection coefficient measurement of oil palm fruit. Moisture content in oil palm fruit determine optimum harvest time of oil palm fruit. Finite difference method is then used to simulate measured reflection coefficient due to different moisture contents in oil palm fruit at various stages of ripeness. The FDM results were found to be in good agreement with measured data when compared with the quasi-static and capacitance model. Overall, the mean errors in magnitude and phase for the FDM were 0.03 and 3.70°, respectively.