

Analysis on monopole antenna for moisture determination in oil palm fruit using finite difference method

ABSTRACT

Finite difference analysis were applied to study the principle operation of monopole antenna for moisture determination in oil palm fruit at 2 GHz. The electromagnetic field interact with oil palm fruit on the interface between the antenna and oil palm fruit and cause a reflection. The reflection measurement is based on mismatch impedance or dielectric properties between two media. Reflection coefficient is used to quantify the level of reflection. The monopole antenna was made of RG405/U semi-rigid coaxial cable with an inner and outer diameter of 0.45 mm and 1.50 mm, respectively with 2.23 mm length of protruding conductor over 5.66 cm length of monopole antenna. This monopole antenna for moisture detection was compared with induced EMF method in terms of reflection coefficient at 2 GHz. The results show that the complex reflection coefficient measured using monopole antenna provides significant results to predict moisture content in oil palm fruit.

Keyword: Finite different method; Oil palm fruit; Moisture content; Monopole antenna