Microwave dielectric properties of four types of rhizomes from Zingiberaceace family

ABSTRACT

The dielectric properties of four types of rhizomes from Zingiberaceace families, namely Java turmeric, Mango ginger, Black turmeric and Turmeric were measured. The non-destructive measurement technique was adopted for the measurement using HP-85070B open-ended coaxial line probe coupled with a computer-controlled Automated Network Analyzer (ANA) at the frequency range of 0.13–20 GHz which is in the microwave frequency region. The dielectric properties of all samples are presented graphically to show the dependence of these properties on moisture content and frequency. The results show that the dielectric properties of samples follow the trend of dielectric properties of deionised water. The dielectric constant decreased with increase in frequency and the dielectric loss factor decreased in low frequency before increasing at 1.5 GHz and above. The penetration depths for all samples were calculated. The results show that they were only dependent upon the moisture at low frequency ($\leq$ 10 GHz).

Keyword: Moisture content; Dielectric properties; Penetration depth; Types of rhizomes; Zingiberaceace family