Determination of dielectric properties of sesame seeds in the radiofrequency range

Kamil Sacilik

Department of Agricultural Machinery, Faculty of Agriculture, Ankara University 06130 Ankara, Turkey, (e-mail: Kamil.Sacilik@agri.ankara.edu.tr)

Abstract
Sesame seed (Sesamum indicum L.), composed of 50% lipid and 20% protein, and is one of the most important oilseed crops in the world. It is a small, ovate and highly nutritious seed which weighs between 2 and 4 g per 1000 seeds. It is rich in oil (44-45%), calcium, phosphorus and oxalic acids. The seed is a good source of high quality edible oil containing mostly linoleic (44%) and oleic (40%) acids.

In this research, dielectric properties of sesame seeds were determined as a function of moisture content, frequency and bulk density. The dielectric constant and loss factor was greatly affected by the moisture content, frequency and bulk density. The moisture content was the most significant factor affecting the dielectric properties of sesame seed. The dielectric constant increased with an increase in the moisture content and bulk density, whereas it decreased with an increase in the frequency. The dependence of the dielectric constant on frequency and moisture content was more regular than that of the loss factor. The second and third-order polynomial equations were proposed to describe the existing relationship between dielectric properties and moisture content. Dielectric measurements provide new information concerning moisture content and bulk density dependent behavior of dielectric properties of sesame seed in the radiofrequency range that may be useful in sensing of the moisture content and dielectric drying applications.

Key words: dielectric properties, sesame seed