

## **Dielectric properties for selected wall material in the development of microwave-encapsulation-drying**

### **ABSTRACT**

Dielectric properties study is important in understanding the interaction between materials within electromagnetic field. By knowing and understanding the dielectric properties of materials, an efficient and effective microwave heating process and products can be designed. In this study, the dielectric properties of several encapsulation wall materials were measured using open-ended coaxial probe method. This method was selected due to its simplicity and high accuracy. All materials exhibited similar behavior. The result inferred that  $\beta$ -cyclodextrin (BC), starch (S), Arabic (GA) and maltodextrin (M) with various dextrose equivalent exhibited effective encapsulation wall materials in microwave encapsulation-drying technique owing to loss tangent values which were higher than 0.1 at general application frequency of 2.45 GHz. Thus, these were found to be suitable as wall material to encapsulate the selected core material in this microwave encapsulation-drying method. On contrary, sodium caseinate showed an ineffective wall material to be used in microwave encapsulation-drying. The differences in the values of dielectric constant, loss factor and loss tangent were found to be contributed by frequency, composition and bulk density.

**Keyword:** Wall materials; Dielectric constant; Loss factor; Frequency; Bulk density