

Title RF impedance method for determining moisture content in in-shell peanuts nondestructively
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Abstract

In previous research, the moisture content of single in-shell peanut pods, *Arachis hypogea* L., was determined by measuring the complex impedance of a parallel-plate capacitor with a peanut pod held between the plates. In this method, capacitance, phase angle, and/or dissipation factor were measured at 1 and 5 MHz. The measured values were used in a derived empirical equation to calculate the moisture content of the pod. In the present work, similar measurements of the complex impedance at 1, 5, and 9 MHz were made, to measure the average moisture content of several peanut pods placed between two parallel-plates. Unlike in the case of a single peanut pod, when several peanut pods are placed between the plates, all the pods will not be in contact with both plates. This introduces different patterns of air gaps between the pods and the plates which act as capacitors in series with the pods. The equation used for single pods was modified to accommodate these changes, and the average moisture contents were calculated and compared with their air-oven values. The calculated moisture contents were within 1% of the air-oven values for over 80% of the samples tested in the moisture range of 5% and 25%. The method is rapid and nondestructive and is suitable for developing a practical instrument for moisture content measurement of in-shell peanuts.