

A Low Cost Non-Destructive Grain Moisture Embedded System for Food Safety and Quality

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Abstract : Moisture plays an important role in storage, harvesting and processing of food grains and related agricultural products. It is an important characteristic of most agricultural products for maintenance of quality. Accurate knowledge of the moisture content can be of significant value in maintaining quality and preventing contamination of cereal grains. The present work reports the design and development of microcontroller based low cost non-destructive moisture meter, which uses complex impedance measurement method for moisture measurement of wheat using parallel plate capacitor arrangement. Moisture can conveniently be sensed by measuring the complex impedance using a small parallel-plate capacitor sensor filled with the kernels in-between the two plates of sensor, exciting the sensor at 30 KHz and 100 KHz frequencies. The effects of density and temperature variations were compensated by providing suitable compensations in the developed algorithm. The results were compared with standard dry oven technique and the developed method was found to be highly accurate with less than 1% error. The developed moisture meter is low cost, highly accurate, non-destructible method for determining the moisture of grains utilizing the fast computing capabilities of microcontroller.

Keywords : complex impedance, moisture content, electrical properties, safety of food

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