Abstracts

Sensing Dielectric Properties of Arbitrarily Shaped Biological Objects with a Microwave Resonator

A.W. Kraszeweki, S.O. Nelson and T.S. You. "Sensing Dielectric Properties of Arbitrarily Shaped Biological Objects with a Microwave Resonator." 1989 MTT-S International Microwave Symposium Digest 89.1 (1989 Vol. I [MWSYM]): 187-190.

A rectangular waveguide resonator operating in the H/sub 107/ mode at 6 GHz was used in determining the change in resonant frequency and the Q-factor of the cavity when loaded with single soybean seeds or corn kernels of various shapes and dimensions. By measuring those variables for a kernel oriented in two positions differing by 90 degrees with respect to the maximum E-field vector, the average values of Delta F and Delta T were found to be virtually shape-independent. The ratio Delta F/ Delta T is a size-independent and well-defined function of the material properties (epsilon' - 1)/epsilon' ', and as such it can be related to the material density, moisture content, or other characteristic when all other properties remain unchanged.

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