

Author:  [ADVANCED](#) | Volume  Page   
Keyword:   |



[TOP](#) > [Available Issues](#) > [Table of Contents](#) > [Abstract](#)

ONLINE ISSN : 1881-3976

PRINT ISSN : 1341-7592

**Food Science and Technology International, Tokyo**

Vol. 3 (1997) , No. 4 pp.373-378

[\[PDF \(699K\)\]](#) [\[References\]](#)

## Penetration of Infrared Radiation within a Vegetable Model

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(Received: April 24, 1997)

(Accepted: July 15, 1997)

A vegetable model was constructed in order to evaluate its apparent absorption coefficient and penetration of infrared radiation within it. Carrot, daikon (Japanese radish), eggplant, potato, pumpkin and sweet potato were prepared as the test vegetables. This vegetable model was composed of the dry vegetable material, liquid and gas, and its apparent absorption coefficient was calculated with their absorption coefficients and volumetric fractions. The volumetric fraction of the voids (void fraction) was obtained experimentally by a method provided in this study. Thus the damping of infrared rays within the vegetable model irradiated by near-infrared (NIR) or far-infrared (FIR) radiation was estimated in consideration of the spectral distribution of the radiation. The infrared radiation absorbed by the vegetable model was indicated to be damped to 1/100 of the initial value at a depth of 0.21 to 2.54 mm, and the penetration depth in the case of NIR irradiation was deeper than that of FIR irradiation. Moreover, the calculation results suggested that the penetration depth of infrared radiation became deeper with a decrease in the water content.

**Keywords:** [infrared radiation](#), [penetration](#), [vegetable](#), [absorption coefficient](#), [void fraction](#)

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doi:10.3136/fsti9596t9798.3.373

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