

An optimized method for thermal diffusivity measurement of peeled off fruits and vegetables.

ABSTRACT

The aim of the present work was to find out the most suitable method for thermal diffusivity measurement of peeled off fruits and vegetables. Three methods reported in the literature, have been examined. One of them is finite difference method, which needs temperature-time measurements at three equidistant locations in the food flesh. Another method is the well-known Riedel correlation, which determines thermal diffusivity of food item from its water content. The third method is based on the empirical correlation of the present author and his co-workers and reported earlier. Peeled off fresh potato, cucumber, apple and orange samples were exposed to chilled air blast cooling, and temperature-time records were made at five equidistant locations starting from center and at equal distances of $1/5$ th the distance between the center and the outer surface. Collected data was used to estimate thermal diffusivity values by the first and the third methods. The second method was also used to calculate thermal diffusivity from measured water content of the produce. After thorough investigations, it was concluded that the third method was most reliable when temperature records at the center were used.

Keyword: Measurement; Peeled off fruits and vegetables; Thermal diffusivity.