

Thermal properties variation of Malaysian yellowtail catfish during precooling process and numerical verification

ABSTRACT

Malaysian yellowtail catfish, which is widely consumed in Malaysia, was investigated to determine the thermal properties and their variation during precooling process. These properties encompassed thermal conductivity, specific heat and thermal diffusivity. The moisture, fat, protein, carbohydrate and ash contents of the fish muscle were determined in a fresh fish. Mathematical formulae, which correlated between the constituent values and the thermal properties, were used to determine these properties and their variation with temperature. The results were compared with the existing literature of other fishes. Slight differences were noticed, however, the results were still within the common range of fish thermal properties values. The differences may be attributed to the different growing conditions. Models correlated between the thermal properties and temperature variations were developed which are the basic requirements of solving heat transfer problems related to precooling process. These models were used in conjunction with Ansari's empirical equation to predict temperature history at the midpoint of preassumed slab subjected to precooling process. When a typical real slab was tested experimentally in the precooling process, similar experimental temperature history at the mid point was observed.

Keyword: Malaysian yellowtail catfish; Thermal properties models