

Process optimization for drying of shrimp (*Metapenaeus dobsoni*) under hot air-assisted microwave drying technology using response surface methodology.

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Abstract

The study was carried out to optimize the drying conditions of shrimp in the hot air-assisted microwave drying system using response surface methodology. The drying experiments were performed using a Box-Behnken design with air temperature (50-70°C), air velocity (.5-1.5 m/s), and microwave power level (600-1000 W) as independent variables and drying time, water activity, and rehydration ratio as independent variables. The obtained response variables were fitted into the various regression equations to predict a suitable model. The methodology of desired function was applied to indicate 61.74°C air temperature, 922.61 W microwave power, and 1.0 m/s air velocity which offered a reduced drying time of 2.8 h, the water activity of .424 and improved rehydration ratio of 2.51, respectively with a desirability value of .949. The moisture content, drying efficiency, shrinkage, and total color change were determined for the samples obtained under optimized conditions and were observed as 16.5% (w.b), 35.71%, 14.14%, and 16.95 ± 2.14, respectively. Scanning electron microscopy analysis of dried shrimp showed the formation of pores of diameters ranging from 3.17 to 10.6 µm. The process parameters optimized under the study for hot air-assisted microwave drying can be used for the production of good-quality dried shrimps.

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Indexing Terms

Descriptors

air drying | air temperature | colour | drying | drying methods | hot air treatment | moisture content | optimization | rehydration | velocity | water activity | shrimps | aquatic animals | aquatic organisms

Identifiers

color | aquatic species

Organism Descriptor

Metapenaeus dobsoni

Broader Terms

Metapenaeus | Penaeidae | Decapoda | Malacostraca | Crustacea | arthropods | invertebrates | animals | eukaryotes