

Kinetic Modelling of Drying Process of Jumbo Squid (*Dosidicus Gigas*) Slices Subjected to an Osmotic Pretreatment under High Pressure

Authors : Mario Perez-Won, Roberto Lemus-Mondaca, Constanza Olivares-Rivera, Fernanda Marin-Monardez

Abstract : This research presents the simultaneous application of high hydrostatic pressure (HHP) and osmotic dehydration (DO) as a pretreatment to hot -air drying of jumbo squid (*Dosidicus gigas*) cubes. The drying time was reduced to 2 hours at 60°C and 5 hours at 40°C as compared to the jumbo squid samples untreated. This one was due to osmotic pressure under high-pressure treatment where increased salt saturation what caused an increasing water loss. Thus, a more reduced time during convective drying was reached, and so water effective diffusion in drying would play an important role in this research. Different working conditions such as pressure (350-550 MPa), pressure time (5-10 min), salt concentration, NaCl (10 y 15%) and drying temperature (40-60°C) were optimized according to kinetic parameters of each mathematical model. The models used for drying experimental curves were those corresponding to Weibull, Page and Logarithmic models, however, the latest one was the best fitted to the experimental data. The values for water effective diffusivity varied from 4.82 to 6.59x10-9 m²/s for the 16 curves (DO+HHP) whereas the control samples obtained a value of 1.76 and 5.16x10-9 m²/s, for 40 and 60°C, respectively. On the other hand, quality characteristics such as color, texture, non-enzymatic browning, water holding capacity (WHC) and rehydration capacity (RC) were assessed. The L* (lightness) color parameter increased, however, b * (yellowish) and a* (reddish) parameters decreased for the DO+HHP treated samples, indicating treatment prevents sample browning. The texture parameters such as hardness and elasticity decreased, but chewiness increased with treatment, which resulted in a product with a higher tenderness and less firmness compared to the untreated sample. Finally, WHC and RC values of the most treatments increased owing to a minor damage in tissue cellular compared to untreated samples. Therefore, a knowledge regarding to the drying kinetic as well as quality characteristics of dried jumbo squid samples subjected to a pretreatment of osmotic dehydration under high hydrostatic pressure is extremely important to an industrial level so that the drying process can be successful at different pretreatment conditions and/or variable processes.

Keywords : diffusion coefficient, drying process, high pressure, jumbo squid, modelling, quality aspects

Conference Title : ICFSTCT 2016 : International Conference on Food Safety, Toxic Components and Technology

Conference Location : Havana, Cuba

Conference Dates : November 24-25, 2016