

An investigation on the application of ohmic heating of cold water shrimp and brine mixtures - DTU Orbit (08/11/2017)

An investigation on the application of ohmic heating of cold water shrimp and brine mixtures

Cooking is an important unit-operation in the production of cooked and peeled shrimps. The present study explores the feasibility of using ohmic heating for cooking of shrimps. The focus is on investigating the effects of different process parameters on heating time and quality of ohmic cooked shrimps (*Pandalus borealis*). The shrimps were heated to a core temperature of 72 °C in a brine solution using a small batch ohmic heater. Three experiments were performed: 1) a comparative analyses of the temperature development between different sizes of shrimps and thickness (head and tail region of the shrimp) over varying salt concentrations (10 kg m⁻³ to 20 kg m⁻³) and electric field strengths (1150 V m⁻¹ to 1725 V m⁻¹) with the heating time as the response; 2) a 2 level factorial experiment for screening the impact of processing conditions using electric field strengths of 1250 V m⁻¹ and 1580 V m⁻¹ and salt concentrations of 13.75 kg m⁻³ and 25.75 kg m⁻³ and 3) evaluating the effect of pretreatment (maturation) of the shrimps before ohmic processing. The maturation experiment was performed with the following maturation pre-treatments: normal tap water, a 21.25 kg m⁻³ brine solution and without maturation. The measured responses for experiments 2 and 3 were: the heating time until the set temperature of the shrimps was reached, weight loss, press juice and texture profile. It was possible to fit main effects model relating process settings and the heating time, weight loss and press juice measurements. Furthermore, the results showed that over the tested process workspace no significant changes were seen in the texture measurements of the shrimps and that the shrimp achieved a comparable quality compared to the conventional heating processes reported in the literature. The findings show a promising utilization of ohmic heating as a unit operation for the shrimp

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