

COMBINED EFFECT OF VARIOUS NITRITE CONCENTRATION AND HIGH PRESSURE TREATMENT ON FUNCTIONAL CHARACTERISTICS OF RAW MEAT BATTER

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Abstract

The quality of meat products is basically determined by the meat batter. However, relatively few studies deal with the preservation of the quality of meat batter and the possibility of reducing added additives. In order to reduce the amount of additives in these products, however, the shelf life should not be shortened, other minimal processing technologies are required such as high hydrostatic pressure (HHP) management.

The aim of this study was to investigate the combined effect of nitrite concentration and high pressure treatment on objective color, water holding capacity (WHC) and protein solubilization of raw meat batter, containing 50, 75, 100 and 125 ppm nitrite, respectively. The applied pressure treatment were 450 and 600 MPa. Meat batter samples were measured using objective color measurement (CIELab) and to investigate water holding capacity pressing test was used. Meat proteins were tested by gel electrophoresis (SDS PAGE). The effect of the nitrite and the pressure on color and water holding capacity was evaluated by two-way analysis of variance (ANOVA) at p 0.05 significance level.

High pressure and nitrite concentrations had effect on the objective color of raw meat batters. The nitrite reduction and high pressure decreased the redness (a^*) of the samples. High pressure increased the batters lightness (L^*) but nitrite reduction decreased it and resulted in darker color. Yellowness (b^*) of the raw meat batters were not influenced by the high pressure. The 450 and 600 MPa pressure treatments significantly enhanced the water holding capacity of raw meat batters. However, reducing the amount of nitrite used for making the batter can adversely affect water holding capacity of the raw batter. Based on the statistical results, there was no interaction between the applied pressure and the amount of nitrite used. High pressure had impact on the albumins (60 - 70 kDa) and sarcoplasmic proteins (100 - 250 kDa). Pressure treatment at 450 MPa or above decreased the intensity of protein bands. The high pressure treatment had no effect on myoglobin (16.9 kDa) solubilization. The nitrite reduction didn't affect protein denaturation.

Overall, it can be said that by increasing the pressure the amount of nitrite can be reduced in the meat batter.

Key words: Meat batter, High hydrostatic pressure, Color, Water holding capacity, Two-way analysis of variance.