



New Emerging Technologies for Improving Poultry Meat Quality: Effect of High Pressure Processing on Chicken Meat Protein Gel Formation

J. Chan, A.O. Dileep, and M. Betti

Summary

High pressure processing (HPP) is one of the most promising food technologies with practical implications in meat processing. It is important to understand the modifications of proteins induced by high pressure treatment. This study will result in the determination of the optimal combinations of pressure and temperature to induce protein gel formation in chicken meat batters.

Problem

One of the challenges in the production of further processed meat products is the utilization of PSE (pale, soft, exudative) and DFD (dark, firm, dry) meat (Figure 2). Raw breast meat color is related to muscle pH and functional properties in poultry meat. PSE meat costs the U.S. poultry industry at least \$30 million/year due to reduced protein functionality in further processed products. DFD meat is not a major issue in processing, however; it appears darker in color. The present investigation is intended to restore and/or enhance the gel-forming capacity of poor functional quality meat by using high pressure processing technology.

The major objectives of this study:

- 1) To investigate the physico-chemical properties of chicken meat proteins extracted from four types of muscles (*P. Major muscle*, *P. Minor muscle*, *Biceps femoris*, *wing muscle*)
- 2) To study the differences in the physico-chemical properties of DFD, normal, and PSE chicken breast meat
- 3) To determine the effect of high pressure processing on protein gel formation in DFD, normal, and PSE chicken breast meat batters

Our Approach

Batters will be prepared for the high pressure processing treatment as shown in Figure 1.

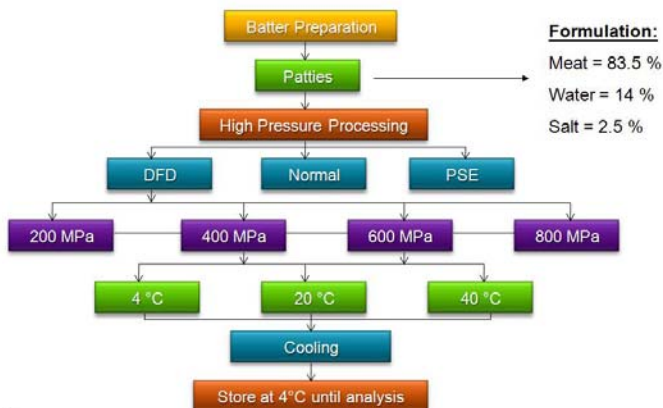


Figure 1. Schematic diagram of study design

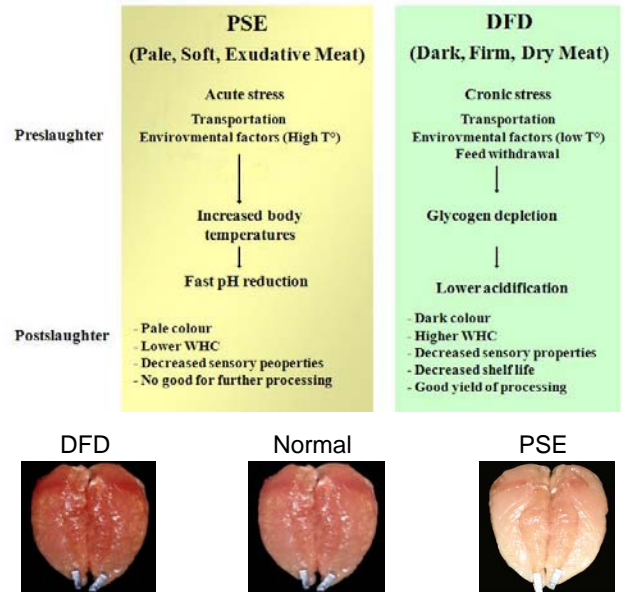


Figure 2. Schematic diagram of DFD, normal, and PSE meat

Our Observations

The present study will enable the understanding of functional properties of proteins extracted from different muscles in chicken. From this, modifications of proteins induced by high pressure processing will be determined. Muscle protein gelation is essential to the formation of desirable meat product texture. High pressure processing may restore and/or enhance the gel-forming capacity of poor functional quality meat. There is also the possibility to develop novel meat products by designing new textures (protein gel formation) in which flavor and nutritional value are minimally affected.

What does this mean?

PSE meat is a major challenge in the poultry industry. High pressure processing is a possible solution to improve the functional properties of poor quality meat and maintain desirable textural properties of further processed meat products. This study will enable the poultry industry in the development and marketing of novel, innovative, value-added meat products.

Acknowledgements

This research project is supported by funding from Alberta Livestock and Meat Agency (ALMA).

Contact Information

Dr. Mirko Betti, PhD
Assistant Professor
University of Alberta
Phone: (780) 248-1598
E-mail: Mirko.Betti@ales.ualberta.ca