



pH-shifting processing of spent hens mince: protein extraction optimization

H. Wang, J. Wu* and M. Betti*

Summary

An approach to increase the utilization of spent hen meat is to extract the functional proteins from this low-value meat source. This study was conducted in order to optimize the protein extraction conditions. A new-developed extraction technique known as pH-shifting method gives the possibilities to increase the utilization of spent hen meat by extracting proteins.

Introduction

Spent hens are referred to the hens that are at the end of their egg producing lives, which is usually around one year. Therefore, about 144 million spent hens must be removed annually from the egg production and it becomes the major waste for the egg industry in North America. The poultry industry need to find an effective and economic method to deposit this protein rich low value material. One of the alternative methods to increase the utilization of this source is to extract functional proteins (Figure 1). Thus, the objective of this study was to develop and optimize the extraction conditions of proteins from spent hens.

Materials and Methods

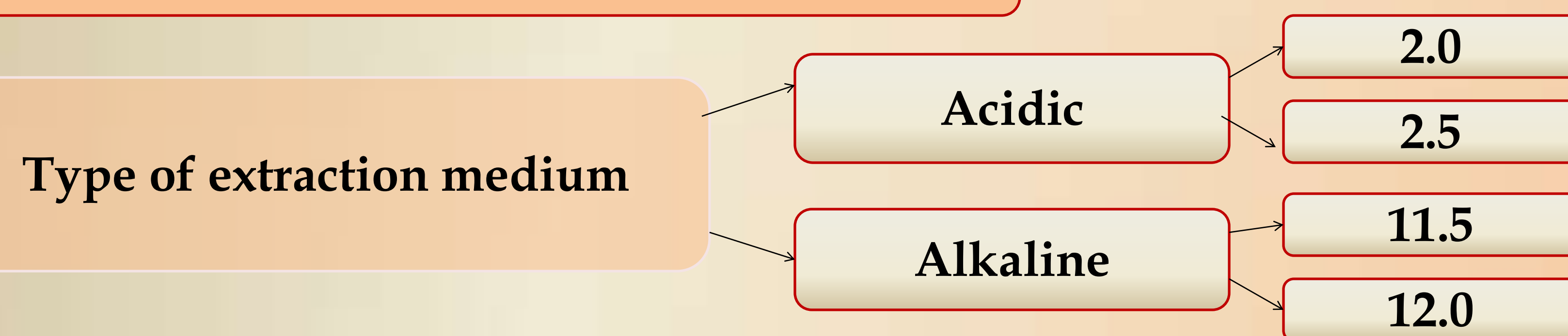


Figure 1. Experimental design

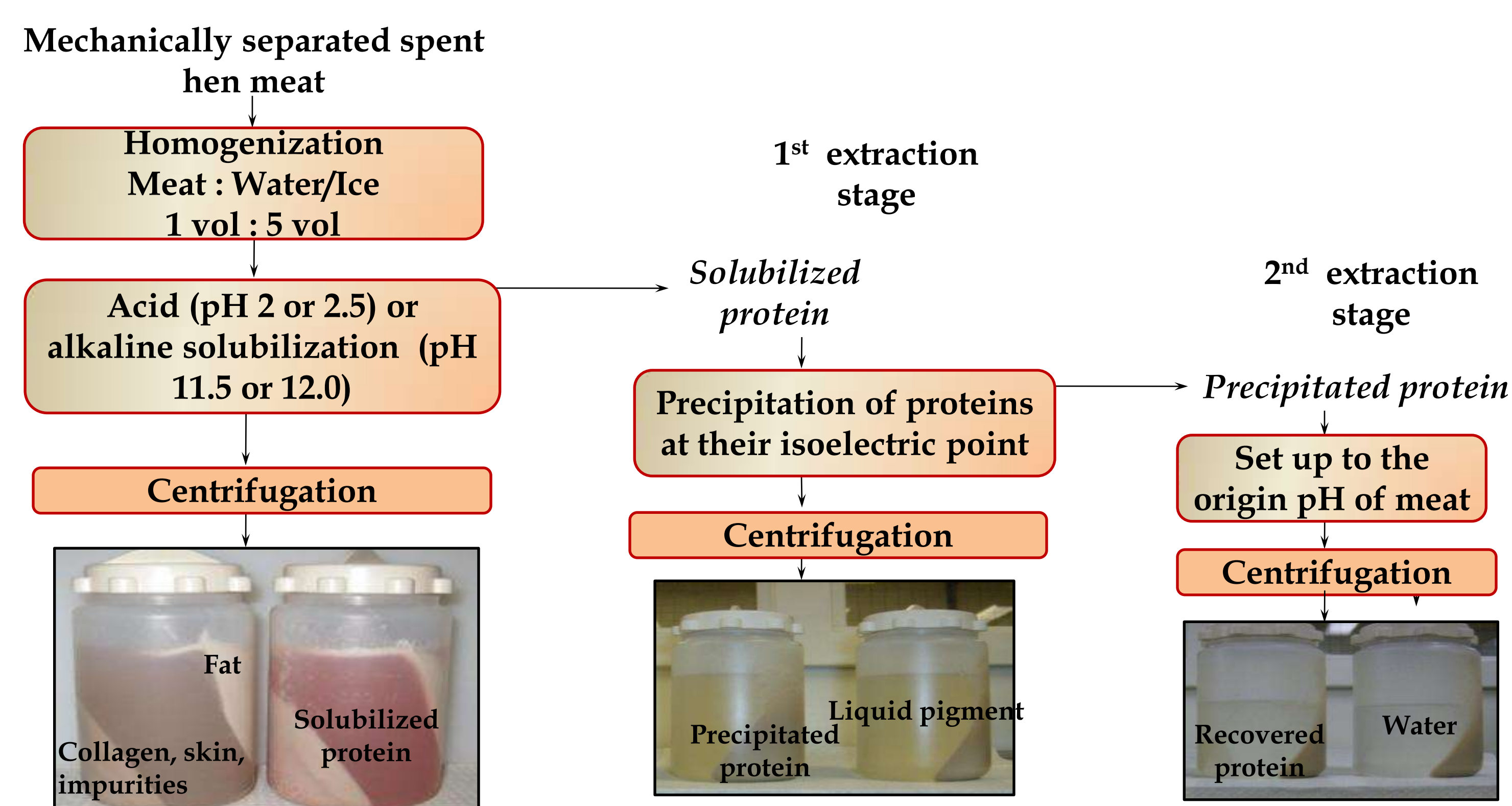


Figure 2. Schematic diagram of the separation process

Results

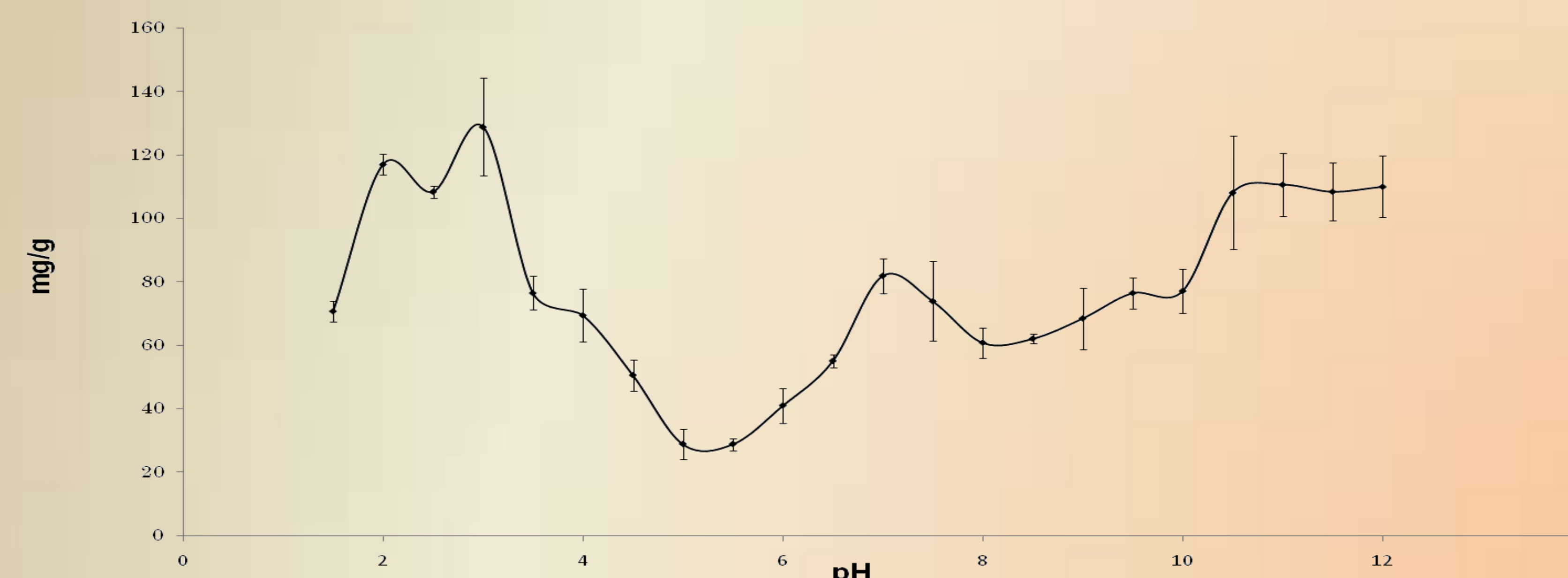


Figure 1. Protein solubility of mechanically separated spent hens meat at pH from 1.5 to 12.0 (n=4)

Table 1. Protein content (%) and protein yield (%) of the protein isolate extracted from spent hens minced meat (pH 2, pH 2.5, pH 11.5 and pH 12) at 10000 RPM

Extraction pH	Protein Yield %	Final protein Content % (dry based)	Final protein content % (wet based)
pH 2	70.2 ± 1.4 ^a	85.9 ± 3.0 ^b	15.5 ± 0.5 ^b
pH 2.5	70.4 ± 1.4 ^a	90.0 ± 0.9 ^{ab}	16.2 ± 0.2 ^{ab}
pH 11.5	60.8 ± 2.9 ^b	93.1 ± 1.4 ^a	16.8 ± 0.2 ^a
pH 12	62.6 ± 4.7 ^b	89.5 ± 0.7 ^{ab}	16.1 ± 0.1 ^{ab}

Possible Applications

- This protein isolate could be used as a membrane material for microcapsulation;
- It also could be used for edible film production in the making sausages;
- With chemical modifications, it is possible to produce biodegradable adhesives from this protein isolate for the wood industry.

Contact Information

*Dr. Mirko Betti, Associate Professor, University of Alberta
Phone: (780) 248-1598 E-mail: Mirko.Betti@ales.ualberta.ca
* Jianping Wu Associate Professor, University of Alberta
Phone: (780) 492-6885 Email jianping.wu@ualberta.ca

Acknowledgments to
Project Sponsors:

