



Utilization of Poultry By-products in Adhesive Development

Nandika Bandara, Jianping Wu

Project timeline: September 2012 – March 2013

Summary

- The poultry industry generates huge amount of by-product annually in the means of feathers, poultry meal, mechanically separated meat residue and as spent hen.
- End value of such by-product is reduced due to limited applications.
- Developing value added products from poultry by-products will increase the economic value.

Problem

- Byproducts of poultry industry in Alberta per year ^a:

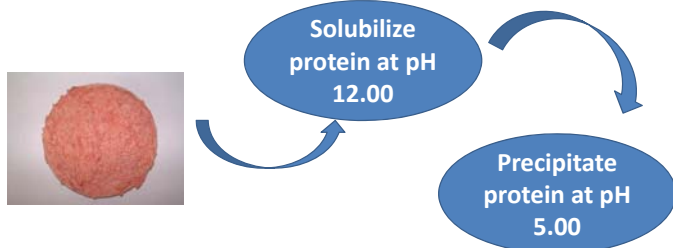
Type of By-product	Total number of animal in Alberta	Live Weight (millions of kg)	Amount of byproduct available (millions of kg)
Spent hen	2,457,000	3.69	2.76
Chicken	55,845,000	93.43	5.14
Turkey	1,727,000	14.81	0.81
Spent broiler breeders	572,776	2.00	1.50

^a: Numbers of animals were obtained from Statistics Canada "Poultry and Egg Statistics" (2012); "Cattle Statistics" (2012) and "Hog Statistics" (2012).

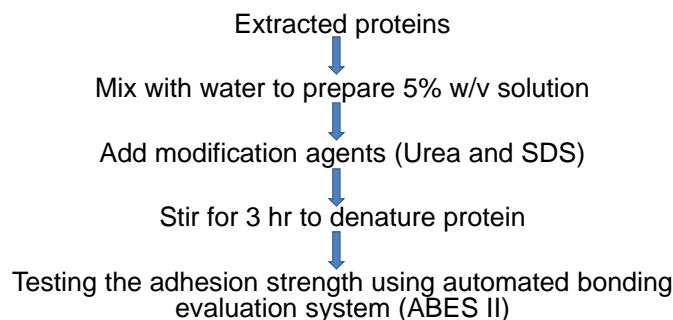
- Current main applications of poultry by-products is in the animal feed industry or disposal in landfills
- Wood adhesives are mainly produced from petroleum based chemicals. eg: Urea formaldehyde, Phenol formaldehyde
- Issues with synthetic wood adhesives: formaldehyde emission, non-renewability, environmental impact
- Developing wood adhesives from by-product proteins:
 1. Eliminates the problems of synthetic adhesives
 2. Add value to the poultry by-products

Our Approach

Extraction of Protein from Mechanically Separated poultry meat residue (MSPM-R)



Modification of protein for wood adhesive:



Our Observations

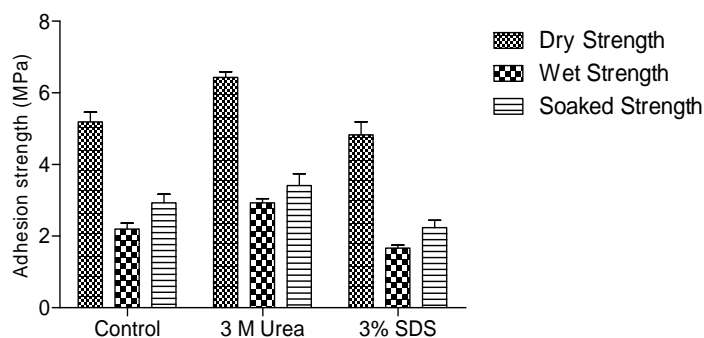


Figure 1. Adhesion strength of protein extracted from mechanically separated poultry meat residue with optimized modification conditions

- Increased adhesion strength after denaturing the proteins with urea and SDS
- Changes in the thermal transitions were observed in DSC after modifications
- Potential to use biomimetics to improve the adhesion strength

What Does this mean?

- Low adhesion strength from MSPM-R proteins compared to the spent hen protein adhesive developed in our lab – still within the requirement for wood adhesives used for internal applications
- Potential to use low value MSPM-R proteins alone or mixing with spent hen protein to develop strong wood adhesives

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Contact Information

Dr. Jianping Wu,
Phone: (780)492-6885
E-mail: jwu3@ualberta.ca