Utilization of Bovine Hide Protein for Food

B. R. Rao[1] and R. L. Henrickson[2]

Collagen is available in the form of hide protein from animals slaughtered for food. Animal hide is a major byproduct of the meat packing industry. The use of hide, in addition to manufacturing leather, as a protein supplement in traditional foods improves the economy of animal agriculture. Another source of collagen is the trimmings of connective tissue from meats used for manufacturing restructured meat products. Mechanically deboned meat both from conventionally chilled meat animal carcasses and hot boned carcasses is yet another source of collagen. Therefore, food uses of this abundantly available protein are an important challenge to the food scientist.

Sausage and other comminuted meats are a good way of utilizing this protein for food. Sausage makers use meat containing large quantities of connective tissue (collagen) to reduce processing costs. But many processors limit the amount of collagen containing meat to avoid such defects in the final product as gel caps, gel pockets, poor peelability, etc. However, research reports have shown that connective tissue proteins (collagen) bind water similar to meat myofibrillar proteins and only the soluble fraction of collagen is responsible for gel pockets in the finished product when heat processed above 70 °C. Nonfat dried milk (NFDM) is often used in sausage as a binder and research has pointed out that hydrolyzed collagen preparations from limed bovine hide splits could be used to replace NFDM in sausage emulsions.

An earlier report provided information on the use of wet bovine hide collagen in bologna formulations to replace the lean meat at a 20% level. Such a product was found quite acceptable. Bovine hide protein is also available in a freeze dried form. Advantages of the dried product over wet hide collagen are many fold; lightweight, needs no refrigeration, can be stored at room temperature, less microbiological problems, ease of handling, etc.

A research project was initiated to study the functional characteristics of freeze dried and air dried bovine hide protein when incorporated in a bologna formulation at the permissable levels stipulated by meat inspection regulations of USDA. The research plan was to use low bind meats high in connective tissue with freeze dried bovine hide protein (FDBHP) as a binder, moisturizer and stabilizer and to:

1. Compare the finished product with all meat product without extenders and with NFDM as an extender.
2. Analyze the raw meats and the FDBHP for total collagen, different fractions of collagen like heat soluble, salt soluble, acid soluble to determine their role in binding stability, water holding capacity, texture, color, etc. of the finished product.
3. Determine the effect of FDBHP on the salt solubility and heat denaturation of meat proteins in the bologna meat mixture.
4. Determine the nutritive value of the product by amino acid analysis.
5. Determine the economics of incorporating FDBHP in sausage formulations.

[1]Research Associate [2]Professor of Animal Science