

Guidelines for MAFMA Final Report

Final Reports due 3 months after completion of project
(4-5 pages)

Project Title Improving Quality And Extending Shelf Life of Fresh Meat Cuts

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Award Date Fall 2005

Please complete all questions below and attached form

1. Objective Summary (1-2 sentence summary)

The objective is to determine the efficacy of using hydrolyzed gelatin to improve the quality and extend the shelf life of fresh meat cuts, by reducing purge, and oxidation, while extending color life.

2. Objective Accomplishments

(If objectives were not met, what extenuating circumstances contributed to that factor?)

Convey all of your progress on this project including that obtained with the industry and other matching funds.

There is a significant increase in water loss, color loss, and lipid oxidation in the pork loin, chicken and beef samples as the storage time increases from 0 to 7 days, and from 7 to 14 days.

A coating of gelatin significantly decreases water loss, color loss, and lipid oxidation in fresh cuts of pork loin. The improvement depends on the type of meat, and in some cases no significant improvements are seen.

The composition, temperature and concentration of the gelatin significantly affects the effectiveness of the coating. Some gelatins are more effective than others, with beef being more effective than porcine gelatin. Some gelatins can dissolve at over 20% concentration, while others will not dissolve at all. Gelatin must be dissolved at a high temperature to ensure complete dissolution, but must be cooled before coating to prevent heat damage to the meat. The higher the concentration of gelatin, the more effective, but at high levels it becomes visible and unattractive to the consumer.

Dipping is an effective method for applying gelatin, but produces a very thick coating of gelatin. Spraying can also be effective, but more care is needed to ensure even and complete coverage of the meat product.

3. Unexpected findings, if any

It was expected that the gelatin could be applied as a powder or a cold liquid to the meat.

However, the gelatin must be dissolved in hot water in order to form a gel that extends the shelf

life of meat. If it is applied as a powder or in cold water, the gelatin does not adequately form a gel and no protection is provided. In addition, if the gelatin solution is too hot, color loss, lipid oxidation and purge are higher for the gelatin coated sample than the control due to detrimental effects of the heat. The gelatin needs to be dissolved at 65 C, but then cooled to 35 C for coating. Finally, some kinds of gelatin do not dissolve and should not be used at all.

4. Practical impacts of research efforts. Include: implementation of accomplishments by industry partners (if any), identification of economic impacts, and any further pursuit by PI of research in area of this project whether MAFMA or not.

a. Short Term Impacts

The Arnhem Group presented samples and brochures of fresh cut meat commercially coated with a gelatin solution at the 2006 IFT annual meeting to show the shelf life extension. They also showed a video we had made of the coating process at the 2005 Worldwide Food Expo. They have begun marketing this gelatin to their customers.

The PIs are continuing work in this area to determine optimum concentrations and application conditions for different types of meat. Gelatin properties are being studied to determine the properties needed for greatest for extension of shelf-life on fresh meat products.

b. Long Term Impacts

Since the gelatin decreases color loss, water loss and lipid oxidation of fresh cuts of meat, which currently limits shelf life, the addition of gelatin will extend the shelf life and decrease the economic loss for meat products. Over a billion dollars are lost per year by retailers, due to discoloration of meat products (Lavelle et al., 1995) and retailers could save \$792 million per year if discoloration of meat could be prevented (Liu et al. 1995). In some cases, the absorbing pads could be eliminated from packages, reducing processor costs.

Lavelle, C. L., M. C. Hunt and D. H. Kropf. 1995. Display life and internal coked color of ground beef from vitamin E-supplemented steers. *J. Food Sci.* 60:1175.

Liu, Q., M. C. Lanari and D. M. Schaefer. 1995. A review of dietary vitamin E supplementation for improvement of beef quality. *J. Anim. Sci.* 73:3131.

5. If you are also making reports to other funding agencies in the course of this research work, please include a copy of that report.

6. If any publications resulted from the research, a copy must be included. Please note we were notified by the USDA/CSREES National Program Leader for the Midwest Advance Food Manufacturing Alliance (MAFMA) that all publications resulting from research that was funded by MAFMA must include the following wording **“The project was supported by the USDA Cooperative State Research, Education and Extension Service, special research grant number 200X-34328-xxxxx.**

A publication will occur, but it has not yet been written.