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Dennis E. Burson

University of Nebraska-Lincoln, dburson1@unl.edu

Dana J. Hanson

University of Nebraska-Lincoln

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Pork 101

A Short Course Focusing on the Importance of Pork Quality and Consistency



Dennis E. Burson
Dana J. Hanson¹

As we move towards the next century, pork producers face many challenges. The Pork Quality Audit in 1994 identified consistency of the meat product, meat quality and food safety as major issues producers can't afford to ignore.

To introduce participants to these important segments of the pork industry, a three-day, hands-on short course has been developed at the University of Nebraska, with the assistance of the American Meat Science Association, the National Pork Producers Council, Michigan State University and Texas A&M University.

Course Objectives

The course provides:

- In-depth training on quality and consistency issues in the pork industry.
- Insight on value differences in swine, pork carcasses, pork primals and processes pork products due to quality variation.
- A framework allowing participants in all phases of pork production to implement management and production changes to increase value through improvements in quality and consistency.

The target audience for the three-day course is individuals involved in the production, processing and marketing of pork and might include pork producers, veterinarians, researchers,

educators, pork packers, meat processors, retail merchandisers, food service distributors, exporters, allied industry and media. To ensure everyone can participate in the hands-on learning activities, each session is limited to 32 participants.

Course Activities

The activities for the course center around two groups of market hogs. One group of four market hogs is used during the course for live evaluation and slaughter demonstrations. A second group of eight market hogs is slaughtered before the workshop to provide carcasses for fabrication, taste panel evaluations and quality measurements. The use of both sets of market hogs allows for the course to cover quality and consistency issues from production to consumption.

On the first day, participants have the chance to evaluate four live hogs, including a lean or fat animal and a light weight or heavy weight animal. These hogs are slaughtered on the second day of the workshop, and demonstrations, such as measuring carcass pH and carcass composition, HACCP (hazard analysis critical control point) systems for slaughter, hot processing of pork, microbiological interventions during slaughter and microbiological sampling for generic *E. coli*, are included. On the third day of the course the carcasses from the slaughtered hogs are evaluated for lean quality and quantity traits and are priced according to industry buying programs.

A second set of market hogs of diverse genetic background are recorded on video and slaughtered prior to the course. These carcasses are used dur-

ing the workshop to give participants the chance for hands-on lessons in carcass evaluation, carcass fabrication, curing of the hams and bellies and taste panel evaluations.

Other activities provide unique learning experiences for the participants. For example, the first day's dinner provides participants with two chops to rate for tenderness and taste. The chops can come from loins preselected for opposite quality traits such as high marbling versus low marbling and pale, soft and exudative (PSE) versus dark, firm and dry (DFD). Different quality contrasts are served to different individuals to cover a number of quality comparisons during the meal. The information is summarized and presented to the participants at the end of the first day.

Course Outline

The following agenda is followed for each Pork 101 short course.

DAY 1

- | | |
|-----------|---|
| 4 p.m. | Welcome
Impact of genetics on lean quality
Grading and evaluation of live animals
Pork carcass lean value pricing
Evaluate market swine |
| 5:30 p.m. | Quiz on pork quality
Dinner and taste test
Perspective on quality and consistency
Group selects one of eight hogs for fabrication
Review results of dinner taste test |



DAY 2

- 7 a.m. Breakfast
- 7:30 a.m. Pork carcass evaluation and review of eight carcasses for fabrication
- 8 a.m. Pork slaughter demonstration
HACCP and microbial interventions
pH and other quality measurements
Measures of carcass composition
Hot boning demonstration
- 10:30 a.m. Pork carcass fabrication
- 12 p.m. Lunch
- 1 p.m. Value-added product demonstration including bacon, low-fat ham and fresh pork sausage
Demonstration of PSE and DFD pork processing
Marinated pork products

DAY 3

- 7 a.m. Breakfast
- 7:30 a.m. Pork Quality Assurance
Review of quality and consistency on carcasses
Taste panel evaluation of hog used in the demonstrations
Assessment of carcass value
Evaluation of cured products made the previous day
Carcass grading demonstration
- 12 p.m. Lunch
Adjourn

Course Evaluation

Past evaluations by participants indicate the course is successful and many participants had very positive remarks about it. When asked to identify things they liked about the course, the most popular answers related to "the hands-on nature of the course" and the "evaluation of the market hog from live to the meat products."

¹Dennis E. Burson is an associate professor and Dana J. Hanson is a graduate student in the Department of Animal Science.

Development of Intervention Strategies to Extend the Shelf-Life of Fresh Ground Pork

David M. Gaebler
Roger W. Mandigo¹

Summary and Implications

The effects of storage time, packaging atmosphere and raw material source on shelf-life of fresh ground pork were studied. Fresh ground pork (18 percent fat) was packaged in an atmosphere of 80:20 percent O₂:CO₂ or 100 percent CO₂ and placed in unlighted refrigerated storage (34°F) for a period of two or eight days to simulate distribution time of the product from manufacturer to retail merchandiser. Products were then placed under lighted storage for eight additional days (100 foot candles, 34°F) to simulate retail display conditions. Ground sirloin had higher percent surface metmyoglobin (darkness and brown color) than ground pork shoulder after eight days of lighted storage. Lipid oxidation (rancidity) was higher in ground pork shoulder than ground pork sirloin. Pork shoulder had higher a (redness) values than pork sirloin in both atmospheres. Microbial loads (aerobic microorganisms) were higher in product stored eight days versus two days; however, total aerobic microbial loads did not exceed 10⁶ (the level commonly used to indicate microbial spoilage) for product stored in either atmosphere. Carbon dioxide successfully extends product shelf-life up to eight days under lighted storage conditions.*

Introduction

The preparation of meat products for retail display has changed dramatically over the last 20 years. Large supermarket chains have reduced or eliminated in-store preparation of fresh

red meat products to reduce labor and capital equipment costs. Today, meat products are prepared, packaged and labeled at large processing facilities, and shipped in refrigerated trucks to centralized distribution warehouses which then distribute products to individual stores. A consequence of this change is the necessity of longer shelf-life for products to reach the consumer. Fresh red meats packaged in oxygen permeable film have an expected shelf-life of two to three days under retail display conditions. One method for increasing shelf-life of refrigerated meats is to modify the atmosphere within the package. The shelf-life of fresh meat can be increased to six to 10 days with modified atmosphere packaging in a high-oxygen environment, and up to 21 days in a low-oxygen environment.

Modified Atmosphere Packaging (MAP) is one of several methods used by processors to control microbial spoilage of food products. Normal atmosphere contains 20.9 percent oxygen and 0.1 percent carbon dioxide. By increasing the carbon dioxide levels in the package, growth of aerobic spoilage organisms can be delayed, thereby extending the shelf-life of the meat product.

The two most frequently used atmospheres in MAP products are an 80:20 percent mixture of oxygen and carbon dioxide and 100 percent carbon dioxide. These atmospheres use different strategies to achieve the same result. The 80:20 percent O₂:CO₂ mixture uses higher-than-normal carbon dioxide levels to reduce aerobic microorganisms in combination with higher-than-normal oxygen levels to help maintain red meat color normally associated with freshness. The atmosphere is sealed into individual packages which

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