

# The National Pork Quality Benchmarking Study

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## Abstract

The 2002-03 Benchmarking Value in the Pork Supply Chain Project was conducted to evaluate the status and the progress of the pork industry since the first National Pork Quality Audit conducted in 1993-94. The project was a cooperative effort between the National Pork Board and several industry partners and was conducted by the American Meat Science Association in cooperation with Colorado State University, the University of Illinois and Texas A & M University. The project was done in four phases: an industry survey, processing component, a retail segment, and an industry strategy workshop.

In Phase I, pork processing companies were surveyed to identify, quantify and rank factors influencing pork quality. Surveys were designed to determine the quality of pork currently at the slaughter and fabrication segments of the pork chain. Meat processors provided slaughter information based on 64% of the 98 million barrows and gilts slaughtered in federally inspected plants in 2002. All major hog-producing areas of the U.S. were represented. Based on a dollar value, results of the survey indicated that the primary concerns about pork quality at the packing level were; (1) inconsistent weights; (2) thin bellies; (3) pale, soft and exudative (PSE); (4) too fat carcasses; and (5) abscesses/injection sites. Survey results were used to determine costs associated with quality deficiencies. It was estimated that \$8.08 or approximately 8% of the live-animal value is lost per slaughter barrow/gilt due to quality variability.

In Phase II, the objective was to evaluate the effects of PSE pork on the production of boneless and bone-in hams and to investigate the effect of belly thickness on processing and slicing yields as well as consumer satisfaction. The ham primals were selected and shipped through normal channels to a ham processing facility. The hams were categorized into low PSE, medium PSE, and high PSE groups. The

results showed that color and water holding capacity generally followed normal patterns with the high pH product generally having lower L\* values and lower drip loss. The values calculated for pack-off yield (after slicing and packaging) and final yield were clearly in favor of the high pH (low PSE) hams. Clearly, the low PSE group outperformed the rest of the treatment groups in that it had the lowest minor and major defects and the highest percentage of no defects. The sensory panelists demonstrated through purchase intent that they preferred the low PSE product two to three times that of any other treatment. The belly data showed that the thinner bellies had higher percentage cook shrinks and lower overall final yield percentages than the thick bellies. However, the results of this study showed that consumers prefer leaner bacon when evaluating or purchasing it visually and experience very minimal differences in acceptability and purchase intent based upon palatability.

In Phase III, the objective was to characterize retail products from the loin (enhanced and non-enhanced), ham (boneless), and belly (not-fully-cooked bacon), assessing the implications of quality on prices charged by retailers and to determine the opportunities lost with pork quality defects. Retail packages of boneless loin chops, bacon, and ham were purchased at retail markets in eight major U.S. cities which were chosen to provide broad geographical representation across the United States. Twenty-five retail stores in each city (n=200) were visited. Across all retail stores visited, average retail case displays consisted of 64.3% processed meats, 8.0% fresh poultry, 7.9% bacon, 6.8% fresh beef, 3.5% fresh pork, 2.6% heat and serve products, 2.4% ham products, and 2.4% frozen poultry products. Approximately 13% of the boneless pork chops found in the retail display were characterized as being of "poor quality." Overall, boneless loin chops had a mean NPPC color rating of 3.52 and were characterized as having a reddish-pink colored lean. Across all loin chops collected, the mean peak WBS force was 2.96 kg. Trained sensory panel mean overall tenderness ratings were 5.95, ranging from 4.25 to 7.75 on an 8-point scale for all chops evaluated in the study. The study also found that enhanced product offers organoleptic benefits in juiciness and tenderness, but is more frequently associated with off-flavors than non-enhanced product. Off-flavors most encountered by the panelists included salty, metallic, sour, and rancid/oxidative flavors.

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For the ham data, mean panelist ratings for juiciness, tenderness, texture, and ham flavor intensity were all between 5.36 and 5.83. The most frequently detectable flavor was salt, with an average rating of 1.20. Mean price for each type of ham differed ( $P < 0.05$ ) from each other, indicating mean retail prices (\$/kg) for ham with natural juices, ham with water added, and ham and water product were \$2.10, \$1.92, and \$1.60, respectively. Trained panel ratings for juiciness and tenderness were highest ( $P < 0.05$ ) for ham and water product, followed by ham water-added and, lastly, ham with natural juices. Texture scores favored ham products in exactly the reverse order. Flavor intensity and smoke flavor ratings for ham with natural juices was higher ( $P < 0.05$ ) than both ham with water added and ham and water product.

From the bacon data, it was determined that, contrary to previous hypotheses by the authors, no significant differences between lipid content, lipid quality, or palatability characteristics were found to occur among price categories. However, it is suggested that the highest priced national brand bacon was a more consistent product, as indicated by the least variation in percent lipid (DM), panel crispiness, chewiness, and smoke flavor intensity ratings.

Phase IV represented the strategic analysis of the data. Using results of the SWOT analysis, these are strategies that could be implemented by the U.S. pork industry to improve the “quality” of its products:

1. Continue industry progress in attending to, and improving upon, pork quality shortfalls previously identified in the National Pork Chain Quality Audit—1992

and presently elucidated in the National Pork Chain Quality Audit—2002, especially focusing upon improving the consistency of weight, composition and quality of U.S. pork.

2. Improve the amount and quality of communication among those in different sectors of the pork production chain to assure availability of sufficient information to allow for corrective actions to improve further the acceptability of U.S. pork.
3. Great progress has been made in improving lean meat yields, but further reductions in backfat thickness may be counterproductive because too many hogs are now too lean (generating problems with performance, productivity and reproduction) and too many carcasses have unacceptable quality (bellies that are too thin and cuts with too little marbling).
4. Industry must develop clear economic signals for easily and objectively measuring “quality,” along the production chain, to facilitate coordinated focus on generating pork to meet domestic and global, seasonal and geographical, consumer demands for fresh, enhanced, processed, consumer-friendly, value-added and ready-to-eat products.
5. Industry must assure that appropriate attention is paid to animal welfare, food safety, introduction of Foreign Animal Diseases, environmental issues, competing animal-protein sources, non-meat protein sources, U.S./world economies and potential opportunities for international cooperation in global marketing of “North American” pork.