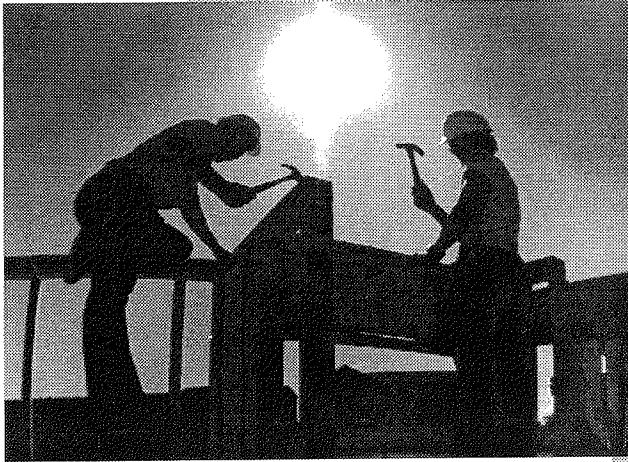
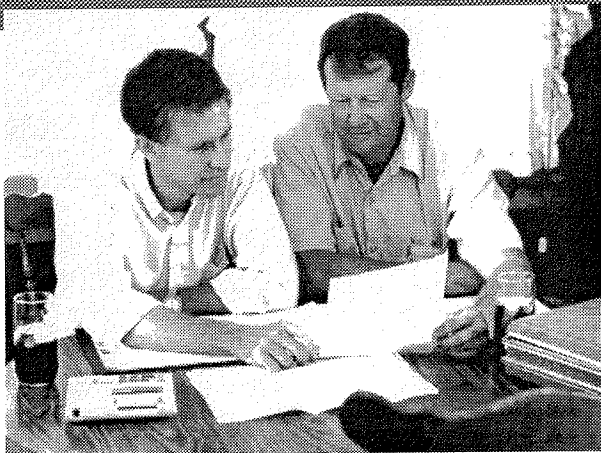


# 1995 ILLINOIS SWINE RESEARCH REPORTS

DEPARTMENT OF  
ANIMAL SCIENCES



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# The Pork Quality Audit

## **Background.**<sup>1</sup>

Within the U.S. business sector, there is an interest in "Quality". A major reason for this is the tremendous success for the Japanese in adopting the "Quality Religion" and in using this to manufacture dependable, doable and defect-free goods which meet consumer needs. Typically, the livestock and meat industries have perceived quality as being associated with descriptive terms such as "freshness", wholesomeness", and "grade". However in the 1990's, needs for improvement in "quality" of meat-animal products are causing livestock producers, packers, processors, purveyors and detailers to reconsider their production practices in terms of which decisions affect value/desirability of live weight slaughter animals (swine, cattle, calves and sheep), of their dress-off/offal items, of their carcasses, of their primal/subprimal cuts, and of their steaks, chops, roasts, processed products and fresh ground products. Currently, the U.S. pork industry faces challenges similar to those of the U.S. sector in general. For every barrow/gilt slaughtered, an unknown amount of money is lost due to correctable quality shortfalls. These "quality deficiencies" must be identified, measured and then addressed. The pork industry cannot expect increases in prices for its products/by-products when quality does not warrant such increases. Quality defects represent lost revenue opportunities for the industry. Currently, an unknown amount of money may be lost to elements/entities/sectors of the pork production system because of failure to prevent nonconformity or of failure to produce high-quality slaughter pigs, carcasses or dress-off/offal items. With more complete knowledge of the extent and causes of these defects, pork producers can seek ways through improved genetics and management techniques to reduce or eliminate these quality defects.

## **Objectives.**

The Pork Quality Audit was conducted to:

- A. establish a baseline for quality shortfalls and identify targets for desired quality levels.
- B. To quantify numerically, and monetarily, the incidence of quality defects in U.S. slaughter hogs.

## **Procedures.**

The audit was designed to be conducted in two phases in an effort to address its objectives. **Phase 1:** Research review. A number of surveys and research trials have been conducted which have addressed pork quality issues and perceptions. Results from these studies and any

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<sup>1</sup>Prepared by Dr Floyd McKeith, Judy Heavner and Hans H. Stein, Department of animal sciences, University of Illinois.

other available data-sets have been gathered and reviewed. The review helped identify traits that affect quality and/or impact defects associated with pork quality. In addition, it gives the pork industry an indication of the current state of the knowledge available regarding pork quality.

**Phase 2:** Data acquisition. Once the channels of communication between researchers and elements of the pork industry had been established, a survey instrument was developed to conduct interviews with people from individual sectors and segments of the pork chain. When accessible, records from the various sectors were analyzed to add to the data-set regarding pork quality. Data were analyzed to evaluate the factors affecting value and the relative impact of each type of defect. In addition, the frequency of the quality defects were quantified when possible. Also, the costs of the defects in the various sectors were estimated.

### **Results.**

**Phase 1:** The research review summarized results from more than 100 studies involving pork quality and covers factors which influence quality in the various sectors of pork production and marketing. Factors including genetics, transportation, fresh meat storage, carcass chilling, etc. are discussed in detail as each relates to specific influences on pork quality. The research review provides a base for identifying factors which impact nonconformity in pork quality.

**Phase 2:** Phase 2 of the audit established baseline information for the different sectors of the industry. Results suggest that the bulk of the hogs are located within 150 miles of the plant and that they are purchased from individual producers using some form of grade and yield purchasing program. Approximately 30 % of the pigs purchased lacked uniformity. Slaughterweights for the majority(66%) of the pigs ranged from 220 to 260 lb and the dressing percentage for 86 % of the pigs ranged from 72 to 76 %.

Live hog and carcass condemnations averaged approximately 0.2 % of the slaughter hog supply. The largest component of the condemnations (38%) were animals arriving at the plant dead or those that died during lairage.

Skin problems were identified by the packers as a problem with 15% of the slaughter hog supply. Dehairing problems accounted for 52% of the skin problems, and parasites accounted for an additional 21 % of the skin problems.

Over 13% of the hogs slaughtered required carcass trimming to remove external-surface defects. Abscesses and bruises accounted for 57% and 22% of the required trimming, respectively.

Results from the fabrication portion of the survey revealed that 80% of the pork carcasses had sufficient muscling. Approximately 36% of the pigs had 1.2 inches or more of back fat, and the average percentage of muscling was 49.5%.

The majority of pork cuts are trimmed to have either no fat trim, 0.13 inch fat trim or 0.25 inch fat trim indicating that packers are presenting cuts that meet the demand for reduced amounts of external fat trim. In order to meet the desired fat trim levels, approximately 28% of the boxed pork required minimal trimming, 54% required intermediate trimming, and 18% required excessive trimming.

Results from the survey determined that 92% of the carcasses had sufficient marbling. However, 13-15% of the carcasses had loins or hams that exhibited two-toned muscle color.

In addition, 10% of the carcasses were classified as PSE and 4% were considered DFD by plant personnel. The incidence of ecchymosis (blood splash) was 9.9 and 9.4% for hams and loins, respectively. Additional trimming to remove external-surface defects was required during fabrication on 10% of the carcasses. Abscesses and bruises accounted for approximately 57% of the required trimming losses.

The survey's result indicate that the average US market hog weighs 247 lbs, has a dressing percentage of 73.4%, has 1.1 inches of backfat and has a muscling percentage of 49%.

Packer economic losses from quality defects were identified. The total cost of nonconformities at the packer level was 10.08 dollar per pig marketed. Of this, the cost of carcass and partial condemnations was about 1 dollar while excess backfat and seam fat costs 3.38 dollars.

Water holding capacity was lower than desired for nearly 20% of the raw materials. Processors manufacturing hams reported excess fat on the hams approximately 38% of the time. Processors reported that 6.6% of the bellies were too thin for bacon production. Furthermore, 70% of the processors reported that some trimming was required in order for the belly to meet specifications. Problems related to color or trimmable defects in bellies were relatively minor.

Total costs of non-conformities at the processor level resulted in the loss of 2.32 dollar per hog slaughtered. Failure to meet trim specifications accounted for approximately 45 % of these costs.

Responses of purveyors revealed that a major problem with the trim being presented to the purveyors is the excessive fat content compared to that in the purchase specifications. Purveyors indicated that approximately one-fourth of the trim they receive has excessive fat. This generates additional expense because extra lean is needed to blend with the fatty portions in order to attain the desired fat composition.

Personnel from retail food chains were surveyed to gain an understanding of the quality of pork being presented to consumers. Quality problems of greatest concern included: excessive color variation, too much purge, inadequate shelf-life, and lack of uniformity/consistency of cuts. The concerns of the retail group were similar to those of the other pork sectors indicating that the pork quality problems are not being corrected at the earliest level of the chain and instead, are being passed along the distribution chain.

Interviews with American Meat Institute (AMI) personnel identified some very positive attributes of pork: 1) Pork is competitive in price with poultry, 2) Product development has enhanced pork's image, and 3) The pork industry has pushed the development of lean products. They also identified some areas that the industry should continue to work on: 1) Reduce fat, 2) Maximize color and water holding capacity of the muscle, and 3) improve the consistency of the products available.

Officials from the Food Marketing Institute gave a similar response to that of AMI. They identified fat and lean quality (color and water holding capacity) concerns as factors for the industry to improve. In addition, personnel from the National Restaurant Association suggested that consumer perception of fat is a negative for pork in the marketplace.

The major quality problems for U.S. pork in the export market were identified by officials

from the Meat Export Federation (MEF). They suggested that there is excessive variation in the quality and freshness of U.S. pork. Specifically, the incidence of PSE is too high. Furthermore, U.S. pork lacks freshness because of inadequate product packaging and product temperature control. MEF officials also expressed concern relative to the lack of uniformity of pork in meeting cutting and trim specifications; specifically, inconsistent sizes and weights. Excessive external fat and inadequate muscling were additional problems for U.S. pork at the export markets. MEF officials also observed reduced consumer appeal related to residues found in U.S. pork. The amounts of residues which are actually found in U.S. pork were low, however, the negative perception related to residues hurts the image of U.S. pork.

### **Conclusion**

In order to enhance the value of pork or to reduce the costs of moving pork through the chain, a number of current quality concerns have to be corrected. Data from the audit suggest that concerns about excessive fat, color, waterholding capacity, and consistency of products occur in almost all segments of the pork chain. These non-conformities account for more than 50 % of the quality related costs through the chain. Eliminating these non-conformities could enhance the value of pork.

At the farm level, the following step will contribute to this:

1. Decreasing the level of back fat in market hogs.
2. Increasing use of genetic lines that provides the desired levels of waterholding capacity and color in the finished products.
3. Increased uniformity, that is, marketing of hogs who are equal in size, genetic background, muscling percentage etc.
4. Avoid marketing of hogs containing drug-residues.