



Carcass Quality

why is it important?

Dr. Jodi Sterle

Assistant Professor and State Extension Swine Specialist
Texas A&M University

As show season is upon us, I decided to take this opportunity to explain some of the factors affecting pork quality and things that you can do to improve your chances of winning a carcass contest. The first step towards improving pork quality is to start thinking of your pig as meat, or product. *Everything* that you do, from injections to feed to stress, can affect pork quality. Understanding the factors affecting pork quality and which ones you can control may help you come out ahead in a carcass contest.

Most shows have minimum standards for carcass contests, and although they vary slightly from one show to another, there are many similarities. I have taken the standards for Houston Livestock Show and Rodeo and San Antonio Livestock Exposition to use as examples.

STANDARDS FOR PORK CARCASS CONTESTS AT HOUSTON LIVESTOCK SHOW AND SAN ANTONIO LIVESTOCK EXPOSITION

- Hot carcass weight
- Muscle score
- Carcass length
- Backfat thickness
- Loin muscle area
- Loin muscle color
- Loin muscle marbling
- Loin muscle firmness
- Loin fat firmness or abnormalities
- Percent muscle
- Other defects requiring disqualification

- The first standard mentioned is the acceptable weight range of hot carcass weight. This is the weight of the carcass after it is stunned, bled, dehaired and the viscera (intestines) and head is removed. The carcass is then chilled prior to fabricating into primal and retail cuts. Pork carcasses in carcass contests are "ribbed" (cut parallel to the rib) at the 10th rib for backfat and loin eye muscle measurements. The weight ranges in most shows are adequate enough to encompass the range of live weights accepted to show.

- The second criterion is a carcass muscle score equal to or above a 2.0. The National Pork Producers Council (NPPC) has put forth a publication "Procedures to Evaluate Market Hogs" which describes muscle scores. A muscle score of "2" is considered intermediate in muscling, not thin (where the carcass is angular and lacks bulge and thickness), and not thick. A carcass with a muscle score of "3" is considered thick muscling and is described as being bulging in appearance, with the hams and shoulder being significantly thicker than the loin (due to increased muscle, not fat).

Muscle Scores



Thick 3.0 Average 2.0 Thin 1.0

The next criteria concern carcass length, backfat thickness at the last rib and loin muscle area. These are usually adjusted to a 170 pound carcass weight (approximately 230 pounds live weight) for comparative purposes. Therefore, if the carcass is heavier than 170 pounds, then it will be adjusted back and carcass measurements estimated based on what they measure now. Heavier hogs will often have more fat and could be docked accordingly while lighter hogs may not have as much muscle. This ensures that all hogs can be compared to each other fairly.

The criteria are:

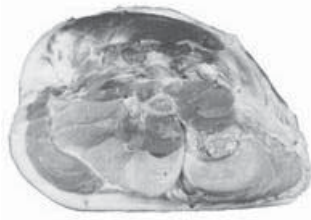
Minimum carcass length of 29.5 inches. Carcass length increases approximately .045 inches for every pound of hot carcass weight increase. Most hogs today average 31 to 33 inches in carcass length. Carcass length is the least variable measurement that is considered.

Maximum backfat thickness at last rib of 1.1 inches. Hogs fatten from front to rear as they age, so the last rib measurement is often equal to or lower than the 10th rib measurement. This can definitely work in your favor, especially in heavy weight hogs. Backfat thickness at the last rib increases .007 inches with every pound increase in hot carcass weight.

Minimum loin muscle area at 10th rib of 4.50 square inches. The loin muscle is what we often refer to as the "top". It is one of the four lean cuts of pork, and is most famous for giving us pork chops. There are two loin muscles, one on the right and one on the left of the backbone, or spine. A measurement of 4.50 square inches is not excessive at all, and most class winners will meet this standard easily. Loin muscle increases approximately .016 square inches for every pound increase in hot carcass weight.

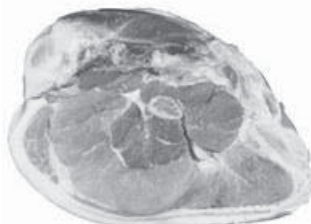
The next set of criterion are the most subjective, but may be the most important. Carcass meat quality is directly linked to consumer satisfaction. Stress, improper handling, the presence of the pork stress gene, and other genetic factors affect pork quality. Researchers are becoming more aware of the implications of poor pork quality. Many show pigs are unacceptable in this category. I would expect more emphasis to be placed on this category in the future.

pale, soft and exudative muscle



Loin muscle color. Color is an excellent indicator of pork quality. Fresh pork should be reddish pink in color. A dark color results in shorter shelf life and increased bacterial growth. The dark color can be caused by a variety of factors, but in show pigs is often caused by stress and increased activity (from transporting and showing the pigs). This can be minimized by exposing the pigs to a variety of sounds, people and exercise before it gets to the show as well as using gentle, calm handling when loading and transporting. A pale, pinkish gray color is common in pigs with the stress gene. Often, the meat is watery in appearance and the muscle does not hold its shape well.

red, firm and non-exudative muscle



In fact, the meat appears watery because it loses its ability to keep the water in the muscle. The water leaks out prior to cooking, and results in dry meat that lacks juiciness after cooking. The meat will also shrink considerably from slaughter to plate, due to escaping water.

Loin muscle marbling. Marbling is the flecks of white fat that are present *within* a muscle. The more marbling a muscle has, the more flavorful and juicy it is when cooked. However, marbling is directly related to fat deposits elsewhere in the body. As we strive to decrease backfat, we are also decreasing marbling. This is an excellent argument for moderation in both areas.

Loin muscle firmness. This trait goes hand-in-hand with color. Soft muscles are usually exudative ("leaking" water) and therefore will be dry and tough after cooking.

Extremely firm muscles are also undesirable. Pork that is PSE (pale, soft and exudative) is common in hogs with the stress gene, and is one of the leading arguments for absolute removal of the gene from the industry.

Loin fat firmness or abnormalities. Fat should be solid and white. Soft, oily fat is often off-color (brownish) as well. It is unattractive in the meat case and is more likely to turn rancid.

Percent muscle. For ribbed carcasses, like those in most carcass contests, the pounds of quality lean product (% muscle) containing 5% fat and adjusted to 170-pound carcass weight, the following formula is used:

$$\begin{aligned} & [88.307 - (.036 \times \text{hot carcass weight (pounds)}) \\ & \quad (18.574 \times 10^{\text{th}} \text{ rib backfat (inches)}) \\ & + (3.734 \times \text{loin muscle area (square inches)}) / 170] * 100 \end{aligned}$$

This formula weighs each measurement (hot carcass weight, backfat and loin eye area) separately. In other words, the formula allows some factors (i.e. backfat) to affect percent muscle more than others. Both stock shows hold 47% muscle as the lower limit in the carcass contest. The extreme muscling and leanness that is present in today's show pigs can yield values of 60% or greater.

Other disqualifications include the presence of a testicle (cryptorchidism) whether naturally or surgically altered, and the presence of old bruises or abscesses (especially at injection sites). These factors also negatively affect pork quality and often result in excessive amounts of trim taken from the carcass in order for it to be acceptable.

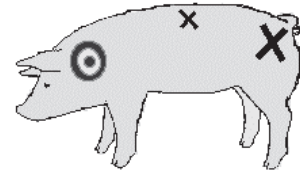
What can YOU do to ensure acceptable pork quality?

Two main things affect pork quality: genetics (such as the stress gene) and environment (such as nutrition or handling). If you are purchasing pigs for show, it is your responsibility to know what genetics you are buying. As I have said before, total elimination of the stress gene from the swine industry is an absolute must. Ask your show pig breeder if he knows the status of his herd. Buy pigs only from reputable breeders who are acting responsibly. The stress gene will not only affect pork quality but the disposition and behavior of your animals as well.

There are many environmental factors that affect pork quality. The following list is in no way comprehensive, but will give some hints to prevent poor quality:

- **Proper handling.** Care should be given, especially during transport and at the show, to always handle pigs calmly and gently. Excessive stress is a major cause of poor carcass quality. Slaughter plants now rest hogs for a few hours before slaughter to improve carcass quality after transport.
- **Disposition.** Although hard to change completely, an animal can be conditioned to overcome some aspects of its disposition. Exposure to sounds, people, movement and even different equipment will make the transition from "home" to the show easier on the animal and reduce stress.

- **Observe and follow withdrawal times.** A withdrawal time must be printed on any animal health care product (from vaccines to penicillin) in food-producing animals. Simply put, the withdrawal time is the amount of time that has been established by research for the drug to clear the animal's body, making the meat (or milk) safe for human consumption. ANYTIME that you reach for a syringe or feed additive, you should think about the withdrawal time. Since you may not know when your hog is going to be slaughtered, treat the day of the show as the day of slaughter and you will be safe. Withdrawal times are for the safety of the consumer, which could be you or your family. If a product is not approved for use in swine or is used other than stated on the label, a veterinarian MUST approve of its use and adjust the withdrawal time accordingly.
- **Inject animals properly.** Follow label instructions for route of administration (intramuscular, subcutaneous, etc.) For intramuscular injections, the site of administration should be in the neck, NEVER in the ham or loin.
- **Restricting feed intake and weight gain.** "Holding" animals, or severely restricting feed intake, has a negative effect on pork quality. Care should be taken when restricting animals and water should *NEVER* be restricted.



For more information, read the handbook: Procedures to Evaluate Market Hogs: 1991; National Pork Producers Council. Order by calling 1-800-456-PORK

**BY UNDERSTANDING THE FACTORS AFFECTING PORK
QUALITY, YOU CAN HELP MANIPULATE THESE FACTORS
AND HELP PREVENT POOR QUALITY.
IT IS NOT ONLY A GOOD IDEA; IT IS YOUR RESPONSIBILITY.**

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