

## Lesson 3: Pork

Pork carcasses are graded and purchased on a yield basis. Continuing work is being done to accurately evaluate the quality of pork carcasses.

### Pork Quality Characteristics

Pork quality is concerned with evaluating characteristics that make the edible product nutritious and wholesome after processing and storage. The pork product should be suitable for processing, be attractive to consumers, and be appetizing and palatable (flavorful) after cooking. Quality characteristics have been defined so that there is consistency from processor to processor. The evaluation characteristics are muscle color, muscle firmness/wetness condition, marbling (intramuscular fat), and other tissue conditions. They are primarily evaluated in the loin muscle viewed between the 10th and 11th thoracic vertebrae.

**Muscle color** - The most desirable color for muscle is reddish pink. Muscle color is important because consumers do not want to buy meat that is too pale or too dark. Very light muscle tends to shrink and turn gray in retail display cases, which results in dry-tasting products after cooking. Since consumers often assume that very dark meat is from older animals, they are less likely to buy it.

Muscle color varies from one part of the carcass to another but is usually the same color across a muscle group. Processors use color pictures to help them consistently evaluate the color of the muscle. There are five color scores: 1 = pale pinkish gray, 2 = grayish pink, 3 = reddish pink, 4 = purplish red, and 5 = dark purplish red. Carcasses scoring a 1 or 5 should be eliminated from consideration for retail cuts.

**Muscle firmness/wetness condition** - The firmness or wetness of the muscle is evaluated and given a score ranging from 1 to 5. A score of 1 indicates a very soft and very watery condition. It is usually associated

with a pale pinkish gray muscle color. Also, it shrinks excessively during processing and lacks juiciness after cooking. A score of 2 indicates a soft and watery muscle that is not as severe as in score 1. Score 3 indicates a slightly firm and moist muscle condition. Score 4 indicates a firm and moderately dry muscle condition. A rigid, closed structure with no visible surface fluids is scored a 5. It is often associated with a purplish red or darker muscle color. Carcasses receiving a score of 1 or 2 should be eliminated from consideration for retail cuts.

**Marbling** - Marbling is the intramuscular fat, which is the visible fat within the boundaries of the muscle. Some marbling is considered desirable because it provides for a juicy and flavorful cooked product. There are 5 marbling scores: 1 = devoid to practically devoid, 2 = traces to slight, 3 = small to modest, 4 = moderate to slightly abundant, and 5 = moderately abundant or greater. Palatability would be decreased because lack of fat causes meat to be dry and less flavorful. Excessive fat (moderately abundant or greater) does not make the meat proportionally more flavorful but does add too many calories. Carcasses scoring 5 should be eliminated from consideration for retail cuts. Carcasses scoring a 1 should be eliminated from consideration for retail cuts because this score indicates that the meat would not be palatable.

**Other tissue conditions** - If either of the following conditions are present, the carcass is eliminated from consideration: steatosis and soft, oily fat. Steatosis is fatty infiltration in muscle tissue, indicating a problem such as muscle atrophy. Soft, oily fat is often slightly brown, is unattractive in the display case, and is more likely to turn rancid during processing and storage.

### Saleable Product Determination

Although there are USDA standards for grades of pork carcasses, every packer has established its own system for grading. As pork carcasses are moved through the processing plant, cutability measurements are

Figure 3.1 - Percent Muscle Formula

$$\frac{88.307 - (.036 \times HCW) - (18.574 \times 10th\ rib\ backfat) + (3.734 \times LMA) \times 100}{170} = \% \text{ muscle}$$

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Figure 3.2 - Sample Calculation of Percent Muscle

If a hog carcass has a HCW of 180 pounds, 1 inch backfat at the 10th rib, and 5 square inches LMA, the percent muscle is calculated as follows.

$$\frac{88.307 - (.036 \times 180) - (18.574 \times 1) + (3.734 \times 5)}{170} \times 100 = \% \text{ muscle}$$

$$\frac{88.307 - 6.48 - 18.574 + 18.67}{170} \times 100 = \% \text{ muscle}$$

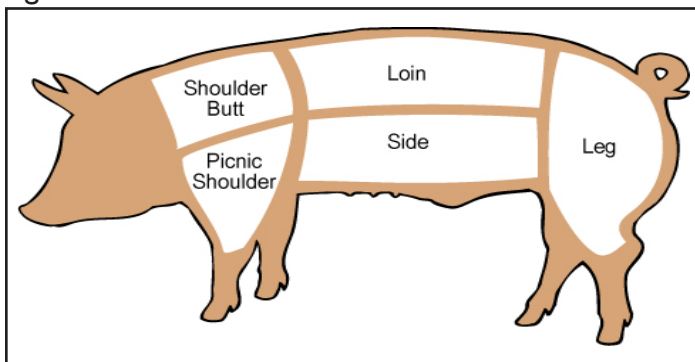
$$\frac{81.923}{170} \times 100 = \% \text{ muscle}$$

$$= 48.19 \text{ or } 48\% \text{ muscle}$$

Because the percent muscle is below 50%, the producer's selling price will most likely be docked for this pork carcass.

taken on the carcass to assign a percentage of muscle with 5 percent fat. Cutability refers to the amount of leanness and muscle or red meat an animal has. This measurement is referred to as the percent muscle or percent lean of a carcass. Currently, 50 percent muscle is considered average by the industry. Carcasses over 50 percent muscle are often given a premium, which is added to their purchase price. Carcasses under 50 percent muscle are usually docked, which means the producer is paid less for the carcasses. In order to calculate percent muscle, the hot carcass weight (HCW), the average backfat thickness at the 10th rib, and loin muscle area at the 10th rib are needed. Most processing plants use loin depth to estimate loin muscle area (LMA). After these measurements are taken, they are put into a formula to derive the percent muscle, which is adjusted to a 170 pound hot carcass weight (see Figure 3.1 and Figure 3.2).

Figure 3.3 - Wholesale Cuts of Pork



### Wholesale Cuts

After the carcass is measured for percent muscle, the carcass is cut into wholesale cuts and shipped to retail stores. The wholesale cuts of pork are the shoulder, loin, leg, side, and picnic shoulder (see Figure 3.3).

### Retail Cuts

After the wholesale cuts arrive at the retail level, they are fabricated or cut into retail cuts. Pork cuts can be either fresh or cured, which enhances their flavor and taste. The following is a list of the retail cuts of pork.

#### Leg

- Bone-in fresh ham
- Smoked ham
- Fresh boneless ham roast
- Leg cutlets

#### Loin

- Sirloin chop
- Rib chop
- Boneless rib end chop
- Boneless center loin chop,
- Butterfly chop
- Center rib roast
- Bone-in sirloin roast
- Boneless center loin roast
- Boneless rib end roast

## Loin (continued)

- Loin chop
- Boneless sirloin roast
- Tenderloin
- Canadian-style bacon
- Country-style ribs
- Back ribs

## Shoulder butt

- Bone-in blade roast,
- Boneless blade roast
- Ground pork
- Sausage
- Blade steak

## Picnic shoulder

- Smoked picnic
- Arm picnic roast
- Smoked hock

## Side

- Slab bacon
- Sliced bacon
- Spareribs

Variety meats - These retail cuts are not from any wholesale cuts, but they are other edible products from the hog.

- Tongue
- Heart
- Sweet breads
- Brains
- Liver
- Kidney

## Credits

Boggs, Donald L., and Robert A. Merkel. *Live Animal Carcass Evaluation and Selection Manual*. 4th ed. Dubuque: Kindall/Hunt Publishing Company, 1993.

*Meat Evaluation Handbook*. Chicago: National Livestock and Meat Board, 1988.

*Procedures to Evaluate Market Hogs*. 3rd ed. Des Moines: National Pork Producers Council, 1991.

*Purchasing Pork: A Consumer Guide to Identifying Retail Pork Cuts (poster)*. National Pork Producers Council in Cooperation with the National Pork Board, 1997.

## Summary

The quality of pork carcasses is determined by evaluating muscle color, muscle firmness/wetness, marbling, and other tissue conditions. Pork carcasses are evaluated for cutability by calculating the percent muscle of a carcass. Hot carcass weight (HCW), average backfat thickness at the 10th rib, and loin muscle area at the 10th rib (LMA) are used to calculate the percentage of muscle on a carcass. Wholesale cuts are divided into retail cuts. Pork can be either fresh or cured.

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