
MEAT SCIENCE:
*classroom teaching ideas
and examples*

Dr. Justin Rickard

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Department of Agriculture

Illinois State University

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Economic Relevance of Judging

-classes are ranked from the most valuable to least valuable

*value = cutability + quality

Cutability

-defined as the expected yield of lean meat

*higher cutability = more meat

*lower cutability = less meat

*External fat and muscling are the most important criteria. Product with a greater amount of external fat will result in lower cutability, whereas product with a higher cutability results from having less external fat. A greater amount of muscling results in an increase in cutability.

Quality

-defined as the expected palatability of the product (how good will it be to eat?)

*We often think of quality from an eating experience standpoint, and in doing so we consider tenderness, juiciness, and flavor. Quality from a product standpoint includes the following criteria: color, firmness, marbling (see table), and waterholding capacity. It is important that the muscle hold water (either water that is already present or water that will be added during processing).

Exercise #1

Fresh Ham Evaluation and Judging

-Ham Basics

What is a good ham?

What are the basic parts of the ham?

Rank the hams based on cutability, quality, and value.

-Judging Hams

Cutability is the most important factor, following by quality. Hams are judged 80% on cutability and 20% on quality (Pale, Soft, and Exudative – PSE hams should be placed last).

Basis Reasons Terminology

-trimness

-less fat alongside and beneath the butt face

-less collar fat

-less seam fat

-muscling

-greater area of exposed lean in the butt face

-deeper, wider butt face

-longer, deeper, wider center-cut section

-quality

-more desirable reddish-pink color in the butt face

-firmer

-less muscle separation

-greater amount of marbling in the butt face

*yield bone-in center cut slices requiring less retail fat trim

*yield center cut slices with a higher muscle to bone ratio

*yield a higher percentage of closely trimmed bone-in center cut slices

Exercise #2

Cutability Evaluation (knife separable fat, bone, lean)

In Steps

1. Weigh the ham, and record the weight
2. Remove skin (if present) and closely trim all lean and fat
3. Debone the ham
4. Separate (cut apart) fat, bone, lean
5. Weigh each pile (fat, bone, lean)
6. Determine what percentage of the total ham weight was fat, muscle, and bone

Questions

Which ham had the highest cutability, based on actual percentages?

Which ham was the wastiest?

Are the answers the same as they were during judging/evaluation?

Which ham is the most valuable? Why?

-or, if there is only one ham to work with...

-What is the value of this ham?

-ham, skin, fat

*It is not necessarily important that the ham be properly deboned. The important thing is to separate the fat, muscle, and bone. It doesn't have to look nice for this exercise.

Exercise #3

Sausage Manufacturing

-after the cutability lab, you can either use the product in sausage manufacture or freeze it and use it at a later date.

-making ground pork can be substituted for sausage manufacturing

-a basic breakfast sausage

*Recipe for 10 lbs of sausage

Ingredient	Amount
Salt	¼ cup
White pepper	1 Tb
Ginger	1 tsp
Sage	2 Tb
Nutmeg	1 Tb
Thyme	1 Tb
Ice water	2 cups

Grinding Systems

-commercial grinder

-kitchen aid mixer

-food processor

-old fashioned hand crank

Packaging Systems

-plain freezer bags

-vacuum systems

-plastic wrap and butcher paper

Exercise #4

The Importance of Water

**We want meat to hold water because of its role in product weight as well as eating experiences. A certain percentage of water will be lost from muscle during processing, packaging, and retail display. In addition, a certain percentage may be lost during the cooking process. It is important to keep these losses at a minimum, and because of that it is important to understand how to measure loss of water.

Basic Drip Loss

*a certain amount of free water located in muscle may be lost as “drip”

1. cut a sample of meat from the ham (during the cutability lab)
2. weigh the sample and record the weight
3. hang the meat sample with a fishing hook in a refrigerator
4. after hanging, take the sample down and reweigh
5. Drip Loss % = $100 - (\text{post weight} / \text{pre weight})$

Basic Cooking Loss

*a certain amount of water may be lost during cooking

1. after forming patties (either sausage or ground pork), weigh each and record weight
2. cook patties thoroughly
3. reweigh after cooking
4. Cooking Loss % = $100 - (\text{post weight} / \text{pre weight})$

Basic Package Purge

*during retail display, some water may be lost

1. weigh a sample of meat and record weight
2. place sample in a plastic bag, and place into refrigerator for 7 days
3. remove sample and reweigh
4. Package Purge % = $100 - (\text{post weight} / \text{preweight})$

PORK QUALITY STANDARDS

Quality of fresh pork varies greatly. The quality levels shown below will appear differently to consumers, taste differently when cooked, and perform differently when converted to processed products. High quality pork has greater monetary value than low quality pork. Quality can be evaluated by simply visual appraisal, or it can be determined more accurately by scientific tests. This chart may be used to help identify variations in pork quality. Color and Marbling Standards charts are also available.

York The Other White Meat.

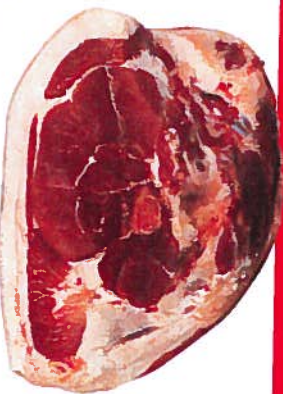
COLOR - TEXTURE - EXUDATION



PSE Pale pinkish gray, very soft and exudative. Undesirable appearance and shrinks excessively.



RFN Reddish pink, firm and non-exudative. "IDEAL". Desirable color, firmness and water-holding capacity.



DFD Dark purplish red, very firm and dry. Firm and sticky surface, high water-holding capacity

COLOR STANDARDS

					
1.0 Pale pinkish gray to white Minolta L* Value ¹ 61	2.0 Grayish pink 55	3.0 Reddish pink 49	4.0 Dark reddish pink 43	5.0 Purplish red 37	6.0 Dark purplish red 31

MARBLING STANDARDS²

						
1.0	2.0	3.0	4.0	5.0	6.0	10.0

Color and marbling scores are as described in "Composition & Quality Assessment Procedures", 1999, NPPC
¹ Minolta L* values use D65 daylight light source.
² Marbling scores correspond to intramuscular lipid content
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For more information contact:
 National Pork Producers Council

P.O. Box 10393
 Des Moines, Iowa 50316 USA
 (515) 223-2000
 www.nppc.org



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Justin Rickard, Ph.D.

Instructional Assistant Professor

Department of Agriculture

Illinois State University

Campus Box 5020

Normal, IL 61790-5020

jwricka@ilstu.edu

(309) 438-0285