How to Manage Water-Holding for Yield

(Factors that impact WHC)

C.R. Kerth, Ph.D
Texas A&M University

TERMS TO KNOW

Rigor Mortis (also known as Rigor) - The process of converting muscle to meat.

Post-mortem - After death

Exanguination - Removal of blood

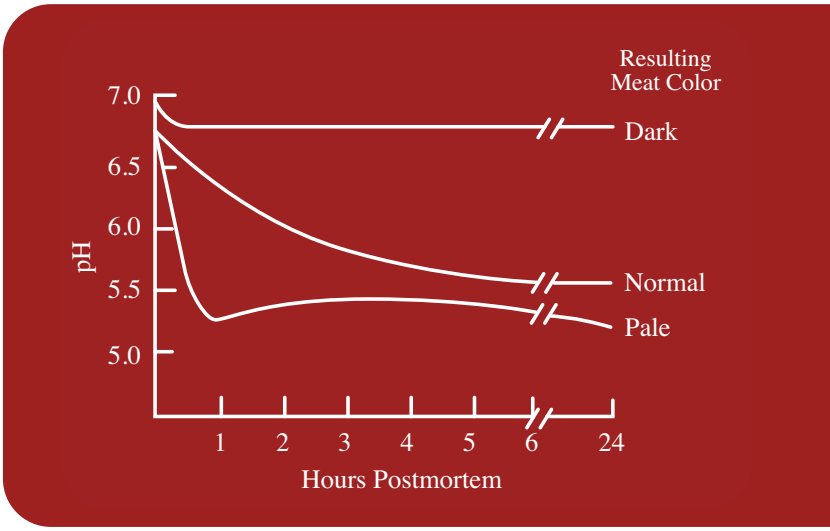
Yield

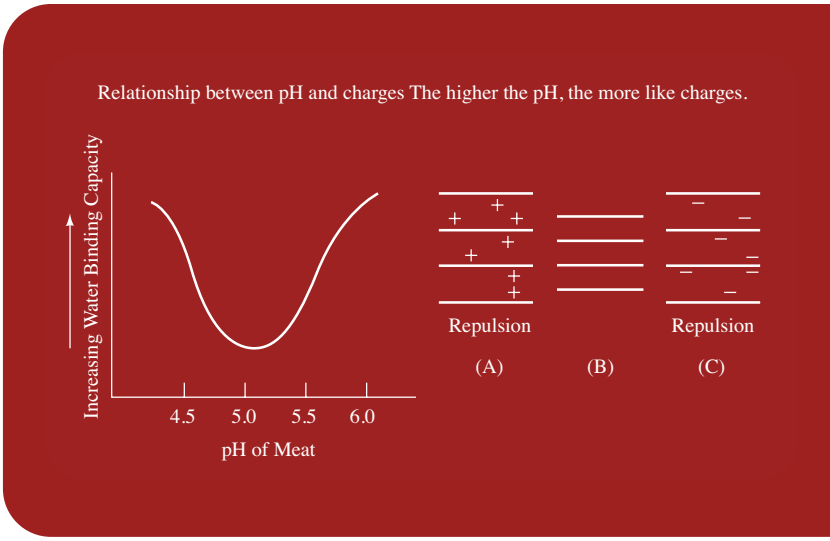
The Process of Rigor

- At the time of death, the pH of muscle is near neutral (pH = ~7.1)
- The closer that we can keep the muscle to neutral, the better the WHC (see previous fact sheet).
- Lighter pigmented meat (pork and poultry) tend to have lower pH and also have a faster rate of pH decline postmortem, completing rigor in as little as 15 minutes.
  - — Low pH, lower WHC, and paler meat (susceptible to pale, soft, and exudative (PSE) meat)
- Darker pigmented meat (beef, bison, and lamb) tend to have high pH and a slow rate of pH decline requiring ~24 hours to complete rigor.
  - — High pH, high WHC, and darker meat (susceptible to dark, firm, and dry (DFD) meat)
- Meat that is processed into sausage within minutes of exsanguination has very high WHC because of the high pH.

Cooler Storage of the Carcass

- Lighter pigmented that go through rigor very rapidly are chilled very rapidly immediately after harvest to try to slow the rate of pH decline.
- Darker pigmented meat
  - — May be electrically stimulated to try to speed up the rate of pH decline to arrive at a better, less dark color.
  - — Often have cold water misted on the tops of the carcasses hanging in the cooler once rigor has begun to reduce the amount of cooler shrink.





Adapted from Wismer-Pedersen, J. (Chapter 3, Part 5) in The Science of Meat and Meat Products, 3rd ed., Price & Schweigert (Eds.)

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THE MEAT LOCKER
BY AMERICAN MEAT SCIENCE ASSOCIATION

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Factors Influecning Water Holding Capacity During Processing

- *Ingredients*
  - Salt
    - Reduces the point of equal charges to 4.1 by adding its own negative charges making the meat hold more water.
  - Alkaline sodium phosphates creates its own negative charges making the meat hold more water.
    - Raises the pH of the meat which moves away from the point of equal charges and creates more room for water.
    - Critical to cook yields.
  - Avoid anything with vinegar (acetic acid) while making the product before cooking as it will reduce the pH making it hold less water.
    - Use encapsulated acid (citric or lactic acid) for making acidic products like snack sticks or summer sausage.
  - Darker pigmented meats will hold more water than lighter meats (use thigh meat instead of breast or back meat).
- *Cooking methods and yields*
  - Do not overcook.
    - Cook only to the minimum temperature required by your HACCP plan to avoid excess cook loss.
    - Cook to a lower temperature and hold for the required time according to Appendix A rather than to a fixed temperature for 0 minutes.
  - Whenever possible cook with steam or at the highest humidity possible to minimize evaporation and cook losses.

Packaging & storage of wholesale meat cuts

- Vacuum packaging is the best method for reducing the amount of weight loss due to purge and evaporation.
- Cuts should be stored as close to freezing (~27 °F in meat) to minimize the amount of purge.
- Overcrowding of cuts in boxes should be avoided to minimize excess weight on the cuts "pushing" water out of the meat cut.

American Meat Science Association

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