Module 13. Acidified Low Acid Foods

Thermal Processing for Meat and Poultry Products Training

USDA

Purpose and Objectives

- Purpose of Module 14
  - Provide concepts on acidification and methods to monitor and control.
- Performance Objective
  - Can assess acidification procedures and determine if they are controlled and documented.

Introduction: Acidified Foods

- Fermented foods preserved by lactic acid from bacteria
- Preservation by addition of acid to low-acid ingredients
- May be called “pickled foods”
- Includes acidified and marinated vegetables
- Excludes jellies, dressings, condiments, fermented foods, refrigerated foods, and naturally acid foods

Definition of Acidified Foods

- An acidified food is a low-acid food to which acid or acid food is added to produce a final pH of 4.6 or less
  - Proper acidification prevents growth of *C. botulinum*
  - Final product pH must be 4.6 or less to prevent *C. botulinum* growth

Meaning of pH

- pH is the term used to designate degree of acidity or basicity (alkalinity)
- More hydrogen ions = more acidic
- Scale ranges from 0 to 14
- Values smaller than 7 mean more hydrogen ions or more acidic

Comparison of the Acidity of Pure Water with Representative Foods at Each pH Value

- Pure water is neutral at a pH of 7.0
- Above a pH of 7.0, there are more OH^- ions
- Below a pH of 7.0, there are more H^- ions
- The pH of beef, pork, and chicken is considered low acid

Buffering Capacity

- Buffering capacity refers to the ability of a food to resist change in pH
  - Varies from food to food

Determination of pH

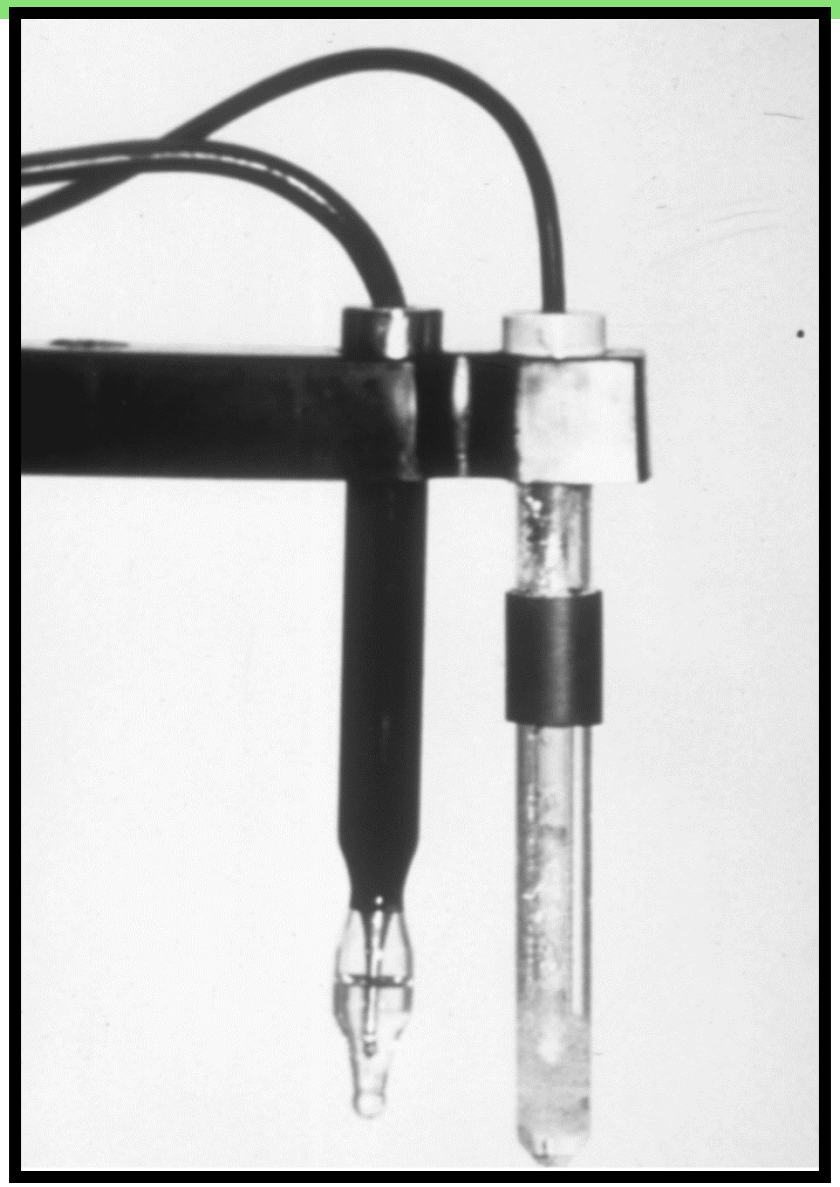
Colorimetric Method

- Depends on color change of dye
- Uses indicator solutions
- Uses indicator or pH paper
- Provides only approximate values

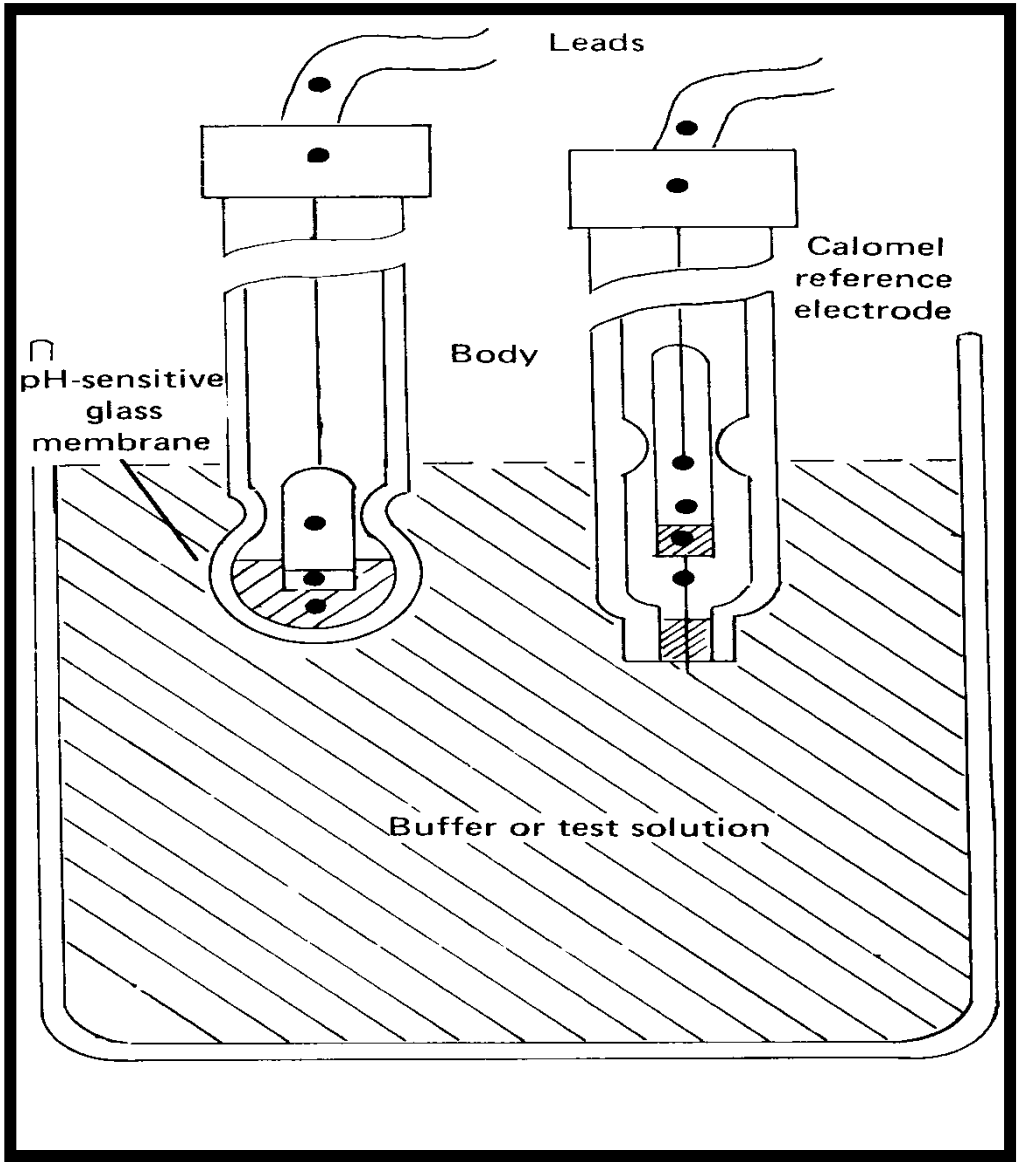
Electrometric Method

- Using a pH meter is most common method for determining pH
- Meters can be digital or analog

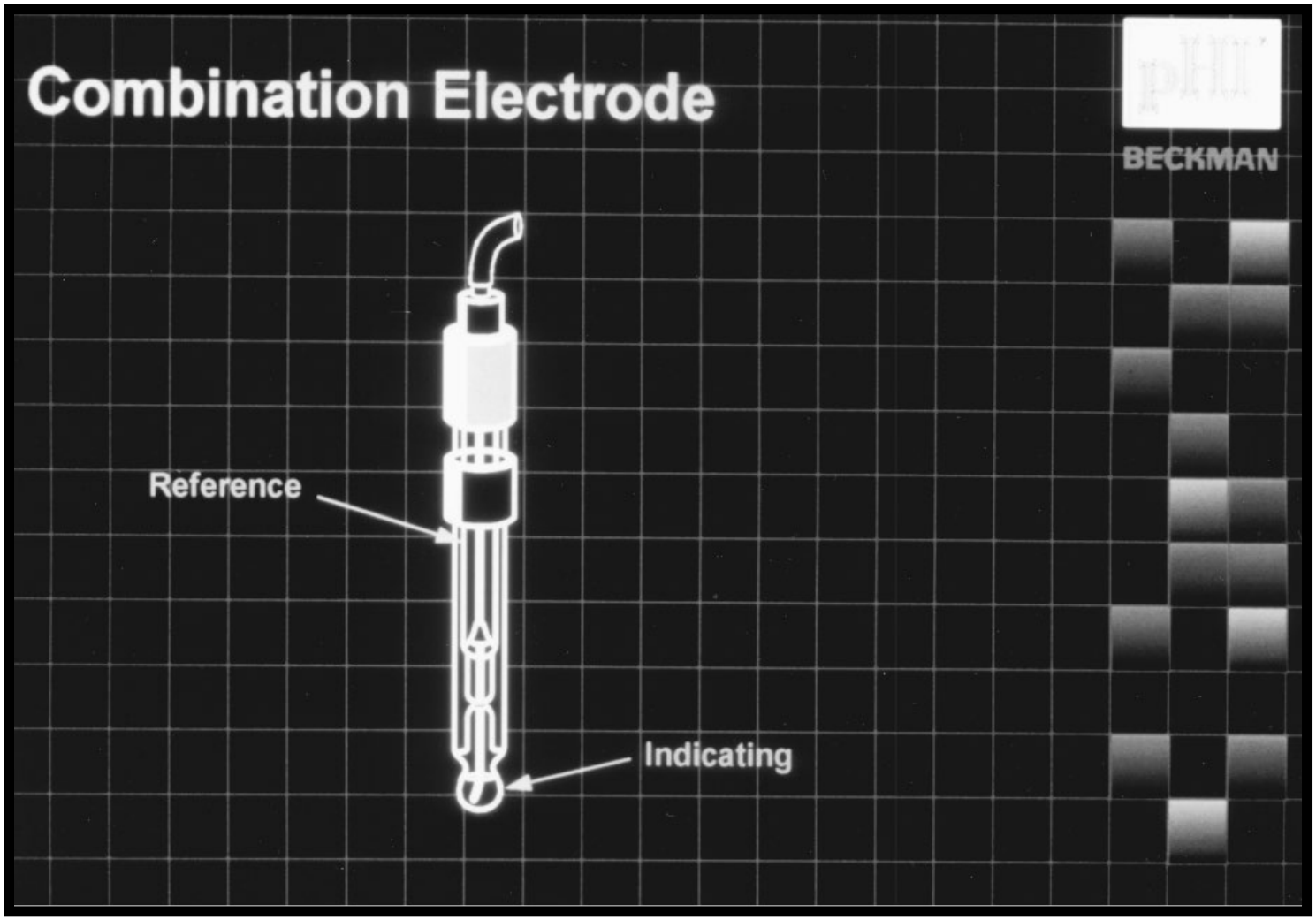
pH Meter Electrodes (2)



Use of pH Meter Electrodes



Combination Electrode



Electrodes

Precautions

- Rinse electrodes to prevent cross-contamination
- Do not wipe electrodes
- Clean oily or greasy electrodes properly
- Maintain consistent temperatures to avoid pH changes

Acidification Procedures

1. Acid blanch food
2. Immerse blanched foods in acid solution
3. Direct batch acidification
4. Add acid foods to low-acid foods
5. Direct acidification of food in container

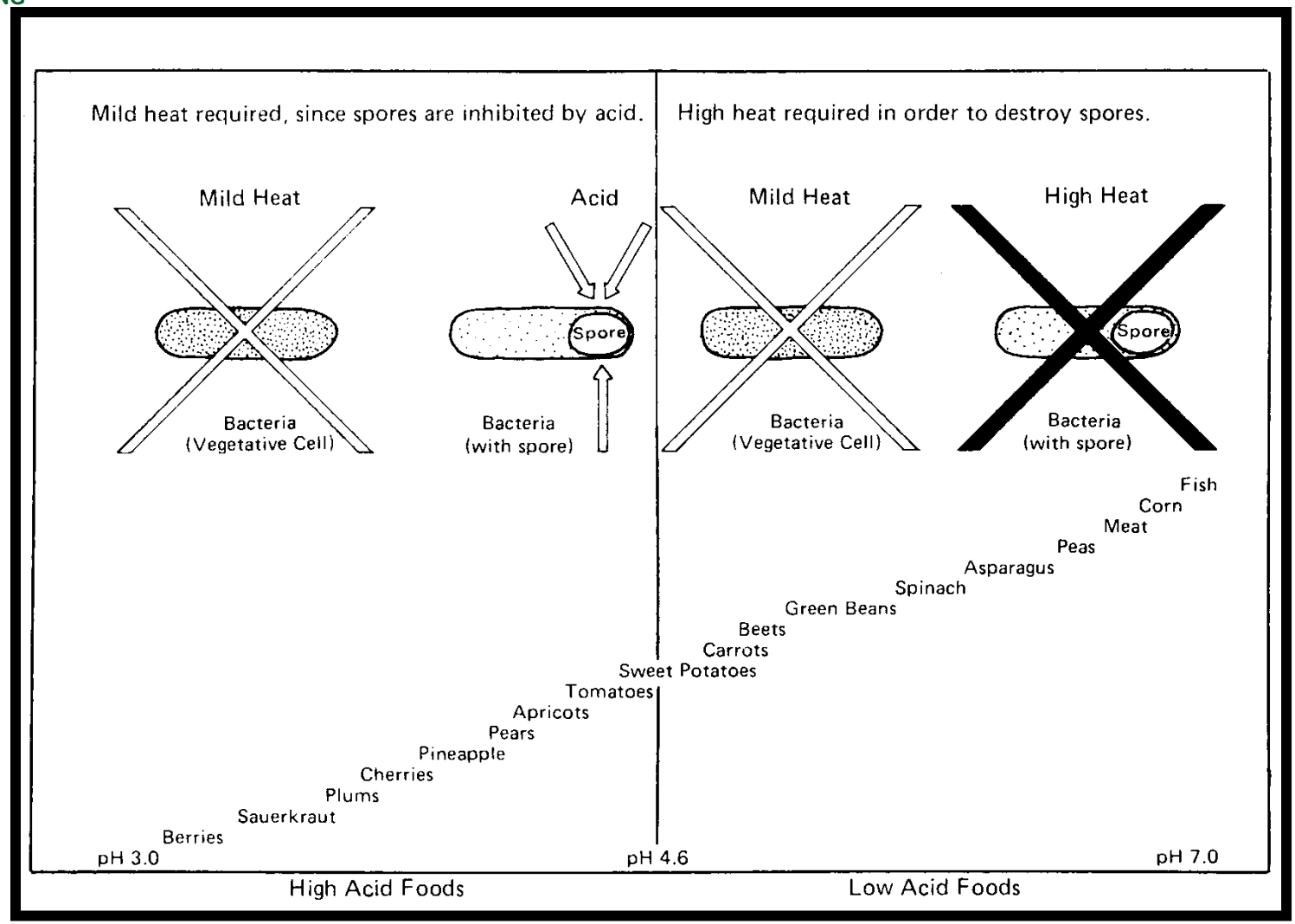
Acidification Procedures

- Each acidification method requires proper control
- May utilize more than one procedure

Acidification Procedures

1. Every container of product is acidified in same proportions
2. Monitor acidification by pH measurement
   a) Reference 431.5(e)
3. Monitor scheduled thermal process
4. Control container handling

High Acid vs. Low Acid Foods



Regulations Governing Acidified Foods

- USDA - 9 CFR, Part 431
- FDA - 21 CFR, Part 114, Part 110, and Part 108.25

Failure to Properly Acidify Product

- If pH is greater than 4.6, then one of the following must occur:
  - fully reprocess product
  - process as low-acid food
  - hold for evaluation
  - destroy

Record Requirements

- Maintain records showing adherence to processes schedules
- Retain records of all process deviations

Key Points

- The term pH is used to designate the degree or intensity of acidity
- pH can be determined electronically with a meter or by other approved methods
- It is extremely important to ensure the pH meter is correctly maintained, calibrated, and operated
- Proper acidification of a low-acid ingredient should be addressed in the establishment's HACCP Plan
- Thermal processes must be designed to destroy all vegetative microoganisms

Acidified, Low Acid Foods

- Students should read:
  - 431.1 Definitions:
    - Acidified Low Acid Product
    - Low Acid Product
  - 431.5(e) Measurement of pH

Questions?

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