REDUCED OXYGEN PACKAGING

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WHAT IS IT?

The reduction of oxygen in a package **by removing oxygen**; **displacing oxygen and replacing it with other gases**; or **otherwise controlling the oxygen content** to a level below that normally found in the atmosphere (approximately 21% at sea level).

VACUUM PACKAGING

Vacuum Packaging (VP)-A process in which air is removed for a package of food and the package is hermetically sealed so that a vacuum remains inside the package.

COOK-CHILL

Cook-Chill (CC)- A packaging method in which cooked food is hot filled into impermeable bags which have the air expelled and are then sealed or crimped closed. The bagged food is rapidly chilled and refrigerated at temperatures that inhibit the growth of psychotropic pathogens.

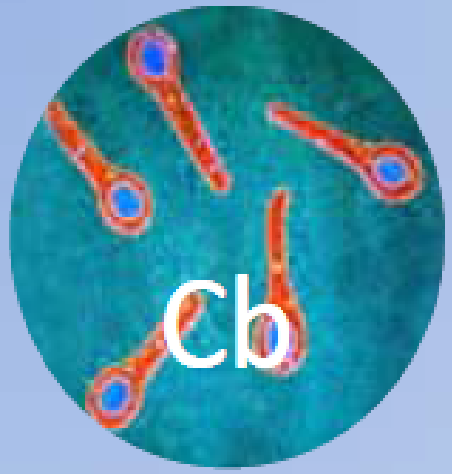
SOUS VIDE

Sous Vide (SV) – A packaging method where raw or partially cooked food is vacuum packaged in an impermeable bag, cooked in the bag, rapidly chilled, and refrigerated at temperatures that inhibit the growth of psychotropic pathogens.

WHY THE CONCERN?

Cb

Lm



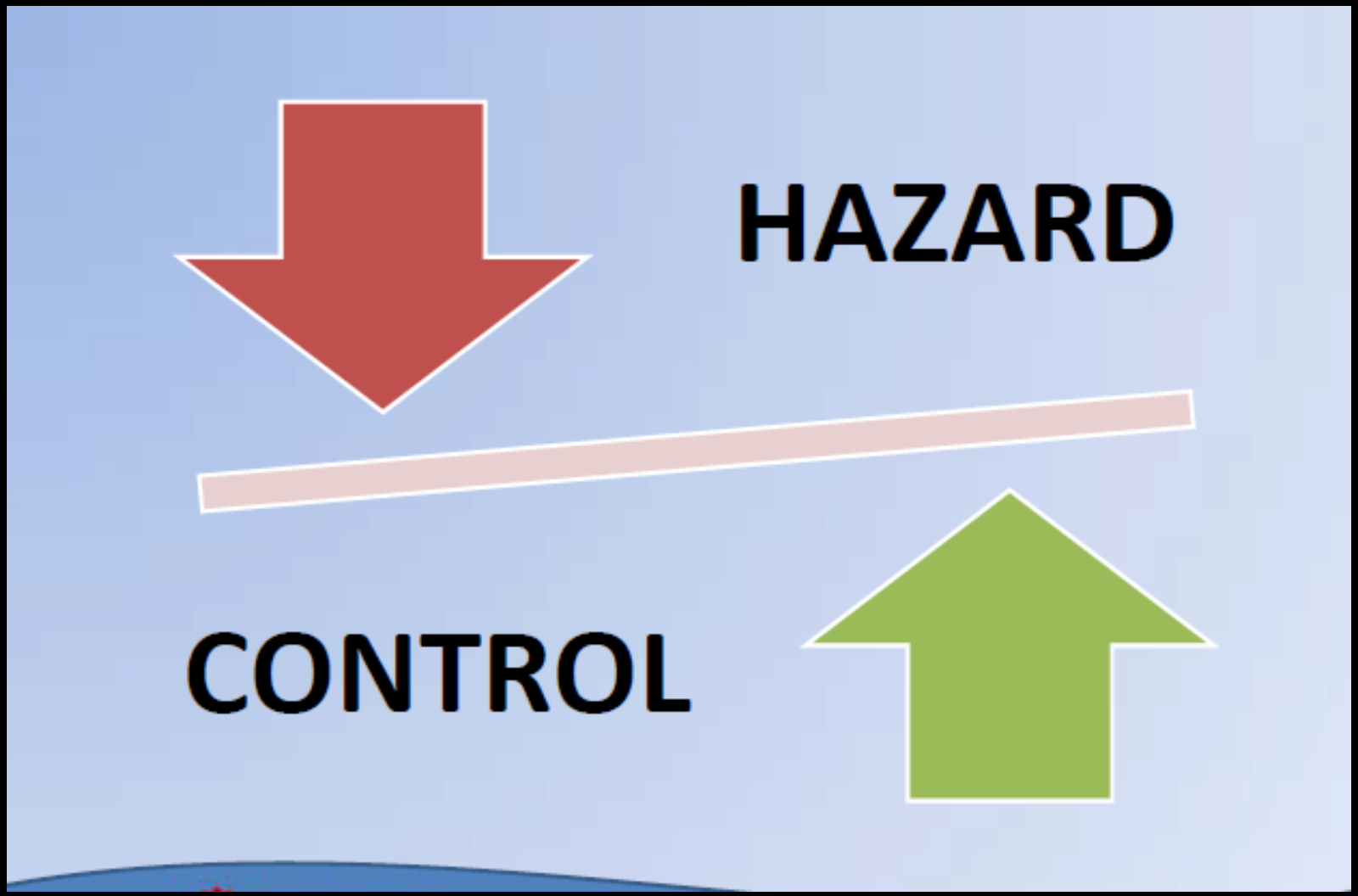
Clostridium botulinum

- Produces most potent toxin known
- Strict anaerobe
- Produces spores
- Strains E and some B are **psychrotrophic**

Listeria monocytogenes

- Infectious bacteria (invades body)
- Facultative anaerobe
- Does **not** produces spores
- All strains are **psychrotrophic**

HACCP



REFRIGERATION AS A PRIMARY BARRIER

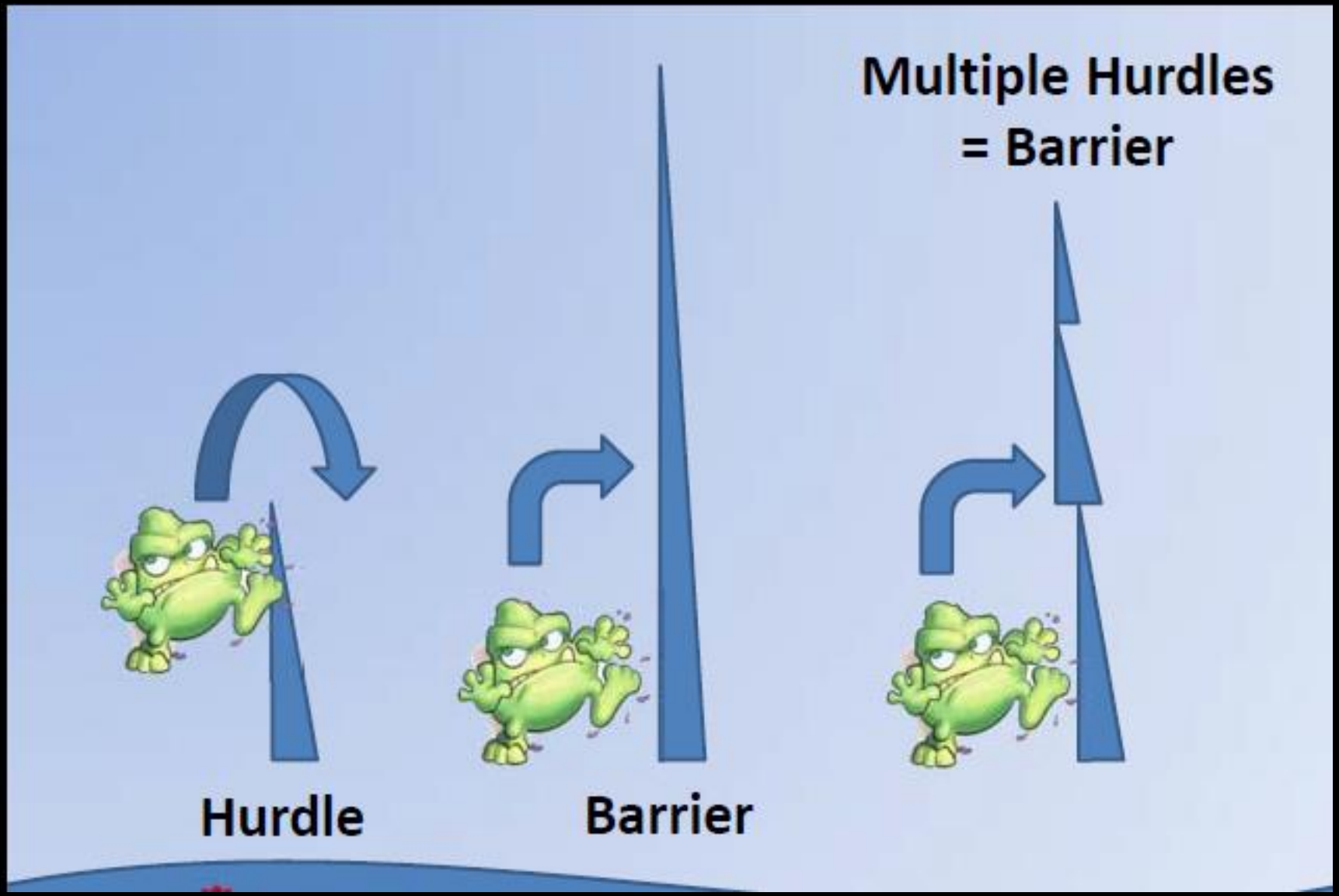
Required refrigeration temperature to prevent growth	
Psychrotrophic *Clostridium botulinum*	≤38°F
Listeria monocytogenes	≤34°F

REFRIGERATION PLUS SECOND BARRIER

- pH @ 4.6 or less
- Aw @ .91 or less
- Cured meat or poultry @ USDA regulated facility
- High levels of competing organisms (raw foods)
- Other methods if scientifically proven (WPS, Preservatives, Hurdle Effect)

*Cooking and Time (i.e. Cook-Chill, Sous Vide)

HURDLE EFFECT



HURDLE EFFECT

For Use with Sous Vide and Cook Chill

Table A. Interaction of pH and a_w for control of spores in food heat-treated to destroy vegetative cells and subsequently packaged.

a_w Values	pH Values		
	4.6 or less	> 4.6 – 5.6	> 5.6
0.92 or less	Non-PHF*/non-TCS**	Non-PHF/non-TCS	Non-PHF/non-TCS
> 0.92 – 0.95	Non-PHF/non-TCS	Non-PHF/non-TCS	PA***
> 0.95	Non-PHF/non-TCS	PA	PA

* PHF means "Potentially Hazardous Food"

** TCS means "Time/Temperature Control for Safety Food"

*** PA means "Product Assessment Required"

HURDLE EFFECT

For use with Vacuum Packaging

Table B. Interaction of pH and a_w for control of vegetative cells and spores in food not heat-treated or heat-treated but not packaged.

a_w Values	pH Values			
	< 4.2	4.2 – 4.6	> 4.6 – 5.0	> 5.0
< 0.88	Non-PHF*/non-TCS**	Non-PHF/non-TCS	Non-PHD/non-TCS	Non-PHF/non-TCS
0.88 – 0.90	Non-PHF/non-TCS	Non-PHF/non-TCS	Non-PHF/non-TCS	PA***
> 0.90 – 0.92	Non-PHF/non-TCS	Non-PHF/non-TCS	PA	PA
> 0.92	Non-PHF/non-TCS	PA	PA	PA

* PHF means "Potentially Hazardous Food"

** TCS means "Time/Temperature Control for Safety Food"

*** PA means "Product Assessment Required"

WHEN IS A HACCP PLAN NOT REQUIRED FOR A ROP PROCESS ?

- ✓If the food is a NON-TCS Food OR
- ✓Held at 41°F or less AND removed from packaging IN the food establishment within 48 hours after packaging.

*Note: A HACCP Plan is still needed for some specialized processes such as Acidified Foods and Smoking/Curing.

REDUCED OXYGEN PACKAGING

BASICS – PRE PROCESSING

RECEIVING


U.S. FOODSERVICE
4819
1. Receive Foods
2. Store foods
3. Create dedicated area
4. Clean and sanitize area
5. Prepare Foods
B. ROP Basics 1. Preprocessing

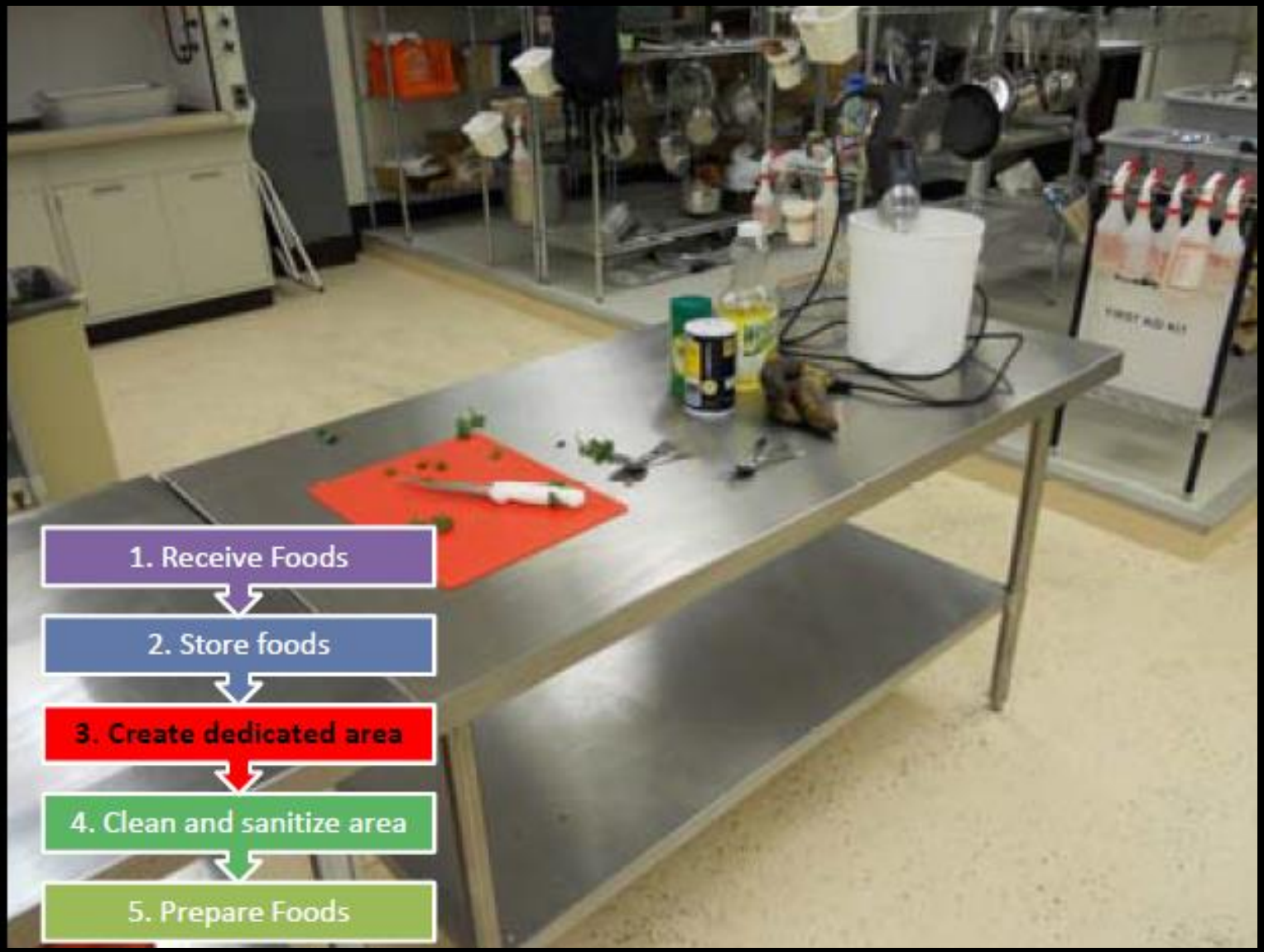
RECEIVING


1. Receive Foods
2. Store foods
3. Create dedicated area
4. Clean and sanitize area
5. Prepare Foods
B. ROP Basics 1. Preprocessing

STORAGE


1. Receive Foods
2. Store foods
3. Create dedicated area
4. Clean and sanitize area
5. Prepare Foods

DEDICATED AREA



CLEAN AND SANITIZE AREA

PREPARE


5. Prepare Foods


1. Receive Foods
2. Store foods
3. Create dedicated area
4. Clean and sanitize area
5. Prepare Foods
B. ROP Basics 1. Preprocessing


SALT LICK
DRY RUB
5. Prepare Foods
B. ROP Basics 1. Preprocessing


Clean and sanitize equipment


Pay attention to difficult to clean/sanitize areas

PLACE IN BAGS


Bring bagged foods to vacuum machine


Place bags inside

VACUUM SEAL

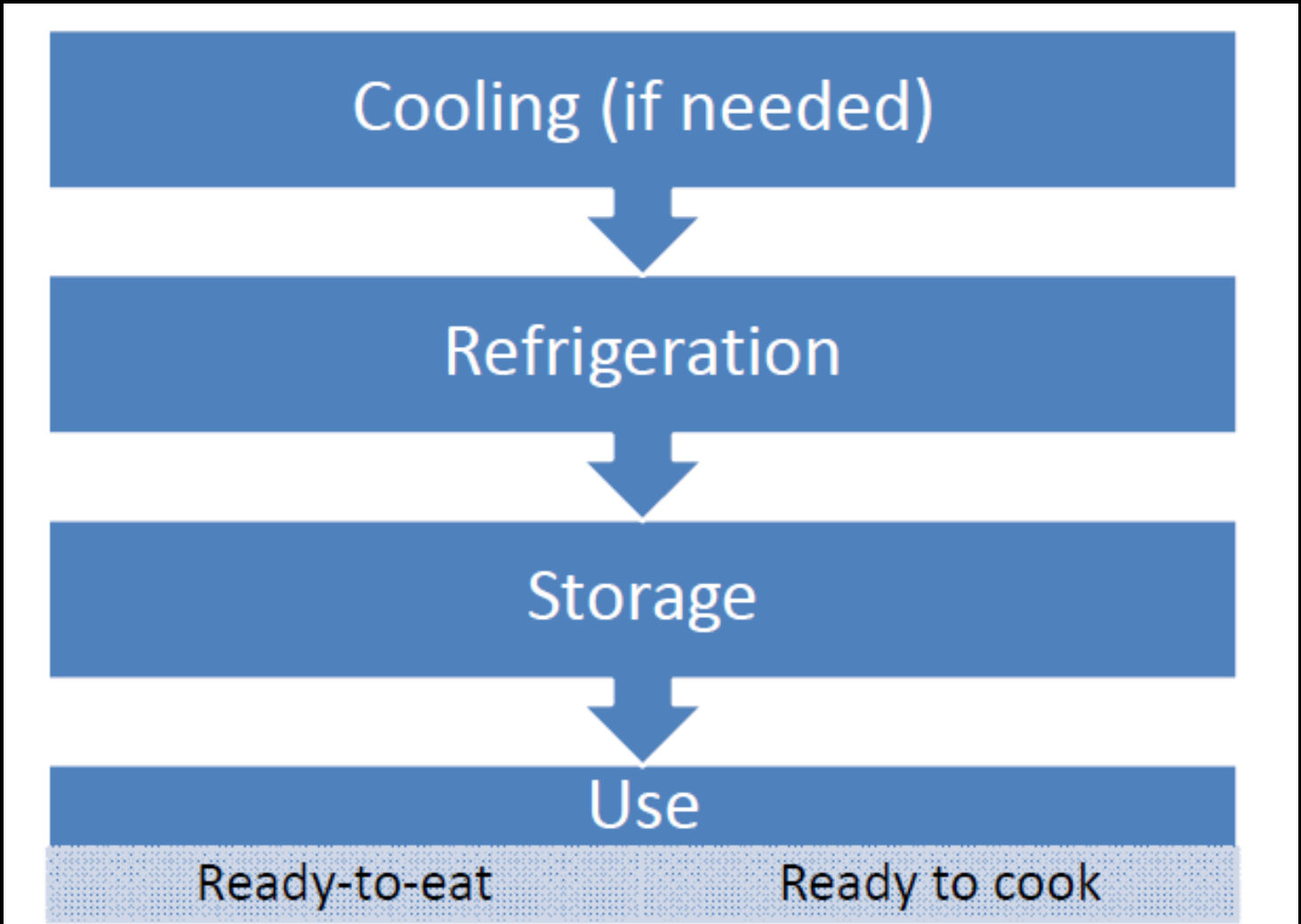
VACUUM PACKAGING

VACUUM RAW MEATS BEFORE VEGETABLES

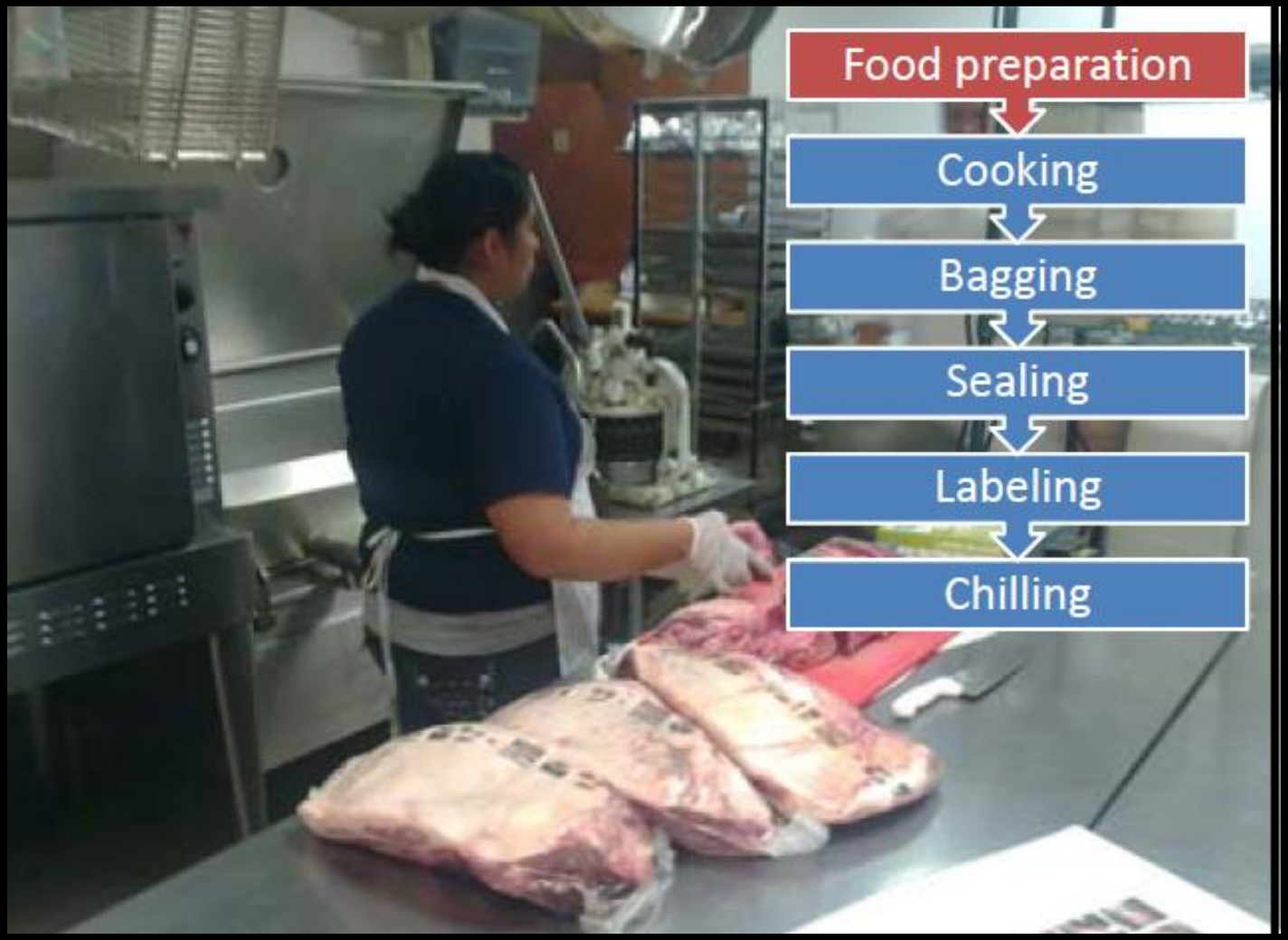
LABELING

- Name of product
- "Maintain food at 41◦F or below"
- Date Mark:
  - 30 days or the original manufacturers sell-by or use-by date, whichever comes first.

FINAL STEPS IN VACUUM PACKING



COOK- CHILL


Food preparation
Cooking
Bagging
Sealing
Labeling
Chilling

COOK CHILL

COOK CHILL


Food preparation
Cooking
Bagging
Sealing
Labeling
Chilling

COOK CHILL

Must be bagged and sealed before reaching 135◦F or below

COOK CHILL

- Food preparation
- Cooking
- Bagging
- Sealing
- Labeling
- Chilling

COOK CHILL


Food preparation
Cooking
Bagging
Sealing
Labeling
Chilling

COOK CHILL

COOK CHILL

Held in a refrigerator with an electronic system that continuously monitors time and temperature

COOK CHILL REHEATING

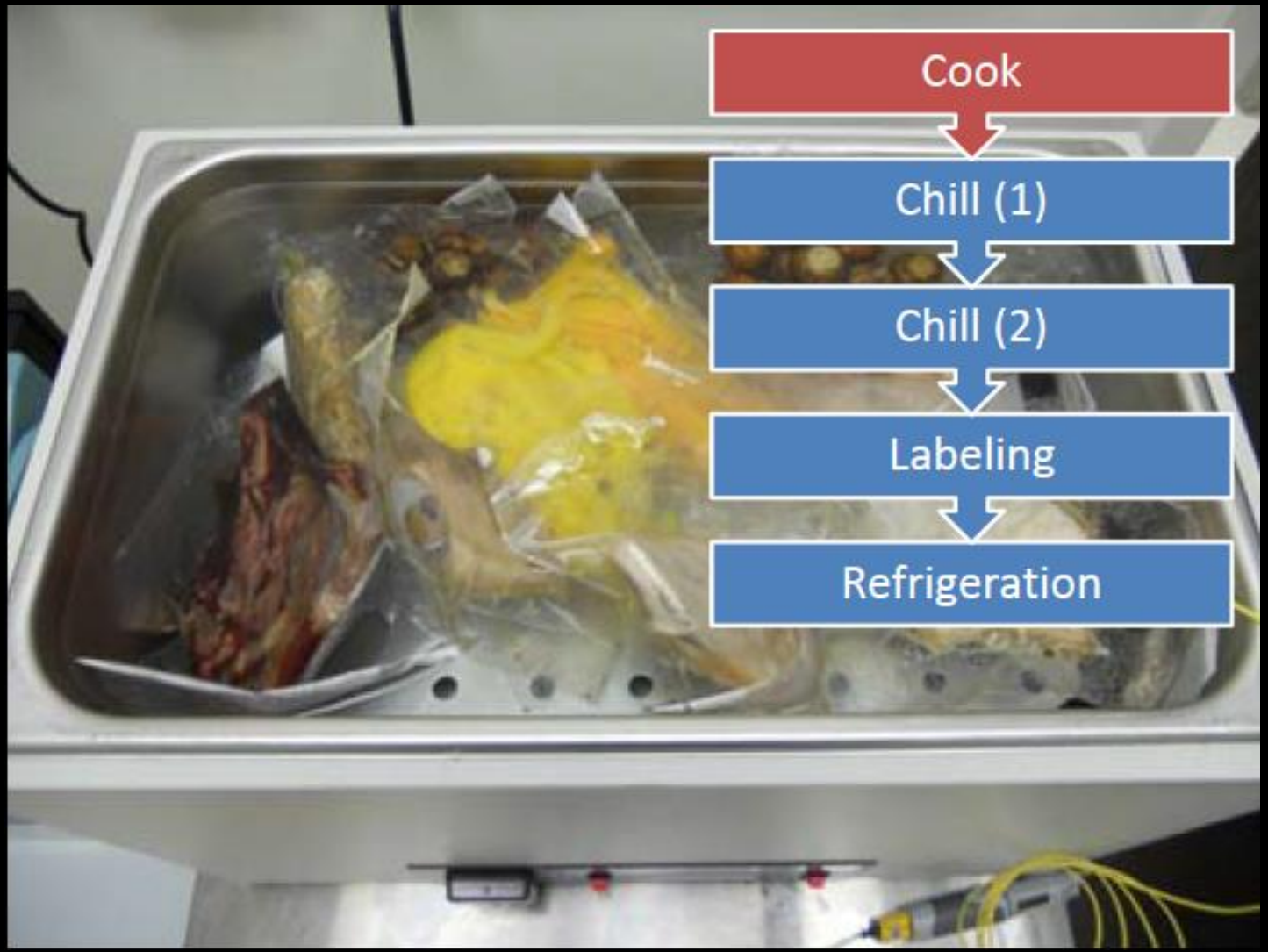
TRANSPORTATION

Transported to satellite equipped with verifiable electronic monitoring devises

SOUS VIDE- "UNDER VACUUM"

SOUS VIDE

SOUS VIDE



CHILL STEPS AND LABELING

First, cool to 41˚F in the sealed package(2/6)- THEN once you reach 41˚F, 3 choices:

1. Cool to 34°F or below and keep there until consumed/discarded- 30 days date marking
2. Hold at 41°F or below – 7 days date marking
3. Frozen- no shelf life, no date marking

Cook

Chill (1)

Chill (2)

Labeling

Refrigeration

REFRIGERATION

VACUUM PACKAGING **CHEESE** IN RETAIL FACILITIES

Do not need to apply for a variance IF:

- Commercially manufactured and must meet standards of identity of Hard Cheeses, Pasteurized Process Cheese or Semisoft Cheese.
- Must have a HACCP plan
- Refrigeration 41˚F or less
- Shelf life of 30 or manufacturers use by date, whichever is sooner.
- Discard after 30 days or at expiration

VACUUM PACKAGE **SEAFOOD**- FROZEN KEEP FROZEN BEFORE, DURING AND AFTER VP

Label: "Keep Frozen until use. Thaw under Refrigeration and use immediately."

Note: If product is removed from the RO Packaging or the vacuum is broken on the product before thawing, product does not need used 'immediately'.

Note: All unfrozen fish products from approved food manufacturers will be labeled with **"Keep Refrigerated at 38°F or below".**

VACUUM PACKAGING SUMMARY

- Requires HACCP, unless exempt
  - Exempt if: Properly labeled, held at 41˚F or below and opened in the facility w/in 48 hours
- Non-TCS foods exempt from HACCP
- Refrigeration 41˚F or less (Hurdle 1)
- Second hurdle required
- Proper labels required- "Maintain at 41˚F or below" and discard date.
- 30 Day self life, then discarded
- SOPs required (Bare hand contact, designated work area, only trained employees, cleaning/sanitizing, training program)
- VP Fish only if frozen before, during and after

COOK CHILL/SOUS VIDE SUMMARY

- Requires HACCP, unless exempt
- On-Premise Use only (no retail sales)
- Must be fully cooked per Code
- Cook Chill bagged and sealed before falling below 135˚F
- First, cool to 41˚F in the sealed package-THEN
  1. Cool to 34°F or below and keep there until consumed/discarded- 30 days date marking
  2. Hold at 41°F or below – 7 days date marking
  3. Frozen- no shelf life, no date marking
- Proper labels-Name of product and date packaged
- Refrigerated storage requires 24/7 electronic monitors for time and temperature-checked 2x daily.
- Cooling and cold holding records 6 month retention
- SOPs required

VARIANCE

- If you follow the requirements of the Food Code a variance is not needed to ROP. Check with your regulatory agency.
- If you do not follow the requirements- You will need to submit a Variance
  - Examples
    - Don't want to cook Sous Vide food to code temperature, but want to use low temp/long time instead.
    - Want to use 'other methods' not listed in the code as a secondary barrier.

TIPS FOR REGULATORS

HACCP PLANS

- Regulators DO NOT write the plans
- Regulators review the plans for compliance with the food code. Be cautious is saying you "Approve" a plan, but rather say, the plan looks adequate.
- Operators MUST gain knowledge of ROP and HACCP. Do not hand hold them. This is an important special process that should not be taken lightly.

REVIEWING HACCP ON AN INSPECTION

- Ask to see a copy of their HACCP plan. It should be readily available.
  - Employees are not expected to know and fully understand the HACCP document. This is for managers, supervisors and owners. But employees need to understand the SOPs
- Focus on the greatest risk elements of the HACCP based process. There is usually a product description page. Make note of CC, SV, VP.

DRILL DOWN TO HIGH RISKS

- Highest Risk
  - Low acid food such as meat, poultry, vegetables
- Lowest Risk
  - Acid or acidified foods like fruit, jams, salsa, tomatoes sauces

HACCP INSPECTION

- Since time is usually a factor, focus on CCPs and less on common to regular foodservice items.
- Refrigerator walk through (CCP, labeling, electronic monitoring)
- Choose ONE food product that is TCS to follow. Have PIC walk you through the process. Review equipment sanitation and cleaning during this walk through.
- Compare the process described to the written plan.
- Ask about Critical Limits and Monitoring activities. Are monitoring tools present?

RECORDS

- Very valuable!!
- Ask to see log sheets for the previous 6 months
- Ideally ask for records for the food item you discussed earlier.
- Review records for completeness, deviation with critical limits, and corrective actions. Ask to see any other logs pertaining to corrective actions taken.
- NO RECORD IS PERFECT!
- Are the logs being ‘faked”, “dry labbed”

SOP RECORDS

- Review the SOP records and logs
- Are all required SOPs in place in the HACCP Plan?
- Are they easily available to employees?
- Review Training Records
- Ask an employee questions about the ROP Process even if you cannot observe the operation at the time of the inspection. Are the preforming their tasks as required.

QUESTIONS?

Special Thanks to Dr. Brian Nummer, Extension Food Safety Specialist and Assoc. Professor in the Dept. of Nutrition, Dietetics and Food Sciences at Utah State University.

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