

Keeping Food Safe

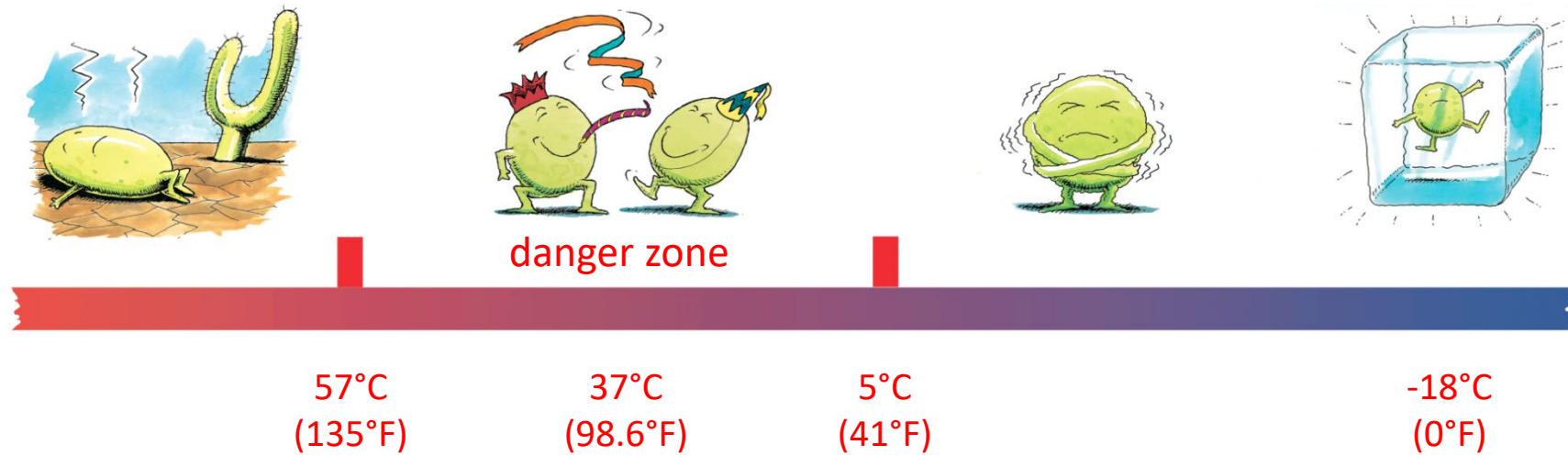
Factors that contribute to foodborne illness

1. Time and temperature abuse
 2. Poor personal hygiene , improper handwashing
 3. Cross contamination
1. Contaminated ready to eat foods

Temperature abuse

- When foods exposed to temperature in the danger zone for enough time to allow growth of harmful MO
- If food not cooked or reheated sufficiently to destroy harmful MO

The danger zone



Time-temperature control: general rules

- Keep hot food hot
- Keep cold food cold
- Keep frozen food frozen

- Or do not keep food at all

Unavoidable situations when food must pass through the temperature danger zone

- Cooking
 - Cooling
 - Reheating
 - Food preparation (slicing, mixing, etc..)
-
- Foods should pass as fast as possible in TDZ
 - Should pass as few times as possible → cooled and reheated once!!!

Temperature control

- Transportation
- Delivery
- Storage
 - refrigerated
 - frozen
 - dry
- Preparation
- Thawing
- Cooking
- Cooling
- Reheating
- Holding
- Service

Temperature measuring devices

To ensure the accuracy of readings, calibrate devices:

- before they are first used
- at regular intervals, as a matter of course
- after damage
- after an inaccurate reading is suspected
- whenever there is a confirmed case of foodborne illness linked to temperature abuse

General guidance for checking the temperature of TCS food

Stage of food handling

When to check temperature

DELIVERY

Every time food is delivered

STORAGE

Refrigeration

Daily, at least

Refrigerated display

Daily, at least

Freezer

Daily, at least

Dry

Regularly

THAWING

Whenever food is thawed

COOKING

Whenever food is cooked

COOLING

Whenever food is cooled

REHEATING

Whenever food is reheated

HOT HOLDING

Frequently throughout the holding period

COLD HOLDING

Frequently throughout the holding period

Types of Thermometers

A thermometer is the most important tool for controlling the temperature of food. Three types of thermometers are commonly used in food banks and agencies.



Infrared thermometers

- Only measure surface temperatures of food and equipment
- Display temperatures instantly
- Prevent cross-contamination and damage to food because they do not touch it



Thermocouples and other digital thermometers

- Do not need to be inserted deep into food to get an accurate reading
- Display temperatures quickly
- Many come with other probes for checking liquids, air temperature, and equipment



Bimetallic stemmed thermometers

- Must be inserted in food from the tip of the thermometer stem to the dimple to get an accurate reading
- Require at least 15 seconds before a final reading can be taken
- Can be easily calibrated at the food bank or agency

Steps in the Flow of Food	Safe Temperature Guidelines	Rationale for Temperature Guidelines
Receiving and Storing Frozen Foods	Foods should be <u>frozen solidly</u> and maintained frozen at all times.	Proper freezing of foods helps to <u>maintain food quality</u> and <u>prevents the growth of spoilage and harmful microorganisms</u> .
Receiving and Storing Refrigerated Foods	Foods should be received and stored so that food is always at or below 41°F (5°C). Raw shell eggs may be received at 45°F (7°C) or below.	Receiving and storing foods below 41°F (5°C) <u>prevents or slows the growth of harmful microorganisms</u> .
Cooking Foods	Different foods, and the methods by which they are cooked, require different end point temperatures to be safe. The range of safe cooking temperatures can vary from 145°F (63°C) to 165°F (74°C). Beef roasts may be cooked at 130°F (54°C) for rare. Foods should reach the required final cooking temperature within 2 hours.	Proper cooking destroys harmful microorganisms that may be present in the food.
Cooling Foods	During cooling, food must be cooled from 135°F (57°C) to 70°F (21°C) within 2 hours and from 135°F (57°C) to 41°F (5°C) within 6 hours.	Proper cooling prevents the conversion of sporeforming bacterial cells to vegetative bacterial cells and the growth of vegetative bacterial cells.
Reheating Foods	All reheated foods must be reheated to at least 165°F (74°C) within 2 hours.	Proper reheating destroys harmful bacteria that may be present in foods.

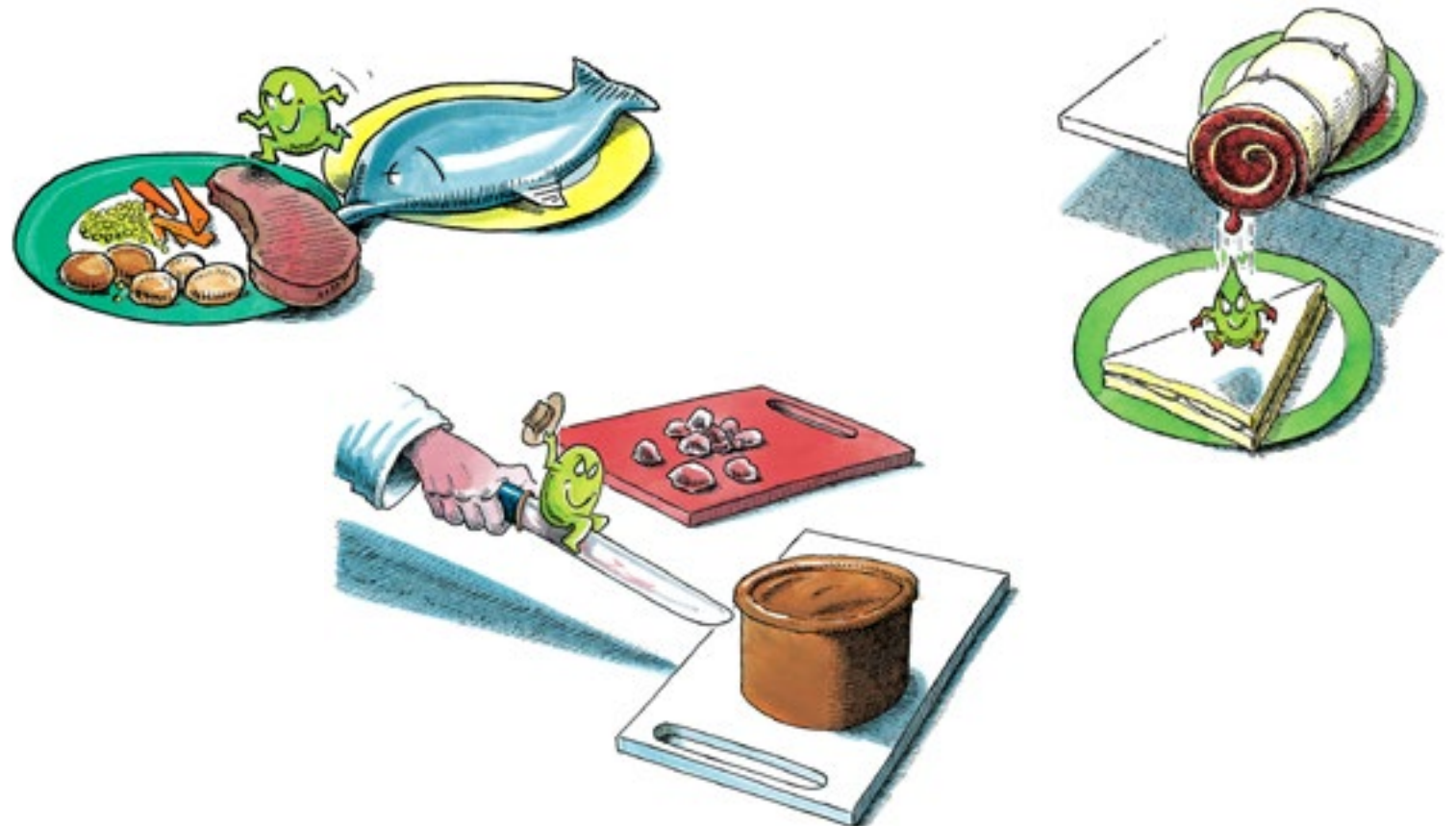
Figure 3.6 Time and Temperature Controls for Potentially Hazardous Foods (cont.)

Steps in the Flow of Food	Safe Temperature Guidelines	Rationale for Temperature Guidelines
Hot-Holding Foods	All foods must be cooked to a safe temperature and then held at greater than 135°F (57°C).	Proper holding of food prevents the growth of harmful bacteria.
Cold-Holding Foods	All foods that are held and served cold must be held at 41°F (5°C) or below.	Holding cold foods below 41°F (5°C) prevents or slows the growth of harmful microorganisms.
Thawing Foods	Thawing may be done in a refrigerator at 41°F (5°C) or less, in a microwave oven and then immediately cooked, or under cool running water at 70°F (21°C).	Proper thawing prevents or reduces the growth of harmful bacteria.
Food Preparation	During food preparation, food should only be in the temperature danger zone [between 41°F (5°C) and 135°F (57°C)] for a maximum total time of 4 hours.	Maintaining foods between 41° (5°C) and 135°F (57°C) for no more than 4 hours limits the number of microorganisms that can grow.

Figure 3.6 Time and Temperature Controls for Potentially Hazardous Foods ~

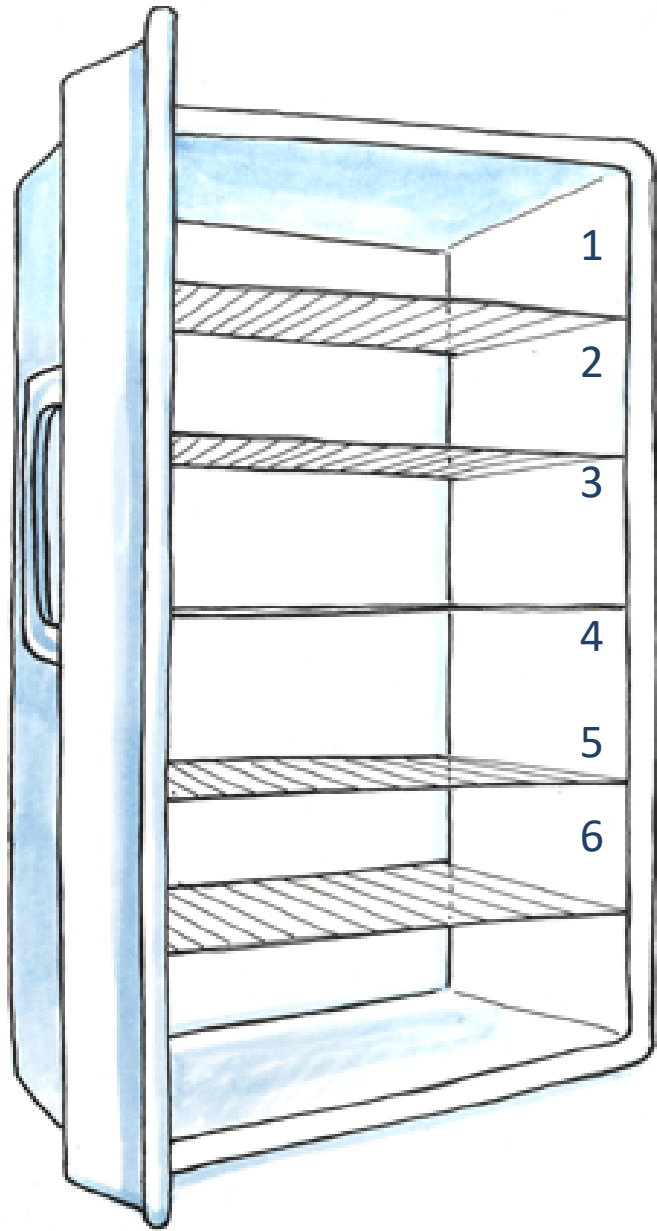
Cross contamination

- Transfer of germs from one food to another
- This is commonly happens when germs from raw foods are transferred to cooked or ready to eat foods via **contaminated hands, equipment, or utensils**



Cross contamination

- Can also be happened of raw foods are stored above ready to eat foods.
- Juices from the raw product can drip or splash onto a ready to eat food
- Prevention tips:
 - Always store cooked & RTE foods over raw products
 - Keep raw and RTE separate during storage
 - Good personal hygiene
 - Keep all food contact surfaces clean and sanitary
 - Avoid bare hand contact with RTE
 - Separate equipment for raw and RTE
 - Prepare RTE first, then raw foods
 - Prepare both of them at separate areas



Following the food product flow

Strategies for determining food quality

- **Sensory evaluation** : commonly used method for making routine quality determinations on foods received at food establishments
- Involves using senses of smell, touch, sight, and sometimes taste
- **Observe** :
 - Color, texture, and visual evidence of spoilage
 - Spoilage: slime formation, mold growth, discoloration
 - Check for tears, punctures, dents, other signs of damage

Sensory evaluation of foods

- Smell :
 - Flavor (combination of smell and taste)
 - Foul odors (ammonia, hydrogen sulfide : the smell of rotten eggs)
 - These odors are caused by bacterial breakdown of protein in spoiled foods
- Taste :
 - Flavor
 - Loss of good taste
 - Development of objectionable taste
 - Alcoholic flavor or smell (by yeast spoilage)
 - Acidic taste (spoiled milk)

Spoilage cannot be used as an
indicator of food safety!!!



Figure 4.2 Food Flow Diagram

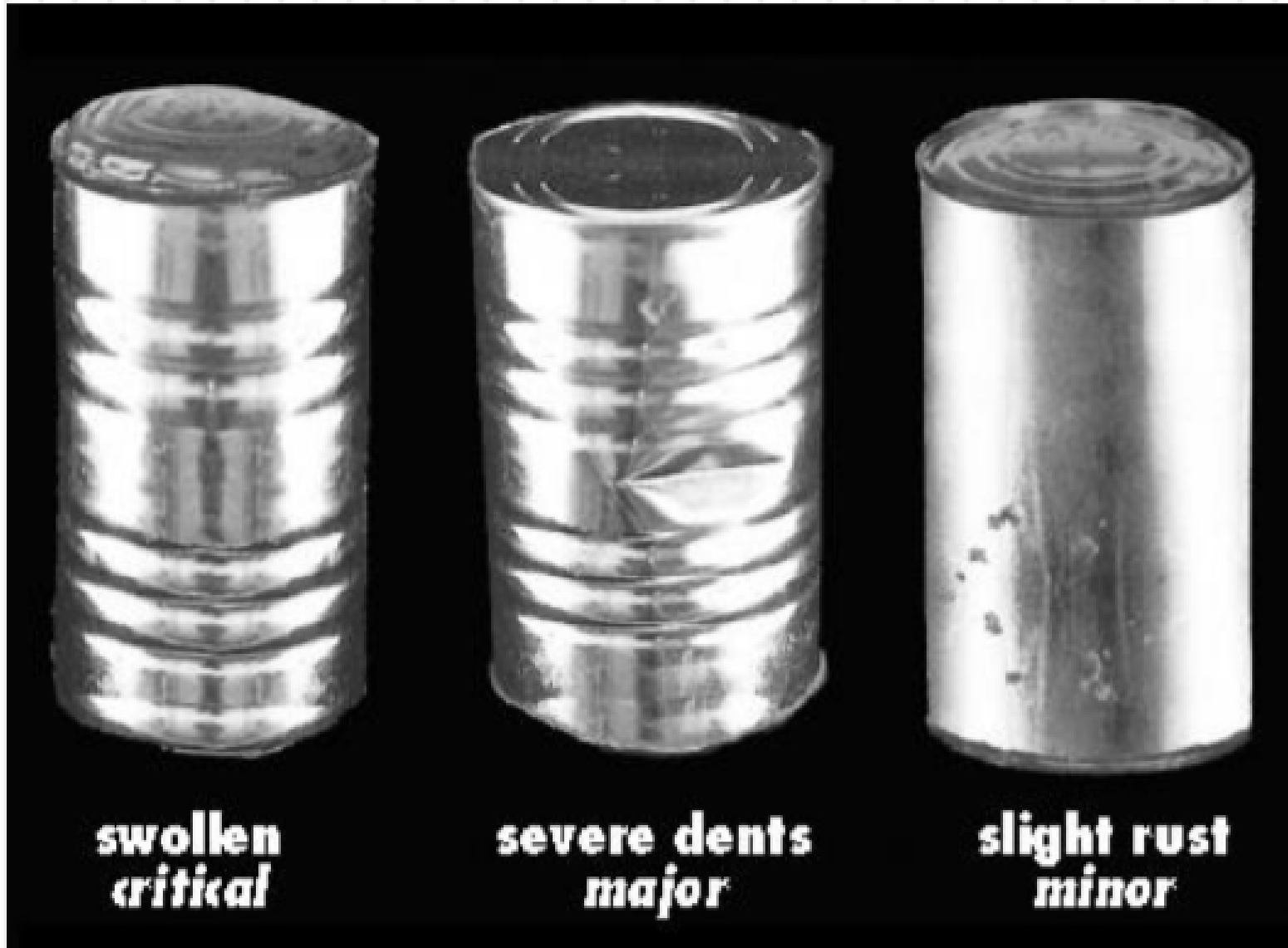
Receiving

Foods

Packaged foods

Check for

- Hermetic packaging
 - Leaks , bulges, dents, broken seals, damage along seams, rust, missing labels
- **Swollen**: gas inside (may be caused by chemical reaction between food and metal , or growth of microbes)



swollen
critical

severe dents
major

slight rust
minor



- Severe dent in can seams



- Deep dents in can body
- Crushed cans that are not stackable



- Missing labels
- Unreadable labels due to stains or tears
- No code dates



- Swollen or bulging ends



- Holes
- Visible signs of leaking (indicated by stained labels)



- Rust that cannot be wiped off

Foods

Red meats products

Cattle , veal, ham, pork, sheep, lamb

Check for

- Potentially hazardous foods
- Never accept fresh meat if temp. exceeds 5 C at delivery
- Fresh meats should be firm, elastic to the touch, characteristic aroma
- No off odors
- No sliminess
- Frozen meat should be solidly frozen
- No signs of thawing and refreezing like ????
- Packaging to prevent freezer burn

Freezer burn



Foods

Poultry

Chicken, turkey, duck, geese

Check for

- High moisture, near neutral pH, high protein → ideal condition for bacterial growth
- Especially in intestinal tract, and skin !!
- Spoilage is indicated when:
 - ☐ Soft tissue, slimy, objectionable odor
 - ☐ Stickiness under the wings
- Darkened wing tips (sign of drying or freeze burn)
- Should be rejected if received fresh at temp. > 5 °C



FRESH
Springy flesh



STALE
Stiff or soft flesh

Foods

Eggs

Check for

- Salmonella enters the egg yolks as it is formed inside the hen
- Egg shell may be contaminated with salmonella especially if the egg is soiled with chicken droppings !
- Raw shell eggs should be clean, fresh, free of cracks, checks
- Refrigerated at 7 C or below
- When opened, should have no noticeable odor, yolk should be firm and cling to the white
- Washing eggs can increase contamination !!!

Foods

Egg products

Egg without its shell

Liquid

Frozen

Dry

Check for

- All should be pasteurized



Foods

Milk and milk products

Milk

Cheese

Butter ice-cream

Check for

- Should be pasteurized
- UHT milk → ultra high temperature in aseptic packaging
- Can be stored several weeks if kept under refrigeration
- Fluid milk : below 5 C
- Cheese : below 5 C, proper color, flavor, and moisture
 - Should be rejected if it contains molds
- Butter : should has firm texture, even color, free of mold



Traditional Pasteurization:

- High Temperature Short Time Pasteurization (HTST)
- Heated to 165°F for 15 seconds
- Perishable with a 2 to 3 week shelf life



UHT

Pasteurization:

- Ultra High Temperature Pasteurization (UHT or UP)
- Heated to 280°F for 2 seconds
- Perishable with a 1 to 2 month shelf life (until opened)



UHT

Pasteurization + Aseptic Packaging:

- Ultra High Temperature Pasteurization (UHT or UP)
- Heated to 280°F for 2 seconds
- Put in a sterile "box" like package (called aseptic)
- Shelf stable for 6 months (until opened)

Foods

Vegetables and fruits

Check for

- Spoil very rapidly
- They continue to ripen even after picking
- Be careful of mushroom packaging → holes should be made to permit respiration
- Washing thoroughly for fruits and vegetables
- Vegetable detergents can be used

Foods

Fish

Check for

- More perishable than red meats , even when stored in refrigerators
- Should be received at self draining ice to prevent drying, and increase the shelflife
- Slime cover on fish and shellfish contains large amount of bacteria
- Fish contains a lot of unsaturated fatty acids → can be oxidized → off flavor → rancid
- Smell, appearance