

## Chapter 4 – Destruction of Pathogenic Organisms

---

We often do not give a lot of thought to the fact that certain methods of food preparation are specifically intended for destroying bacteria and other pathogenic organisms.

### COOKING

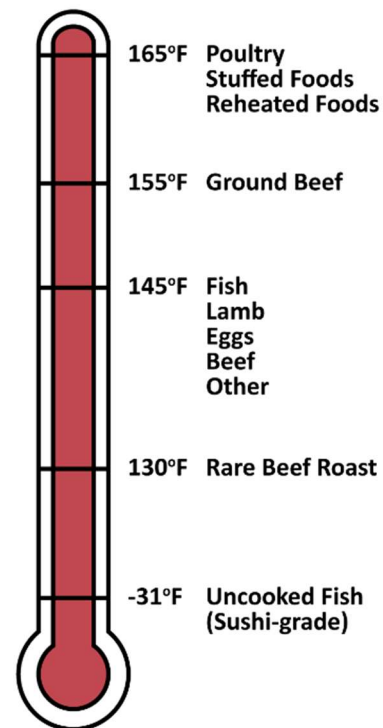
Food is cooked to increase palatability, tenderize, change the character of the food, or make it hot. However, another important reason to cook some foods is to destroy organisms that can cause illness. Proper cooking is often the "critical control point" in preventing foodborne illnesses and disease outbreaks.

Undercooked foods, especially undercooked meats, poultry, eggs, and fish can increase the risk for developing foodborne disease. This is because the dangerous organisms in the raw foods might not have been adequately destroyed.

The following cooking temperatures for specified food will either kill dangerous organisms outright or injure them sufficiently to reduce risk, provided the food is eaten promptly after cooking. To properly destroy dangerous organisms, these temperatures should be met for at least 15 seconds:

- Poultry and stuffed foods - 165°F or above.
- Ground meats, ratites (e.g., ostrich, emu), or injected meats - at least 155°F.
- Fish, lamb, eggs, beef (other than ground beef), and unspecified meats - 145°F or above.
- Rare beef roasts - at least 130°F. Must meet the definition of whole-muscle, intact beef per Idaho Food Code 3-201.11 (E).

### DESTRUCTION OF ORGANISMS



**Microwave Cooking.** When cooking with a microwave oven, food must be rotated and/or stirred during cooking to compensate for uneven heat distribution and heated to a temperature of at least 165°F in all parts of the food. Foods cooked in a microwave must be allowed to stand covered for 2 minutes after cooking.

**Food Processing.** Cooking as a food processing method must be done to obtain commercial sterility and/or in accordance to specified good manufacturing practices. Smoking of meat must be done during the cooking process or at a temperature of at least 140°F.

**Cooking Stuffing.** Stuffing placed in an animal's body cavity for cooking must be cooked to at least 165°F. The number of foodborne outbreaks due to undercooked stuffing in poultry necessitates this requirement.

**Non-Continuous Cooking of Raw Animal Foods.** It must first be heated no longer than 60 minutes, then immediately cooled from 135° F to 70°F within 2 hours. Within a total of 6 hours, it must cool from 135°F

to 41°F or less. After cooling, the food must be held frozen or cold. Prior to sale or service to the consumer, the food must be cooked using a process that heats all parts of the food to a temperature and for a time as specified per Idaho Food Code 3-401.11 (A-C).

### **REHEATING**

TCS foods that have been cooked and then refrigerated and are to be reheated for hot holding must be reheated so all parts of the food reach **165°F within two hours** (unsliced beef roast - 130°F). Proper reheating is very important in order to destroy the increased number of dangerous organisms in the food from when it was first cooked.

**NOTE:** Steam tables, bain-maries, warmers, and similar facilities are intended for hot holding and cannot be used for cooking or reheating purposes.

### **FREEZING**

Fishery products which are not thoroughly cooked and are intended for raw, marinated or partially cooked consumption must be **blast frozen to at least -31°F for 15 hours or conventionally frozen to -4°F for 168 hours (7 days)** to successfully kill parasitic worms in the flesh. (Idaho Food Code 3-402.11)

### **THERMOMETERS**

The thermometer is the most vital tool for the food industry. Almost every aspect of the food business - from the source to the consumer - has temperature requirements.

Proper cooking temperatures are essential for food safety. The thermometer used for checking temperatures must be an approved type. The *Idaho Food Code* requires a metal or plastic stem type thermometer which is numerically scaled and accurate to plus or minus 2°F must be used and should be capable of measuring 0° to 220°F. Also, the thermometer must be located adjacent to operations requiring frequent temperature monitoring.

To check cooking temperatures, place the thermometer in the center of the food or the portion of the food that has the greatest density. Avoid placing the thermometer next to a bone or fatty area in meat as this will lead to an inaccurate temperature reading.

It is important to know where the temperature sensing portion of the thermometer is located. Do not assume all thermometers are the same. If unsure, check with the manufacturer. For most dial type thermometers, the temperature measuring area is the lower 2 ½ inches of the stem. Digital thermometers tend to have the temperature measuring area located on the lower ½ inch of the stem.

#### **Calibration Procedure for Thermometers:**

It is important the thermometer used for checking food temperatures is properly constructed and **has been recently checked for accuracy** (+/- 2°F) (Idaho Food Code 4-203.11). A thermometer's accuracy can be checked by using the ice point/boiling point calibration method.

For ice point calibration, fill a container with crushed ice and enough water to make slush for maintaining the ice point temperature. Stir continuously and do not let the thermometer stem or sensing element touch the bottom or sides of the container. Allow the thermometer to reach equilibrium, and then read the temperature. The temperature should read 32°F.

For boiling point calibration, make sure the water is a "rolling" boil. Water boils at different temperatures at different elevations, so it is important to know the elevation of your city or community. Once the water is boiling, insert the thermometer into the water (be careful to not burn your hand from the steam).

The thermometer should read a temperature that corresponds with the elevation of your location.

To achieve the highest degree of accuracy, both methods should be used to check your thermometers. However, if only one method can be used easily, the ice point method is generally recommended because of the differences in boiling points.

<b>BOILING POINT FOR SPECIFIC IDAHO LOCATIONS</b>	<b>ELEVATION</b>	<b>BOILING POINT</b>
Lewiston	738 ft.	211°F
Coeur d'Alene	2,187 ft.	208°F
Caldwell	2,365 ft.	208°F
Wallace	2,744 ft.	207°F
Boise	2,842 ft.	207°F
Twin Falls	3,745 ft.	205°F
Salmon	4,004 ft.	205°F
Pocatello	4,460 ft.	204°F
Idaho Falls	4,730 ft.	203°F
McCall	5,030 ft.	203°F
Stanley	6,260 ft.	201°F
Mack's Inn (Island Park)	6,405 ft.	200°F

Idaho locations can be approximated from the examples provided. The thermometer should read within one degree of the boiling points for the specific elevation.

**IMPORTANT: THERMOMETERS WHICH ARE INACCURATE SHOULD BE PROPERLY ADJUSTED OR REPLACED.**

Should you have a problem with your thermometer's accuracy, contact your supervisor.

**SUMMARY**

Ensure the destruction of bacteria and parasites by adherence to the following:

- Cook foods to proper temperature.
- Check food temperatures often with an approved thermometer.
- Fishery products not to be properly cooked need to be adequately frozen before service.
- Check thermometers often for accuracy.

**Reference:** *Idaho Food Code*, Chapters 3 and 4.