THERMOMETRICS
PRECISION TEMPERATURE SENSORS

Safe Food Temperatures

Gourmet Cooking Starts With...Temperature Control

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In my article, Food Maximization-Gourmet Cooking Starts With… Gourmet Cleaning, I talk about the ways chefs keep the professional kitchen clean and safe, and how you can bring the most important two of those techniques: hand washing and bleach buckets, into your home kitchen. By now your kitchen, appliances, and all of your pots and pans are cleaner than the day you first bought them. You ran around gleefully sanitizing everything and enjoyed Beluga caviar with the money you saved on cleaners. **Right?!**

Safe Food Handling Procedures
Today we'll look at the safe food handling procedures that you need to follow – from the grocery store to the table. These will help you save money, because you will understand why food spoils and when you do or don't need to throw it away. It will also help you make your buying decisions when your supermarket suddenly has a **"special"** on meat because their refrigeration broke down. Is it worth the risk? You wonder.

Understanding temperature will let you be in control and informed enough to take advantage or pass on such an opportunity. With more careful handling of your food, you may be able to prolong it's freshness, which is very important if you freeze a lot of your meals for eating later.

Hazard Analysis and Critical Control Points
Professional kitchens usually have a HACCP plan: Hazard Analysis and Critical Control Points. In a nutshell, you look at the physical journey of the food products from the moment you receive them until they are consumed, and decide where there are danger areas to the safety and integrity of the food. An example from a professional kitchen: the meat delivery guy comes a little late, and the receiving person is busy getting other goods put away. The meat sits out for 45 minutes, getting warmer and warmer, while the receiving person puts other things away. Obviously, this receiving person needs to be trained to know that the dried beans and rice can wait; meat, dairy, fish, and poultry must be placed in the refrigerator immediately. How can this translate to the home kitchen? It begins from the moment you pick up your food from the refrigerated display case in the grocery store.

- How long do you continue shopping?
- How long does your food ride around in the warm car in the summertime on the way home?
- Do you stop to pick up a movie?
- Your dry-cleaning?
- Your kids?
- Do you make sure you load the easily spoiled things close to the air conditioner of your car in summer, and away from the heater in winter, or just throw all the bags in the backseat and the trunk?

It's easier than you think, if you take a moment to remember that you are handling food, even when you're not preparing it for eating yet.

Your Food's Temperature

Next, be aware of your food's temperature when it arrives home. Check it with your thermometer – especially now, when it's so hot outside. Liz! You're saying, Have you gone stark raving MAD?!? Thermometers have deadly mercury in them! I will kill myself and my family with your insane ideas! No, no, no. I mean get a food thermometer (and a bleach rag to clean it with, before and after each use!). They have no bulb of mercury to break and won't poison your food. Food thermometers look a lot like a 6 inch metal skewer, except there's a little round temperature gage on one end. They're very cheap ($5 or less), but nothing will mark you as a person who knows their way around a kitchen as well as your use of a food thermometer. It clips like a pen to your sleeve or shirt pocket. It's the most important piece of equipment any chef owns. Check to make sure your "temp" is calibrated properly: get a container of ice and water, and a pot of boiling water on the stove, and temp each. The ice water should be 32ºF (0ºC) and water boils at 212ºF (100ºC). It should read that way within 10-15 seconds. Pretty easy, huh? If it's not calibrated properly, take it back and get a new one.

Accuracy of your Thermometer

Want an interesting experiment? Fill up your bleach bucket with water you think is 70ºF by the feel from your hand, then check the real temperature. Did you err on the side of it being too hot? (Most people wrongly assume 70º water is warm, but it's almost 30 degrees colder than your hand!) You want to check your calibration once a week or so – a degree or two off can be compensated for, but 10 degrees or more, and you want to buy a new thermometer. If the face cracks or bends, get a new one – this is a sanitation issue, not a time to try to fix it yourself.

Bacteria Danger Zone

Once you have your thermometer, feel free to go a little crazy at first, temping everything. The Danger Zone is 45 to 140°F. This is the number one way that food gets adulterated. You see, all meat, poultry, fish and dairy is contaminated to a certain extent. Germs need food, moisture and time to grow. There are already "killer" bacteria in many foods you eat every day, but they're in such tiny quantities that your body's natural digestion process can take care of them, so the food you eat isn't harmful. Have you ever traveled abroad, and were told "don't drink the water," but noticed that the locals drink it every day? They've built up natural defenses to the pathogens in the water supply, so they don't get affected the way you would. You've enjoyed relatively sanitary food your whole life, so you actually have less resistance than an average, healthy person from many "less developed" countries. So how does this matter to the temperature of food? Well, you need to understand that there are already bacteria in food, and freezing the food doesn't kill the bacteria. Keeping the food refrigerated doesn't kill the bacteria. All you are doing is slowing the germs' reproduction down. That's why chicken, meat, fish and dairy spoil quickly, even in the fridge. The germs are multiplying from the time the animal was killed. These items are kept refrigerated to keep them wholesome enough to eat within a reasonable amount of time. They still contain bacteria, though.

So what happens in the Danger Zone?

The bad bacteria in food to multiplies at its optimum growth rate. Food goes bad much, much more quickly. Sometimes, eating bacteria-laden foods aren't fatal to us because they are still in "small" quantities, and because the population is primarily made up of adults (over the age of 16, under the age of 70) who have built up a natural defense system. The elderly, children, and those with low resistance (like AIDS patients or people having chemotherapy) are most susceptible to food poisoning. Healthy adults may eat the same thing, but have enough of the natural defense to fight off the bacteria that can kill a child or old person. That is why, by the way, when you hear about an outbreak on the news – bad hamburgers at a fast food place – it's the little kids who get so dangerously ill and die, not their parents. People mistakenly think it was "one bad burger." It wasn't. It was a person with little natural defense eating one of the many bad burgers.

How Long Does it Take?

So how long does it take if food is in the Danger Zone before the bacteria are at unhealthy levels? Consider meats, fish, poultry and dairy products that have been held in the Danger Zone for two hours to be spoiled. (That's the food's temperature, not the room's temperature!) That amount of time is cumulative. For example: every day your kid comes home from school, makes a glass of chocolate milk to watch cartoons with, and leaves the container out on the counter. You come by, a half hour later, and the milk smells fine and is still cool to the touch, so you put it back in the fridge. Imagine that happens every day. When you pour your children glasses of milk on Thursday for dinner, it's adulterated. It feels cold, it smells fine, and you don't get sick if you drink it, but all of a sudden, your kids have a terrible stomach flu 6 hours after dinner, and the

flu lasts about 3 days. Not to tattletale, but my own beautiful mother tried to kill us for years. Every night, she'd have us set out our glasses of milk when we set the kitchen table for dinner – mom liked to see the table already set while she cooked. That milk would be about 85º by the time we drank it. (gag!) Oh, the humanity! It's a wonder I survived the dinners of my youth. (Don't even get me started on cooking the stuffing inside the bird…I'm saving that particular soapbox for my November article.)

Recommended Temperautres for Food
Here are the Culinary Institute of America's recommended temperatures for refrigerating fresh foods to best keep the growth of bacteria down to a minimum:


Meat and Poultry – 33-36ºF


Fish – 32-33ºF (that's why it should always be sitting directly on a bed of ice)


Shellfish: Mollusks (clams, oysters, scallops) – 32-33ºF


Shellfish: Crustaceans (live lobsters & crabs) – 45ºF


Eggs – 38-40ºF


Dairy (butter, hard & soft cheese, milk) – 38-40ºF


Fruit and Vegetables – 38-40ºF

Did you notice something strange there?

Crustaceans Are Different
The Danger Zone is 45-140ºF, but the recommended temperature for Crustaceans 45ºF! That's because they're live, so they have their own ability to fight off bacteria while they're living. Any colder and they might die of the cold!

Your Fridgerator
Something to watch for, too: your home fridge has different temperature zones. Temp your items on different shelves, especially your milk, to make sure they're being held at the right temperatures for the type of food they are. Here's how you can save money with this information: when your supermarket has one of those "broken fridge"

specials, they need to get rid of everything before it has sat in the Danger Zone for the two hours I mentioned before. Bring your thermometer and temp the different meats by sandwiching the length of the thermometer between two packages, on the plastic side of each (not the Styrofoam tray). If it's still out of the Danger Zone, load up. It's perfectly fine. But if it reads 46ºF or higher, you need to worry how long it's been there. You have two hours, cumulative time. And the butcher will be there with his thermometer too, to answer your questions. Now you can make an educated decision.

Cooking Food

Now that you understand why it's so important to watch out for the Danger Zone for storing things at cooler temperatures, let's talk about the other end of the Danger Zone: the hot side. This is much more simple to understand, and needs far less explanation that the cool side: you need to cook your food completely and properly, so that the bacteria in it will die. Use your thermometer to measure the INTERNAL temperature of the food to determine when it is properly cooked. No, you don't leave your precious temp in the food as it cooks. There are metal stem thermometers that can do that, but not your little temp that clips in your pocket. Just open the oven door, and stick it in, deeply, avoiding hitting a bone.

Recommended Temperautres for Cooked Food

Here are the correct temperatures for cooked foods. You can cook them to higher internal temps, of course, but these are the minimum temperatures they need to reach:

 Reheating leftovers: 165ºF

 Poultry and Stuffing: 165ºF

Ground Beef: 155ºF

 Pork: 150ºF

 Beef: 140ºF

 Lamb: 140ºF

 Seafood: 140ºF

Rare Beef: 130ºF (this is for steaks and roast beef, it's not recommended, but many people eat their beef cooked rare to medium rare, so the board of health

gives this range.)

Cooking Food in Bulk
Now, just cooking a food doesn't protect it from growing more bacteria. One example: a restaurant made a big batch of its white clam chowder, and then loaded its walk-in refrigerator with large containers of the chowder, fresh and hot from the 20 gallon steam kettle. They didn't stir any of the containers, or place them in smaller batches in ice baths. A full day later, you could feel the containers, and they were still warm. That's when the health inspector walked in. To make a long story short, he justifiably freaked out. Each separate container was its own health code violation (serious ones). The entire 20 gallons had to be thrown away, because they obviously had spent way more than 2 hours in the Danger Zone. Luckily, no customer had been served that bad soup. When you cook in bulk, remember that you want to cool your food as quickly as possible by dividing food into smaller portions, stirring, use of icebaths around the metal containers, and frequent temping to see how long it's lingering in the Danger Zone. By rapidly cooling your sauces and soups before putting them in the freezer, you're saving money and avoiding potential problems caused by making your freezer work too hard. And you're avoiding potential health risks when you eat that food later on – remember, the bacteria that grows in the Danger Zone will not die in the freezer.

Summary
Whew! That was a lot of information, but you should see the stack of books I boiled it down from! If you ever have a question about your food's safety, don't hesitate to jump on the internet, or stop by your local board of health. Many times, health inspectors are portrayed as these fidgety mean little guys who want to shut all restaurants down, and that's just not true. They are here to educate and protect, and are wonderful resources of information on how you can guard your family's good health. They have many brochures, pamphlets and sometimes even videos you can watch, not only so you won't eat something bad, but so you won't worry every time you eat something good. And that's the true basis of gourmet cooking – starting with ingredients you know will be good.

Author

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homogenizers, pasteurizers, heat exchangers, refrigeration equipment, fillers, stainless steel tanks and other related equipment for the food processing industry.