

Cooking Meat Safely

USE A MEAT THERMOMETER

One of the critical factors in controlling bacteria in food is controlling temperature. Pathogenic microorganisms grow very slowly at low temperatures multiply rapidly in mid-range temperatures, and are killed at high temperatures. For safety, food must be cooked thoroughly. It is essential to use a thermometer when cooking meat to take the guesswork out of cooking and to assure that a safe temperature has been reached to destroy harmful bacteria such as *Salmonella* and *E.coli* O157:H7.

Using a thermometer is the only reliable way to ensure safety and to determine the “doneness” of most foods. To be safe, a product must be cooked to an internal temperature high enough to destroy any harmful bacteria that may have been in the food. Recent research has shown that color and texture changes are not reliable indicators to ensure that all bacteria have been destroyed.

For example, ground beef may turn brown before it has reached a temperature at which bacteria are destroyed. A consumer preparing hamburger patties and depending on visual signs to determine safety by using the brown color as an indicator is taking a chance that pathogenic microorganisms may survive. A hamburger cooked to 160 °F, regardless of color, is safe.

The temperature at which different pathogenic bacteria are destroyed varies, as does the “done-ness” temperature for different meat and poultry products. A roast or steak that has never been pierced in any way during slaughter, processing or preparation and has reached an internal temperature of 145 °F is safe to eat. A consumer looking for a visual sign of doneness might continue cooking it

until it was overcooked and dry. A consumer using a thermometer can feel reassured the food has reached a safe temperature.

Likewise, poultry should reach at least 160 °F throughout for safety. At this temperature the meat has not reached a traditional “done” texture and color, and many consumers prefer to cook it longer to higher temperatures. (The red color of poultry does not change to the expected cooked color of white until temperatures are well above 160 °F.)

A thermometer should also be used to ensure that cooked foods are held at a safe temperature (below 40 °F or above 140 °F) until served.

A Meat Thermometer Can Help:

- Prevent foodborne illness;
- Cook foods to a safe temperature;
- Prevent overcooking; and
- Hold hot, cooked foods safely.

Use a meat thermometer EVERY time you cook raw foods; reheat leftovers; and hold hot, cooked foods for serving.

WHICH TYPE MEAT THERMOMETER SHOULD YOU BUY?

There are several types of meat thermometers available at grocery, hardware or kitchen supply stores. The type of thermometer determines when it should be inserted in the meat.

Make sure the thermometer you buy is designed for meat and poultry, not for candy or appliances.

Regular, Ovenproof Types: These go into the food at the beginning of the cooking time and can be read easily.

Instant-Read and Digital Types: These are not intended to go in the food in the oven, but give you a quick reading when inserted into the cooked food, and can be read easily.

Pop-Up Types: These are commonly found in poultry, but may be purchased for other types of meats.

Microwave-Safe Types: These are especially designed only for microwave ovens.

WHEN TO INSERT A MEAT THERMOMETER

When should the thermometer be inserted — at the beginning of the cooking time or the end? When you insert the thermometer will be determined by the type, ovenproof or instant-read. The important thing is to use a meat thermometer, no matter how the food is prepared — roasted, broiled, fried.

- An ovenproof thermometer may be inserted into the food at the beginning of the cooking time and remain there throughout cooking. The temperature indicator will rise slowly as the food cooks.
- Instant-read thermometers are not designed to stay in the food during cooking. If you are using an instant-read thermometer, pull the meat or poultry out of the oven far enough to insert the stem about 2 inches into the thickest part of the food but not touching bone. The temperatures should register in about 15 seconds.

HOW TO USE A MEAT THERMOMETER

Before using a food thermometer, read the manufacturer's instructions. The instructions should tell how far the thermometer must be inserted in a food to give an accurate reading. Most thermometers also come with instructions on how to recalibrate the thermometer. (See below for more information about calibrating a thermometer.)

If instructions are not available, check the stem of the thermometer for an indentation, or “dimple” that shows how deep it must penetrate the meat to get an accurate reading. Most digital thermometers will read the temperature in a small area of the tip. Dial types must penetrate 2 to 3 inches into the food. Most thermometers available will give an accurate

reading within 2 to 4 °F. The reading will only be helpful, however, if the thermometer is placed in the proper location in the product. If inserted incorrectly, or if the thermometer is placed in the wrong area, the reading will not accurately reflect the internal temperature of the product.

In general, the thermometer should be placed in the thickest part of the food away from bone, fat or gristle. For whole poultry, insert in the inner thigh. When the food being cooked is irregularly shaped, such as may be the case with a beef roast, check the temperature in several places.

Remember: After each use, wash the stem of the meat thermometer thoroughly in hot, soapy water.

Tips for Thermometer Use:

- Use an “instant-read” thermometer to check patty temperatures. They are designed to be used toward the end of cooking time and register a temperature in about 15 seconds.
- If a meat patty is not thick enough to check from the top, insert the thermometer in sideways.
- The thermometer should penetrate the thickest part of the food.
- To check the calibration, place the stem in a cup of boiling water. If correct, it will read 212 °F. Most thermometers have a calibration nut under the dial that can be adjusted.
- Wash the thermometer after each use.

RECOMMENDED INTERNAL TEMPERATURES FOR MEAT

Most pathogenic bacteria are destroyed between 140 °F and 160 °F. However, for best quality, meat and poultry require various temperatures for “doneness.”

Ground meats must be cooked thoroughly to kill harmful bacteria. Unlike whole muscle meat, which is sterile inside, the grinding process exposes the interior meat to bacteria on the surface, in the air, on equipment or on people's hands. To kill these bacteria, food safety experts have one major rule of thumb, which is to cook ground meat to at least 160 °F. This simple step offers the best protection that consumers can have to serve ground products safely.

Minimum Internal Temperatures (that foods must reach to be considered safe and done, no matter how you prepare them)		
Beef, Pork, Lamb, Veal:		
Fresh ground beef, veal, lamb and pork		160 °F
Beef, veal, lamb (roasts, steak, chops)	Medium rare:	145 °F
	Medium:	160 °F
	Well done:	170 °F
Fresh pork (roasts, steaks, chops)	Medium:	160 °F
	Well done:	170 °F
Ham, cook-before-eating		160 °F
Ham, fully-cooked, reheat		140 °F
Poultry, Stuffing, Eggs and Leftovers:		
Ground chicken or turkey		165 °F
Whole chicken or turkey		180 °F
Breast, roasts		170 °F
Stuffing, alone or in bird		165 °F
Egg dishes, casseroles		160 °F
Leftovers, to reheat		165 °F

MICROWAVE COOKING

- Debone large pieces of meat. Bone can shield the meat around it from thorough cooking.
- Cook large pieces of meat on medium power (50%) for longer times. This allows heat to conduct deeper into meat without overcooking outer areas.
- Stir or rotate food once or twice during microwaving, and turn large food items upside down so foods cook more evenly and safely.
- Do not microwave whole, stuffed poultry. Cooking of meats is so rapid, the stuffing inside might not reach a sufficient temperature to be safe.
- When microwaving unequal size pieces of meats, arrange in a dish or on a rack so thick parts are toward the outside of the dish and

thin parts are in the center. Cook on medium-high or medium power.

- Place a roast in an oven-cooking bag or in a covered pot for safe, even cooking.
- Refer to the manufacturer's directions that accompany the microwave oven for suggested cooking times.
- Remove from microwave and test for doneness in several places with a meat thermometer, or use a microwave-safe meat thermometer during cooking.
- Observe standing times given so cooking is completed.
- Never partially cook food. When microwaving food to finish cooking on the grill or conventional oven, transfer the microwaved food to another heat source immediately.

OTHER SAFETY TIPS FOR PREPARING MEATS

Cleanliness:

- Always wash hands thoroughly with soapy water before preparing foods and after handling raw meat.
- Don't let raw meat juices touch ready-to-go foods either in the refrigerator or during preparation.
- Don't put cooked foods on the same plate that held raw meat.
- Always wash utensils that have touched raw meat with hot, soapy water before using them for cooked meats.
- Wash counters, cutting boards and other surfaces raw meats have touched. These surfaces may be sanitized by cleaning with a solution of 1 teaspoon chlorine bleach per quart of water.

Thawing: Thaw uncooked meat in the refrigerator or in cold water. NEVER thaw meat at room temperature.

Marinating: Marinate food in the refrigerator, not on the counter. Discard the marinade after use because it contains raw juices, which may harbor bacteria. If you want to use the marinade as a dip or sauce, reserve a portion before adding raw food.

Partial Cooking or Browning: Never brown or partially cook meat, then refrigerate and finish cooking later, because any bacteria present would not have been destroyed. It is safe to partially precook or microwave meat IMMEDIATELY before transferring it to a hot grill or oven to finish cooking.

Serving: Hold hot foods above 140 °F and cold foods below 40 °F. Never leave foods, raw or cooked, at room temperature longer than two hours. On a hot day with temperatures at 90 °F or warmer, this decreases to one hour.

Leftovers: Always use clean utensils and storage containers for safe storage. Divide large amounts of leftovers into small, shallow containers for quick cooling in the refrigerator. Avoid placing large pots of gravy in the refrigerator to cool since it will likely take until the next day for this amount of food to cool. To store in the refrigerator, wrap cooked meat in plastic wrap or aluminum foil, or store it in a tightly covered container and use within two to three days. For frozen storage, wrap meat in aluminum foil or freezer paper and use within two

to three months. If you may have kept the food refrigerated for too long, throw it out. Never taste food that looks or smells strange to see if you can still use it.

Reheating Foods: Reheat thoroughly to a temperature of 165 °F or until hot and steaming. Soups and gravies should be brought to a rolling boil.

Sources:

1. Cooperative Extension Service, Texas A&M University (1997). *Ground Meat's Color No Longer Indicates Safety*. Prepared by Melanie Maxcey.
2. USDA: (June 1997). *Use a Meat Thermometer* [WWW document]. URL <http://www.fsis.usda.gov/OA/pubs/cithermo.htm>
3. USDA/FSIS (June 1997). "Microwave Food Safety" [WWW document]. URL <http://www.fsis.usda.gov/OA/pubs/cimwave.htm>
4. USDA/FSIS (October 1997). *Kitchen Thermometers* [WWW document]. URL <http://www.fsis.usda.gov/OA/pubs/thermom.pdf>

This information has been reviewed and adapted for use in South Carolina by P.H. Schmutz, HGIC Information Specialist, and E.H. Hoyle, Extension Food Safety Specialist, Clemson University.

This information is supplied with the understanding that no discrimination is intended and no endorsement by the Clemson University Cooperative Extension Service is implied. All recommendations are for South Carolina conditions and may not apply to other areas. (New 5/99).