



Thawing ~~and~~ Cooking

FROZEN MEATS

ALICE M. CHILD, DIVISION OF HOME ECONOMICS

FREEZING and storing meat in storage lockers and in the household refrigerator have become popular during the last few years. As a result, there is much interest in how to thaw and how to cook frozen meat. The food research laboratory of the Home Economics Division, University of Minnesota, carried on many experiments to find out whether it is better to thaw meat slowly or quickly, how long to cook the frozen meat, and whether the freezing affects its flavor.¹ The results are given in this bulletin.

How the Meat Was Frozen

The cuts were wrapped in moisture-proof paper and placed in a freezing cabinet having a constant temperature of 0° F. The meat was in storage 48 hours, and each piece of meat was wrapped to prevent freezer-burn or excessive drying. The wrapped pieces were separated as much as possible so that the meat would freeze quickly.

Effect of Freezing on Flavor

To see whether freezing affected the flavor of meat, two comparable cuts, right and left of the same animal, were used. One cut was frozen, thawed, and then cooked; the other was cooked to the same interior temperature as the first, without being frozen. Beef rib roasts, pork loin roasts, rump roasts, sirloin steaks, and lamb chops were compared. There was no apparent difference in flavor between the cooked meat which had been frozen 48 hours and that which had not been frozen. All meat was cooked and judged on the day it was thawed.

Effect of Thawing on Flavor

Four cuts from the same animal, as nearly comparable as possible, were frozen for 48 hours. The cuts were thawed at three different

¹ WPA workers and Federal Aid students assisted in the laboratory during this experimentation. Miss Pauline Paul of the Division of Home Economics did most of the experimental work.

temperatures: at refrigerator temperature, 36° to 38° F.; at room temperature, 70° F., and in the oven at 300° F. There was practically no difference in the flavor of the roasts thawed at these different temperatures, or in the flavor of the thawed meat and the unfrozen meat.

The studies showed that whatever method of thawing is most convenient may be used. If there is not time to thaw the meat, put it in the pan frozen, being sure to allow extra time for cooking. If time and space are available, the meat may be put on a rack with a pan under it and allowed to thaw at room temperature. If there is space in the refrigerator and the meat is not needed for a few days, let it thaw in the refrigerator.

CARE OF FROZEN AND THAWED MEAT

Care must be taken in keeping meat, as it spoils easily. Experiments² have shown that if fresh meat is to be kept more than 24 hours, the temperature should never be above 50° F. A temperature of 45° F. or below is preferable. Remember that thawed meat, like fresh meat, must be kept cold to prevent spoilage. It spoils more easily after it has been frozen because the fibers have been broken down and the moist surface is likely to mold. *Frozen meat should be used as soon as possible after thawing.*

Frozen meat that comes from cold-storage lockers should be kept in a cold place and used as promptly as possible. The temperature should be below 50° F. How much to take from the lockers at one time must depend upon the home storage facilities.

COOKING FROZEN MEAT

Thawed frozen meat should be cooked the same as meat that has not been frozen. If unthawed frozen meat is placed in a pan to cook, time must be allowed for it to thaw and then to cook. Otherwise, a roast or chop which looks attractive and ready for the table will be found raw and cold in the center. The experimental work described below shows how important this is and what a difference there is in the time needed for cooking frozen meat and thawed or unfrozen meat.

Two comparable four-pound rolled beef rib cuts were roasted. The right cut was frozen and thawed at room temperature, requiring two hours for each pound for thawing and 35 minutes a pound for cooking. The corresponding left cut from the same animal was frozen, placed in the pan without thawing, and cooked to the same interior temperature (140° F.). It required 55 minutes a pound for cooking, or 20 minutes more a pound than the thawed meat.

Methods of cooking some cuts of meat, with approximate time for thawing and for cooking thawed and frozen cuts, are as follows:

² Yearbook of U. S. D. A., pp. 369-370 (1931).

Roast Beef (Two-rib roast) about 4 lbs.

Thawing time: At refrigerator temperature—1½ to 2 days

At room temperature—2 hours per pound

Wipe meat with damp cloth. Place roast, fat side up, in a shallow, uncovered pan with no water. Use rack unless there are bones which hold it up from pan. Rub with salt.

Method I. Constant Temperature.—Place roast in a very moderate oven (300° F. to 350° F.) and cook according to time table for roasting beef, or to the mark on thermometer for rare, medium, or well-done beef.

Method II. Searing.—Place roast in a hot oven (450° to 500° F.) and sear until the desired color is attained (20 to 25 minutes). Lower the heat to a very moderate temperature (300° to 350° F.), and cook according to the time table. The roast may be seared in a skillet on top of the stove, then placed in a very moderate oven.

More time per pound is needed for small roasts than for large ones. Roasts without bones take more cooking per pound than those with the bone in. Rolled beef roasts take from 10 to 15 minutes longer than standing roasts. Frozen roasts take from 20 to 30 minutes longer per pound than unfrozen roasts.

Time Table for Roasting Beef

Oven Temperature: 300° to 350° F.

	Minutes per pound (approx.)			
	Standing		Rolled	
	Unfrozen	Frozen	Unfrozen	Frozen
Rare	18	43	28	53
Medium	22	47	32	57
Well done	30	55	40	65

Braised Rump—3 pounds

Thawing time: Room temperature—2 to 2½ hours per pound

Chuck, rump, round or neck may be braised. Heat a heavy kettle, rub with a piece of fat. Sear meat on all sides. Season. Slip a rack under meat, add ½ cup water, cover, and cook very slowly. Do not let liquid bubble.

Cooking time: 30 minutes per pound for thawed roast
50 minutes per pound for frozen roast.

Broiled Porterhouse Steak (1½ inches thick)

Thawing time: At room temperature—2 hours per pound

Rub broiler with fat. Preheat compartment, with broiler pan in place, about 5 minutes. Set the oven at 500° F. Place meat on broiler about 3 inches from source of heat. Leave oven door open. After steak is nicely browned on one side, season and turn. Only one turning is necessary. Reduce heat to 350° F. and cook rare, medium, or well done according to time table.

Time Table for Broiling Steak Rare to Medium

	Minutes per pound (approx.)	
	Unfrozen	Frozen
1 inch thick	8 to 10	21 to 33
1½ inches thick	10 to 15	23 to 38
2 inches thick	20 to 30	33 to 43

Chuck or Round Steak—Pan-broiled

Rub heavy frying pan with a piece of fat. Brown the steak on both sides, reduce heat and cook medium, rare, or well done. Serve hot.

Cooking time: For thawed steak, ½ inch thick—approximately 7 minutes, well done

For frozen steak, ½ inch thick—approximately 11 minutes, well done

Ground Beef

Heel of the round, brisket, rump, neck, chuck, and any trimmings may be ground or chopped. A medium grind is best. The ground beef may be made into pound packages or into patties and frozen in the refrigerator or in the locker of the cold-storage plant.

Thawing time: One-pound package, 1¼"x6"x4", at room temperature—4 hours
One-inch patties—2 hours

Pan-broiled Beef Patties (1 inch thick)

Sear patties on both sides in heavy frying pan, reduce heat, and cook medium, rare, or well done.

Cooking time: Thawed patty—8 minutes for well done

Frozen patty—16 minutes

Trimmings of lamb may also be made into patties. Combination meat patties are good: half beef and half pork, or half beef and half veal, or ⅔ beef and ⅓ salt pork. If patties contain pork, they should be cooked well done.

Shoulder Lamb Chops (Braised) ½ inch thick

Brown chops in a little fat, add ¼ cup water, cover, and cook very slowly.

Cooking time: For thawed chop—15 minutes

For frozen chop—20 minutes

Lamb Chops—Pan-broiled

Sear chops on both sides, turning thick chops on edge to brown fat. Reduce heat, and cook until done. Do not add water or cover.

Cooking time: Single chop, ¾ inch thick, thawed—10 minutes

Single chop, ¾ inch thick, frozen—15 minutes

Double chops, thawed—20 minutes

Double chops, frozen—25 minutes

Cooking Frozen Pork

All pork *must* be cooked well done to be sure that the parasite trichina is destroyed. Extra care must be taken when cooking frozen pork as the temperature for well-done pork may not be reached in the center of the cut if cooked too short a time. An interior temperature of 137° F. is sufficient to destroy trichinae. Pork is well done if the meat thermometer reaches 185° F.

Braised Pork Chops ($\frac{3}{4}$ inch thick)

Thawing time: One day (24 hours) at refrigerator temperature

Wipe chops, trim, season. Dip in egg, then in seasoned bread or cracker crumbs. Brown in hot fat in heavy frying pan. Add 2 to 4 tablespoons of water, cover tightly, and simmer.

Cooking time: 45 minutes for thawed chops
55 minutes for frozen chops

The time for thawing chops is for thawing chops separately, not for block of chops frozen together.

Roast Pork Loin

Thawing time: At refrigerator temperature, 13 to 14 hours per pound
At room temperature, 2 to $2\frac{1}{2}$ hours per pound

Wipe roast with a damp cloth, place in an uncovered pan, without water, and rub with salt ($\frac{1}{2}$ teaspoon for each pound of meat).

Method I. Place the roast in a moderate oven (300° to 350° F.) and cook.

Method II. Sear the roast on top of the stove or in a very hot oven (475° F.) until the meat is uniformly brown (15 to 20 minutes), then reduce the temperature to that of a moderate oven (300° to 350° F.) and cook.

Time for Roasting Pork

	Minutes per pound (approx.)	
	Unfrozen	Frozen
Center cut	30 to 35	50 to 55
Rib or shoulder ends.....	50 to 55	70 to 75

Pork Sausage

Sausage may be frozen in packages of approximately one pound each, in links, or made up into patties $\frac{1}{2}$ to $\frac{3}{4}$ inch thick.

Thawing time: At refrigerator temperature—1-pound package, 4 to 5 hours
At room temperature—1-pound package, $2\frac{1}{2}$ to 3 hours
 $\frac{1}{2}$ -inch patty, $2\frac{1}{2}$ to 3 hours
 $\frac{3}{4}$ -inch link, $2\frac{1}{2}$ to 3 hours

Fried Sausage Patties

Make patties about $\frac{1}{2}$ inch thick, place in a warm pan, and fry slowly. Turn once or twice during frying. The grease may be poured off as it collects. Cook until well done.

Cooking time: Thawed $\frac{1}{2}$ -inch patty, 10 minutes
Frozen $\frac{1}{2}$ -inch patty, 15 minutes
Thawed 1-inch patty, 15 minutes
Frozen 1-inch patty, 23 minutes

Thawing time: At room temperature, 2 hours
At refrigerator temperature, 4 to 5 hours

A technical bulletin for scientific workers giving methods and results in detail is being prepared. For a discussion of locker-freezer storage, see Special Bulletin 187 by Morris, Warrington, and Eggert, Minnesota Agricultural Extension Division, University Farm, St. Paul, Minnesota.