

AG-FO-0823—1984

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MN 2500 AGFO-823

Selecting and Storing Ground Beef

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The names ground beef and hamburger are commonly used interchangeably; however, there is a difference. By Minnesota Department of Agriculture regulations, ground beef is prepared by the retailer without the addition of beef fat, whereas hamburger can be prepared by the retailer with the addition of fat. Neither ground beef nor hamburger can exceed 30 percent fat in the final product sold, and neither can contain binders, extenders, or added water. Thus, ground beef and hamburger differ only in method of preparation.

Ground beef can be purchased in three forms—regular, lean, and extra lean. The distinction is again in the amount of fat contained in the final product. Regular ground beef cannot exceed 30 percent fat, lean cannot exceed 22 percent fat, and extra lean ground beef cannot exceed 15 percent fat (see table 1).

Table 1. Summary of comparisons among hamburger, ground beef, lean ground beef, and extra lean ground beef.

	Maximum fat%	Fat can be added?	Water can be added?	Binders, extenders, hearts, beef cheeks, tongue, tongue meat, or other by-products can be added?
Hamburger	30	yes	no	no
Ground beef	30	no	no	no
Lean ground beef	22	no	no	no
Extra lean ground beef	15	no	no	no

Fat in ground beef contributes to flavor as well as to juiciness. Whereas lean and extra lean ground beef contain fewer calories than ground beef, they also have a slightly different taste. The choice depends on the consumer's personal preference, but the use of the meat should also be considered.

If you are making a meat loaf or casserole where the cooked fat remains in the dish, it is best to use lean or extra lean ground beef. However, if you are grilling the product or cooking it in a way that the fat can be drained off, the less expensive regular ground beef or hamburger might be preferred.

Ground beef is a good source of high quality protein. The nutritional value of the meat changes, however, as the fat content changes. When fat content increases, the amount of protein decreases. Uncooked hamburger and regular ground beef are approximately 17 percent protein, lean ground beef is approximately 19 percent protein, and extra lean ground beef is approximately 21 percent protein.

Another factor to consider in selecting ground beef is color. Ground beef should have a bright cherry red color when purchased to indicate maximum freshness. The color on the inside of the ground beef may be purplish-red when first broken open, turning bright red after exposure to the air. This is a normal occurrence when beef is first exposed to air. Do not purchase ground beef that is a brown or green color because this indicates lack of freshness.

If the ground beef purchased is to be used within two days, it can be left in the original wrap and stored in the refrigerator until used. A prevalent practice is to loosen the wrap from the ground beef in the belief that this will dry out the surface of the meat and slow down or reduce the growth of bacteria. There is no difference in the color of wrapped vs. unwrapped lean ground beef after two days of storage, so there is no reason to unwrap ground beef before storing it for two days. In fact, this practice may allow undesirable odors from the air (onions, fish, etc.) to be absorbed by the fat in the ground beef. Figure 2 shows that loosely wrapped lean ground beef may appear more desirable than wrapped lean ground beef at five days of storage; however, as discussed below, both should have been frozen before two days.

Ground beef is an excellent growth media for bacteria. Reasons include the handling and equipment used in the grinding process, the high moisture content, favorable acidity, and the presence of other growth factors such as minerals. Consequently, proper care must be taken to reduce the growth of these microorganisms and keep ground beef from discoloring. Even though most bacteria are destroyed by cooking, high levels of bacteria result in discoloration and eventually slime and an off odor.

For best refrigerator keeping quality, ground beef (as well as other meat) should be stored at 30°-32°F, since bacteria grow more rapidly at 40°F than at lower temperatures. Most refrigerators have adjustable temperature controls. In addition, refrigerators have "warm and cold spots." Place several plastic cups of water at various locations, and gradually lower the temperature over a period of several days. The location at which ice crystals first begin to form is where ground beef and other meat should be stored. Meat freezes at 28.6°F, not 32°F.

Figure 1 shows the difference in the color of ground beef stored for one to three days at 30° and 40°F. The ground beef stored at 30°F had little discoloration at one day, some discoloration at two days, and considerable discoloration at three days. The ground beef stored at 40°F had some discoloration at one day, considerable discoloration at two days, and slime formation and an off odor at three days.

Approximate recommended maximum storage times are two days at 30°F, but only one day at 40°F. If stored longer, discoloration will increase and freshness will decrease (due to bacterial growth). In addition to refrigerator temperature, bacterial level also determines how long ground beef can be stored before discoloration occurs. The ground beef you buy may have higher or lower levels of bacteria than that shown in figure 2 and thus may be stored for shorter or longer times, respectively, before discoloration occurs.

If you will not be using the ground beef within two days of purchase, it should be stored in the freezer. Freezing essentially stops the growth of bacteria. The original wrap should be removed and the ground beef tightly rewrapped in an oxygen impermeable wrap such

as freezer wrap or heavy plastic bags that can be "locked." Once placed in frozen storage, the primary goal of freezing ground beef is to prevent oxygen from coming in contact with the fat and thus causing rancidity. Rewrap torn packages.

Maximum storage time for frozen ground beef is 3 months in a 10°F freezer, 6 months in a 0°F freezer, 8 months in a -11°F freezer, and 10 months in a -22°F freezer. If stored longer than those periods at those temperatures, ground beef will likely become rancid. Rancid ground beef is not harmful; however, it takes a considerable amount of seasoning to cover it up!

If you make patties or meatballs from fresh ground beef to freeze for later use, be sure that you do not add any salt to the ground beef. The salt prevents ground beef from freezing quickly and thoroughly. Salt also speeds the development of rancidity.

The ideal place to freeze ground beef is in a deep freeze. Freezer compartments of many refrigerators are not cold enough to allow three months of good quality storage. Self-defrosting freezers are especially hard on ground beef because the temperature fluctuates during defrost. Ice cube or freezer compartments of one door refrigerators do not get cold enough to freeze meat thoroughly and rapidly and should not be used for meat storage.

When using frozen ground beef, proper thawing techniques should be followed to maintain maximum quality and minimum bacterial growth.

Leave the wrap on the package when thawing ground beef to keep in moisture and prevent further bacterial contamination. If time allows, the best way to thaw ground beef is in the refrigerator.

A recent study (Marriott and others, *Journal of Food Protection*, 43:180) demonstrated that ground beef thawed in the refrigerator beyond 48 hours was less desirable in appearance traits, and that ground beef thawed beyond 24 hours was less desirable in cooked taste attributes. This suggests that thaw time at refrigerated temperature should not exceed 24 hours. Ground beef thawed at room temperature beyond 8 hours resulted in degradation of appearance and cooked taste as well as an increase in bacteria growth. The most abundant groups of bacteria present were *Pseudomonas*, streptococci, staphylococci (non-pathogenic), micrococci, and *Flavobacterium*.

Thus, ground beef should be thawed at room temperature no longer than 8 hours, and at refrigerated temperature if thaw time exceeds 8 hours. The proper thaw time and temperature to maintain acceptable appearance and taste of ground beef is 24 hours or less at refrigerated temperature.

If you have thawed ground beef and decide not to use it, wrap it for the freezer and freeze immediately. Refreezing meat results in extra drip loss upon subsequent thawing, but that is certainly preferable to allowing meat to spoil in the refrigerator.

Figure 1. Ground beef stored at 30° vs. 40°F for 1, 2, and 3 days.

30°F

40°F

0 Days



1 Day



2 Days



3 Days



Figure 2. Comparison of lean ground beef as purchased (wrapped) vs. loosely wrapped and stored at 35°F for 0 and 5 days.

35°F

0 Days



5 Days



Summary

1. Hamburger, ground beef, lean ground beef, and extra lean ground beef vary only in fat content.
2. Refrigerator temperatures for storage of ground beef should be 30°-32°F.
3. Ground beef stored in the refrigerator should be left in the original wrap.
4. Unfrozen ground beef should be used within two days of purchase or frozen.
5. Ground beef to be frozen should be rewrapped with oxygen impermeable freezer wrap. The freezer should be set at 0°F or lower.
6. Frozen ground beef should be thawed in the refrigerator.
7. Thawed ground beef should be used within 24 hours or refrozen.

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