

Aging Beef

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The aging of beef is normally thought of as the time, in days, from slaughter until the carcass is broken down into retail cuts. The average industry time for aging beef before cutting the carcass into retail cuts is about seven days. Consumers can use the following guidelines in determining the length of time their beef should be aged.

WHAT AGING DOES

Cooked, unaged beef has been described as “metallic” and lacking in typical beef flavor. Aging gives beef a flavor that has been described as “gamy.” True beef flavor is fully developed after about 11 days of aging. The aged beef flavor increases with increasing aging time.

Aging also increases tenderness. It has been shown that during the aging process certain changes take place in portions of the structure of collagen and muscle fibers. Currently, it is thought that enzymatic-caused changes in the structure of muscle fibers are largely responsible for the increase in tenderness. It is known that tenderness decreases immediately after slaughter while rigor mortis takes place (taking 6 to 12 hours to complete); then tenderness increases gradually. Tenderness continues to increase up to 11 days, after which there is no increase in tenderness.

One study showed that maximum tenderness and progress of tenderization during aging varies among muscles and is associated with the color of the carcass lean. (See Animal Science folder AG-F0-0688 for a discussion of “Dark-Cutting Beef.”) In general, aging dark-cutting beef beyond seven days did little to increase tenderness. However, in carcasses where lean was lighter in color, tenderness continued to improve during up to 16 days of aging.

The tenderness effects of aging are more evident in carcasses from older animals than in the usually more tender lean from younger animals’ carcasses.

Aging also decreases the shelf life of fresh meat products. Ground beef made from trimmings from aged beef carcasses usually has a shorter shelf life in the retail case and in your refrigerator, primarily because of increased microbial growth that occurs on certain parts of the carcass during the aging process.

Some research has demonstrated that as fresh meat ages, the activity of the various enzymes decreases and protective action against oxidation declines, thus increasing susceptibility to oxidation. This suggests that oxidation of fresh raw meat becomes increasingly important the more meat is aged.

During the aging process, one can also expect a loss of weight of the product. Because the lean (exclusive of trimmable fat and bone) is approximately 70 percent water, it’s easy to see why there is a weight loss. The weight loss is caused by dehydration of the lean and fat. The weight loss occasionally occurs at tremendous proportions depending on relative humidity, amount of air flow and temperature of the aging cooler. During chilling of the hot carcass immediately after slaughter, the carcass will lose 2 to 3 percent of its weight because of moisture loss. Aging the carcass beyond this time will result in additional tissue shrinkage of 1 to 1.5 percent for each seven days. Carcasses with a thin external fat cover will lose more moisture than carcasses with a heavy fat cover. One study observed an 18 percent trim and shrink loss from loins aged 14 days in a 36°F cooler.

CONSUMER PREFERENCE

Most of the beef offered for sale as retail cuts at supermarkets is aged from 5 to 7 days, which would be called moderately aged beef. Beef for certain restaurants is aged from 14 to 21 days, primarily to obtain the strong aged beef flavor.

The consumer preference for aged beef varies, as indicated in the following example. Two families went together and each purchased a side of beef from the same beef carcass. The carcass had been aged for 14 days. One family thought their beef had a wonderful flavor. The other family found the flavor of this aged beef to be objectionable.

The length of time to age beef is strictly a personal preference. Some people prefer aged beef, while other people find the aged beef flavor objectionable.

HOW TO AGE BEEF

If you are personally aging a beef carcass, remember some important considerations about aging. The beef carcass or side should be aged in sanitary surroundings. Also, the aging area should be free of products such as kerosene, gasoline, paint, onions, and fish, since the carcass will absorb these undesirable odors. Because meat is a perishable product, it can spoil at temperatures of 40° to 60° F. Therefore, maintain the temperature at 30° to 35° F while the beef carcass is being aged. Sawdust should not be used on floors because it will contribute to air contamination. Carcasses and wholesale cuts should be properly spaced to allow complete circulation of air around the product. Freezing the carcass temporarily stops the aging process and should be avoided.

Recently interest has increased in short-time (12 hours) aging at 60° to 66° F to speed up the aging process. The carcass is then placed in a 32° to 34° F cooler to chill and complete the aging process. This procedure benefits cow beef more than steer or heifer beef, because cow beef is usually less tender. Apparently, carcasses with a thin fat covering would benefit more than fatter carcasses. However, the effect of this short-time, high-temperature aging on bacterial growth on and in the carcass is not understood fully.

Also remember that fat protects the meat from dehydration. Therefore, if you are aging a beef carcass with very little fat, you can expect a higher weight loss during the aging process than would occur normally with a fatter carcass. Maintaining the aging cooler at 85 percent relative humidity will keep weight losses down during prolonged aging. Carcasses with little external fat are more likely to pickup undesirable cooler odors and should thus be aged no more than five days.

Because of the drying process that takes place during aging, molds often grow on the carcass. If this occurs, merely trim off the mold (and accompanying fat or lean) at the time of processing and discard it. Do not use this trimmed-off portion in ground beef.

Some believe that it is possible to age beef in the refrigerator in the unfrozen, retail cut form. Research concerning the effectiveness of this practice is lacking. However, if you try aging beef in the refrigerator, eat it before an off-odor or off-color develops. For more information on beef color, obtain Animal Science Fact Sheet AG-FS-0967 "Fresh Meat Color

Changes" and Extension Folder AG-F0-0593, "Storing Meat in Your Refrigerator" from your local county extension office.

DRY VS. 'IN THE BAG'

The previous discussion has centered on aging carcasses and wholesale cuts (e.g., ribs and loins) in a cooler of some type. This process is referred to as "dry" aging. If you have an animal slaughtered at a plant or buy a side of beef, aging would likely take place in this manner.

Currently, about 90 percent of the beef shipped from the point of slaughter is shipped as boxed beef. Boxed beef is wholesale cuts packaged into vacuum packages (bags) and placed into a box for shipping. The retailer stores boxed beef under refrigeration until meat is needed for display and sale. The bag is opened and the meat cut into retail cuts. During the period meat is in the bag, it does actually age and is referred to as "aging in the bag."

There is considerable debate in the industry as to which process results in the most desirable flavor. Most people agree that dry aging results in a unique flavor. However, persons not familiar with dry aged beef often describe it as slightly "musty" in flavor when eaten for the first time. One study (*J. Food Sci.*, 50:1544) observed that dry aging resulted in a more intense beef flavor compared with aging "in the bag." However, overall eating satisfaction was higher in cooked steaks aged "in the bag" because of fewer off-odors and off-flavors. It is known that the predominant microorganisms present after dry aging are the pseudomonads whereas the lactobacilli are the most prevalent in beef aged in the bag. It is also well-known that less shrinkage occurs with beef aged in the bag as compared with dry aging.

SUMMARY

Aging of beef is practiced to varying degrees in the meat industry. Your personal preference for the aged beef flavor strongly dictates how long you would age beef or how long you would recommend a processor to age a side of beef that you are purchasing. Keep in mind that as the length of aging time increases, so does the aged beef flavor, the tenderness, and the weight loss. The processor must use valuable cooler space to age your beef, so you must expect to pay a higher price per pound because of the additional expense involved.

For most consumers, aging beef 7 to 10 days will result in acceptable tenderness, desirable flavor and modest weight loss of the carcass. Carcasses with little or no fat cover should not be aged beyond 3 to 5 days.

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