Aging Beef at Home

By Jack Thomas, Professor, Animal & Range Sciences Dept.

Drought conditions, food and fuel costs are all contributing to the decreasing size of our national cattle herd. The number of cattle is likely to continue to decrease for the next few years. This, of course, means a smaller supply of beef, and most likely, a smaller and more expensive supply of Choice beef. Much of the beef we consume is ground, so quality grade is not that important. However, for those of us who still enjoy steak once or twice a week, our enjoyment may suffer a bit in the near future as Choice beef becomes too expensive to eat often and steaks from Select or lower quality grades are consumed more often.

There are three important characteristics to consider when evaluating eating quality of beef: juiciness, flavor and tenderness. Juiciness is usually only a factor if the meat, steak or roast, is too dry. The easiest way to prevent this is to not overcook the meat. Or, in the case of some roasts or other cuts, add liquid. But when it comes to ribeye or loin steaks, cooking to a lower internal temperature of 145 to 155 degrees (rare to medium) will greatly preserve the natural juices. Beef flavor is usually not an issue unless there is some sort of off-flavor. Grass fed beef tends to have a stronger and more pronounced flavor than grain fed beef. However, while we may notice a difference and have a preference for one over the other, both are acceptable. With most beef, and other meats, off-flavors are the result of fat oxidation. Fat oxidation is a chemical process and generally results from fat being exposed to air for prolonged periods. Cooking also increases oxidation of fat. Meat that has been cooked, cooled and then re-heated will have some flavor deterioration. This is called ‘warmed over flavor’ and is the result of fat oxidation. When you buy precooked meat items, there is usually some kind of sauce or gravy added. They are there to mask any possible warmed over flavor. Fortunately, beef fat does not oxidize as quickly as pork or poultry fat. While there are some feedstuffs or plants which may cause off-flavors, this is not going to be a problem in commercial feeding operations. Generally speaking, flavor and juiciness problems start post-mortem during the storage and cooking of beef.

Tenderness is much more variable than juiciness and flavor, and may be affected by genetics, length of feeding, age of animal, post-mortem chilling, storage and cooking. With this many variables, tenderness is the hardest eating characteristic to predict and control. Tenderness is a heritable trait and can be successfully improved through selection. This is not easy to do, because it requires a long process of progeny testing and noticeable improvement may take years. Tenderness definitely decreases with advancing animal age. Harvesting cattle at the youngest feasible age is a great way to decrease tenderness variation. Our current production system does a pretty good job with this. Most of our fat cattle are harvested from 16 to 20 months of age. Very rapid postmortem chilling can also decrease tenderness, but because of food safety concerns, carcasses need to
be quickly chilled. In spite of all the good work that is done to control these tenderness influencing factors, tenderness remains highly variable and plays the most important role in determining our beef eating enjoyment.

Aging beef is one of the best ways to improve and decrease variation in tenderness. In the commercial processing of beef, cattle will be harvested and then processed into major primal cuts and vacuum packaged within 48 hours. Vacuum packaging is a fabulous process for preserving fresh meat. However, to be effective, vacuum packaging must be done in conjunction with refrigeration. Vacuum packaged primal cuts can easily be stored for 30 days with proper refrigeration. The problem is you never know how long the primal has been stored prior to the retailer removing it from the vacuum bag and processing it into retail cuts. This is one of the reasons why you buy steaks one time that are somewhat tough and another time they are tender. The longer time primal cuts spend in the vacuum bag, the tenderer they are likely to be.

Aging beef in a vacuum bag is called wet aging. Aging unwrapped beef is called dry aging. Both have advantages. Both types of aging need to be done on primal, or larger, cuts. Neither works well on individual retail cuts. Dry aging is often done on whole carcasses. In this process, the intact carcass is allowed to hang in the cooler for two to five weeks. There is probably not much advantage to going longer than three weeks, but some people prefer longer aging times. Dry aging of primal cuts simply involves placing a cut on a rack, unwrapped, in a cooler for two to five weeks. The atmosphere in the refrigerator needs to be cold and somewhat dry. The cold, dry air will help prevent any bacterial growth. However, there is likely to be some mold growth. The mold needs to be removed during the processing of the carcass or primal cut. In addition to improving tenderness, many believe dry aged beef has a distinct flavor advantage and attribute this to the mold. Dry aged beef can be more time consuming to process, and more costly, due to having to trim off the mold. The biggest disadvantage, however, is the moisture loss during dry aging. Dry aged beef may lose up to 25% of its weight and can be drier when eaten.

Wet aging is done on primal cuts. It must be done in a vacuum bag and under good refrigeration. The combination of the vacuum and cold temperature limits the ability of almost all bacteria to grow. In fact, the predominant bacteria will be *Lactobacillus acidophilus*. This bacterium is often used in the manufacture of summer sausage and yogurt. And, under vacuum and refrigeration, it grows very slowly. Wet aged beef will not shrink, or shrink very little, while being aged. However, the biggest advantage is that you can do wet aging at home.

To do wet aging at home, you have to purchase vacuum packaged primal cuts, typically strip loins, top sirloins or ribeye rolls. Check to make sure the bag fits tightly around the cut. Home type vacuum packaging machines cannot pull enough vacuum to make it feasible to do the vacuum packaging at home. Place the bag in your refrigerator and check every few days to make sure the bag is still fitting tightly. If the bag becomes puffy, remove from the refrigerator and immediately process. From my experience, I have found that using my kitchen refrigerator operating at a temperature of about 40 degrees F, two weeks is the maximum time to let it age. I have a small dorm type refrigerator that I usually use for aging. It runs at 35 degrees F. At this temperature I age the cuts for three weeks.

After aging, open the bags and drain any fluid. You will notice a musky odor. This odor is typical of vacuum packaged beef and will go away in a few minutes. If it has a sour smell, most likely the bag leaked and is puffy. You will have to determine, just like you would with any other cut, if it is still useable or not (Note: I have never had this happen!). Cut the primal into individual steaks, wrap and freeze. At my house, we wrap steaks two
to a package in heavy duty foil. When we put them in the freezer, we do not stack them until they are frozen, usually 24 hours after placing in freezer.

We can do everything possible to ensure adequate tenderness only to have all our work ruined by overcooking. To help control this, I cut steaks \( \frac{3}{4} \) to 1 inch thick. I place them on a hot grill for 3 \( \frac{1}{2} \) minutes per side. On my grill this cooks steaks to medium rare. Cooking on a hot grill is best, but also the least forgiving. An extra 30 to 60 seconds can lead to the steak being overcooked. So be careful.

The last time I aged a ribeye roll was about three months ago. It cost $92 and produced 18 very good steaks. The cost per steak was about $5.00. This was a considerable savings over purchasing pre-cut ribeye steaks which cost $8 to $10 apiece. These steaks are as good as any you can buy at steak house restaurant. In fact, this is exactly what most high quality steak houses do to ensure a good eating experience for their customers.

I have only done home beef aging with Choice strip loins and ribeye rolls. There has only been one time where I would not rate the steaks as excellent. Wet aging will also work on Select and lower grades of beef. It will not make them as good as Choice, but it will improve their eating quality.

I also tried aging a vacuum packaged pork loin. That was not a good experience. Pork fat will oxidize more quickly than beef and that is exactly what happened. The aged pork had off-flavors due to the oxidized fat. I have never had this happen with aging beef for three weeks.

If you follow these guidelines, beef can be wet aged at home. And you will have an economical, enjoyable beef eating experience. Bon appétit!

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**UPDATE:** US Beef Academy scheduled for July 13 – 18 at the Valles Caldera National Preserve has been cancelled due to fire.
Welcome to the department!

Marcy Ward  
Extension Animal Livestock Specialist

I was born and raised in Colorado. I spent my summers working on a large cow/calf operation in Central Wyoming. I started my college career at Montana State University. After two years I transferred back to Colorado State and finished with a B.S. in Animal Science in 1990. In 1991 I started my graduate work under Dr. Mark Petersen at New Mexico State University. In 1993 I received a M.S degree in Animal Science with an emphasis in Ruminant Nutrition and Range. I was then hired by Purina Mills, Inc as a District Manager. That position changed frequently, so I did everything from Dairy nutrition consulting to selling Monkey Yums. Though I learned a lot, I was not content with industry, and decided to return to school to complete my PhD. My goal was to pursue a career in either education or extension. I worked on the effects of elevated levels of Selenium in pregnant ewes under Dr. Joel Caton at North Dakota State University. After receiving my PhD in Ruminant Nutrition in the fall of 2005, I was hired as the Beef Program Director for Colby Community College in Colby, KS. I oversaw the Farm and Ranch Management and Feedlot Programs for the college. There I taught students both applied and technical beef management practices. In addition, I managed the college’s cow herd, and bull test and production sale. In the summer of 2012 the NSMU Livestock Extension Specialist position came open. I saw this as an ideal opportunity for me to return to working directly with producers’, remain in the academic sector, and most importantly return to New Mexico.

NMSU offices will be closed on Thursday, July 4th in observance of the holiday.

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