

Dry aging enhances palatability of beef

by Bridget Baird, Associate Director,
Product Enhancement Research – NCBA

Summary

The ability of wet aging to increase tenderness by vacuum-packaging, while controlling shrinkage, has caused this aging system to gain wide acceptance in the beef industry. However, there is a potential market for dry-aged beef among those who seek to deliver a uniquely flavored beef product that is associated with a level of preparation mystique.

A new Checkoff-funded executive summary, *Dry Aging of Beef* by Jeff W. Savell of Texas A&M University, explains the art and science behind the process of beef dry aging. This summary is a companion piece to a previous Checkoff publication, *Industry Guide for Beef Aging*, which provides an overview of wet aging parameters.

Background

In the dry aging process, beef carcasses, primals and subprimals are stored without protective packaging at refrigeration temperatures for one to five weeks. This allows natural enzymatic and biochemical processes to occur, resulting in improved tenderness and the development of concentrated beef flavor.

Wet aging occurs within vacuum packaging and represents the primary method of beef aging today. The popularity of wet aging is due to its ability to prevent shrinkage and trim loss, ensuring an economic advantage over dry aging. Wet-aged product is also easier to store and transport than dry-aged product because it is enclosed in a vacuum-packaged bag. However, dry aging has recently regained some interest as foodservice and retail operators look for ways to differentiate their products from competitors.

Dry aging parameters include time, temperature, humidity and air flow

The primary factors to consider when developing dry aging guidelines include days of aging, storage temperature, relative humidity and air flow. Determining the number of days of dry aging seems to be more related to personal preference than scientific literature. As a result, findings from a thorough literature review did not support recommending a definitive minimum or maximum period of dry aging. Dry aging periods of 14 to 35 days have all appeared effective in producing the desired results of this process.

Storage temperature is critical to dry aging because the enzymatic processes involved in aging cease at temperatures below freezing, and microbiological spoilage can be accelerated at elevated temperatures. Dry aging literature has mainly reported storage temperatures between 0°C and 4°C (32°F and 39°F). Storage temperatures for dry-aged beef should not differ from those for wet-aged beef products.

Controlling relative humidity is also critical to the dry aging process – there are consequences for humidity levels that are either too high or too low. While no published studies have compared the effects of different relative humidity levels on dry-aged beef, most studies in this area have used a relative humidity of approximately 80 percent. Items that can help optimize air flow include wire racks, perforated shelves, trees or hooks, supplementary fans and ultraviolet light.

Beef flavor is concentrated with dry aging

Two of the three beef attributes that are encompassed within the term “palatability” are flavor and tenderness. The greatest reason for dry aging beef is to further enhance or intensify its flavor. Dry aging can enhance beef flavor because many of the compounds in beef responsible for flavor are concentrated as moisture is lost from the product over time. It is clear, from a chemical standpoint, that dry-aged beef contains different volatile flavor compounds than wet-aged beef. These compounds interact to produce either positive or negative flavor notes that are picked up by consumers.

There are incidences in the literature where consumers preferred dry-aged beef over wet-aged beef; however, there are also instances when consumers detected no difference between aging methods or preferred wet-aged beef over dry-aged beef. It appears preference for beef flavor differs between consumers and that dry-aged beef may appeal to at least a portion of the population.

For the most part, dry aging is not used to promote a tenderness advantage when compared to wet aging. Though studies have shown improvements in tenderness with additional days of dry aging, these do not differ from wet-aged counterparts obtained from the same sources and handled in a similar manner. However, aging is one of the most valuable tools available post-harvest to improve beef tenderness, and it appears either method (dry or wet) is successful in achieving this improvement.

Dry aging has an economic impact

Though moisture loss during dry aging is positive from a flavor standpoint, it is negative from an economic standpoint. Dry aging can result in substantial losses in both shrinkage (moisture loss) and trim loss. Trim loss includes discolored or dehydrated lean and fat that must be removed before merchandising steaks and roasts from dry-aged beef primals or subprimals.

The literature review reveals differences in saleable yields and processing times between dry-aged and wet-aged subprimals. In the studies reviewed for the purpose of this summary, there was a significant increase in the time required to process dry-aged versus wet-aged beef shortloins into steaks and other saleable products. Much of this increased processing time was due to the removal of dried and discolored lean and fat from the surface of dry-aged cuts. Also, dry-aged beef primals and subprimals had significantly lower retail yields as dry aging time increased.

Pricing steaks and roasts that come from a more expensive process such as dry aging can be a challenge. Dry-aged products must command more in the marketplace to offset the significant shrinkage and trim loss that occur during the process. One study reviewed for this summary evaluated consumers' preference for, and willingness to pay more for, dry-aged versus wet-aged steaks. Though this study did not demonstrate a difference in overall consumer preference for dry-aged steaks versus wet-aged steaks, those consumers who did prefer dry aging were willing to pay more for these products.

Companies develop individual dry aging practices

Dry aging requires refrigerated conditions where humidity and airflow are carefully controlled, as well as a sufficient number of days to achieve the desired palatability outcome for the end user of the product. For those companies interested in producing dry-aged beef, these parameters may need to be tested to develop individual procedures that work best for their unique systems.

The complete version of this review document is available for purchase for a nominal fee from the Checkoff's Customer Service Department by calling 800/368-3138. Reference item No. 12815.

Key Points

- In the dry aging process, beef carcasses, primals and subprimals are stored without protective packaging at refrigeration temperatures for one to five weeks.
- The primary factors to consider when developing dry aging guidelines include days of aging, storage temperature, relative humidity and air flow.
- The greatest reason for dry aging beef is to further enhance or intensify its flavor. Dry aging can enhance beef flavor because many of the compounds in beef responsible for flavor are concentrated as moisture is lost from the product over time.
- Dry-aged products must command more in the marketplace to offset the significant shrinkage and trim loss that occur during the process.
- There is a potential market for dry-aged beef among those who seek to deliver a uniquely flavored beef product that is associated with a level of preparation mystique.
- For those companies interested in producing dry-aged beef, parameters may need to be tested to develop individual procedures that work best for their unique systems.