COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT, LEXINGTON, KY, 40546

ASC-213

How to Make a Country Ham

Gregg Rentfrow and Surendranath Suman, Animal and Food Sciences

Introduction

Country ham is the dry-cured hind leg of a pig that harks back to the way food was preserved before mechanical refrigeration. The country ham finds its roots in China and European dry-cured hams such as China's Jinhua and Yunnan hams, Italy's Prosciutto, Spain's Serrano and Iberian hams, and Germany's Black Forest ham. Country hams are drastically different from their more common cousin, the wet-cured ham, also known as "city ham." The flavor of a country ham is complex, and the texture is unlike that of other hams.

Historically, pigs were harvested during the cold winter months of December through early February. The hams were removed and allowed to cool overnight before salt, sugar, and other spices were rubbed into the ham to begin the process of making a country ham. Today those traditions have not died, but they have changed. The family tradition of butchering hogs has been replaced by buying hams from a local meat processor. And the environments of winter, spring, and summer have been recreated through mechanical refrigeration and heaters. Currently, more than 5 percent of hams are turned into country hams within the ham belt states of Kentucky, North Carolina, Tennessee, and Virginia. The majority of country hams are cured in family owned and operated facilities.

Country hams can be found in grocery stores and specialty shops throughout Southeast and on the internet. Nonetheless, there are some do-it-yourselfers who want to start their own family traditions. Country hams are not difficult to make. The process requires a few easy-to-find ingredients and a secure storage area. Country hams are made in three steps: curing, salt equalization, and aging. These steps are outlined in the manual.

Country hams made at home cannot legally be sold to the public. Only country hams made in USDA-inspected facilities can legally be sold to the public.

Equipment

Compared to the manufacture of other foods, country hams do not require a lot of equipment. The amateur curer may already have some of the equipment, and the remaining equipment can be purchased from a local store or on the internet.

- Green (uncured) ham
- Knives
- Cure
- Waxless butcher paper (optional)
- Ham socks (optional)
- Scale (optional)
- Deli slicer (optional)
- Ham house or secure location

Butcher paper is a common choice for wrapping country hams, but the majority of butcher paper or freezer paper is waxed. A waxed paper will not allow the moisture to escape from the ham, causing the ham to spoil. Paper grocery store bags can be used, but old feed or fertilizer bags should be avoided.

Ham socks may be purchased via the internet or from your local butcher shop.

Ham House or Secure Storage Area

Country hams need to be cured and aged in a secure location. A separate building dedicated to curing hams may be built for around $1,000, but this option my not be feasible for the amateur curer. A garage/barn, basement, or an old corn crib may work for your country ham operation, but each has drawbacks. Hams will absorb surrounding odors such as car and/or tractor exhaust and will attract pests; therefore care and attention should be exercised when curing and aging hams in a garage or barn. Basements may not be cool enough and may promote mold growth on aging hams. Corn cribs lack security from rodents, insects, and wildlife. Regardless of the location you choose, make sure that it is secure, and check your ham(s) often.

Green Ham

Green ham is a term used by the meats industry to describe an uncured ham. Pigs harvested in the United States are five to seven months old and range from 260 to 300 pounds (live weight); hams weigh 20 to 25 pounds. Professional ham curers indicate that the freshest green hams make the highest quality country hams. Professionals will purchase hams within 24 to 36 hours post-harvest, which may not be possible for the amateur ham curer. Grocery stores rarely stock green hams, and if special ordered the hams could be older than 20 days. These older green hams can be used to make country hams, but the quality will be limited. Local butcher shops may be the best option for purchasing the freshest hams.

Typically, green hams should be trimmed before curing; most have a large deposit of flank fat that should be removed. In addition, any loose fat or skin can be cut away. The length of the hock/shank is a personal preference, but beginners should cut the hock off, leaving only 1½ to 2 inches of the shank on the ham. A shorter length will make it easier to pack cure into the hock/shank.

Figure 1. Green (uncured) ham. The flank fat can be removed before curing.

Cure Mixture

Cure recipes vary from state to state and person to person. The following basic country ham cure recipe can be considered a sugar cure, which is the most preferred cure mixture for hams. No matter what recipe is preferred, the main ingredient must be salt.

Ham Cure

Cures 100 pounds of ham.

- 8 pounds salt
- 2 pounds of sugar (white or brown)

Other ingredients may be added according to preference, such as:

- Black pepper
- Red pepper
- Paprika
- Nitrate/nitrite (Prague powder, saltpeter, Instacure #2)

The salt and sugar will absorb into the ham. The pepper will contribute to the color of the ham.

Use nitrate/nitrite according to manufacturer's guidelines to avoid bodily harm. Typically, nitrate is used in dry curing.

The cure mixture can be moistened with water, which will allow for better adhesion to the skin surface of the ham. Add just enough water to give the cure mixture a slightly moist or cool feel.

A common mistake is to flip flop the recipe and use more sugar than salt, if this occurs the ham will spoil.

Figure 2. A shorter hock reduces the chances of the hock and stifle joint souring during the curing process.

Figure 3. The cure mixture. Ten pounds of the mixture is enough to cure 100 pounds of ham.

Curing Hams

There are two methods (bag-cured and boxed-cured) to cure a country ham; both have advantages and disadvantages. Study both methods and determine which is better suited to your available equipment.

The weight of the ham determines the amount of cure needed. For example, 10 pounds of mixture will cure 100 pounds of ham; therefore, 1 pound of mixture is needed to cure 10 pounds of ham, and a 25-pound ham needs 2.5 pounds of mixture.

Bag-Cured Method

The bag-cured method is commonly used and requires less labor than the box-cured method.

Steps

1. Calculate the amount of cured needed for the weight of ham.
2. Open the hock by gently separating the lean from the bone and the muscle from the skin with your finger. Add at least four tablespoons of cure into the opening.
3. Rub cure on the surface of the ham, rubbing the majority into the exposed lean surfaces of the ham.
4. Carefully wrap the ham tightly with waxless paper to keep the cure in place. A 36 x 23-inch piece of paper is large enough to cover a 25-pound ham.
5. Place the wrapped ham in a ham sock with the hock at the bottom of the stockinet.
6. Some curers suggest the ham sit on a flat surface for 24 hours to allow the cure to absorb moisture from the ham, which helps the cure stay in place. This step can be avoided if the cure is pre-moistened as described above.
7. Hang the ham, hock pointed down, in a cool, dry, secure place.
8. Allow the hams to cure (the process of absorbing the cure mixture) at two days per pound of ham or another rule of thumb is 60 days.

Figure 4. Gently separating the skin from the muscle in the hock will make it easier to pack the hock with the cure mixture.

Figure 5. Adding plenty of mixture to the hock of the ham will fully cure the hock and prevent a soured hock and stifle joint.

Figure 6. Notice the fully covered hock and how the cure is tucked between the skin and the muscle.

Figure 7. Add cure to the remaining portions of the ham, rubbing the majority of the mixture into the exposed lean butt face and center portion of the ham.

Figure 8. An overhead view of the ham fully covered with the cure mixture.

To wrap the ham, begin with the butcher paper positioned in the shape of a diamond in front of you.

- Place the ham on the paper and fold the bottom point of the paper over the hock.
- Fold either side of the paper over the center section.
- Fold the top over the butt face.
- Fold the remaining side over the ham.

Figure 9. Wrap the ham in unwaxed butcher paper.

Larger hams may require more than one sheet of butcher paper. A small piece of tape may be used to hold the paper in place.

Figure 10. A fully wrapped ham.

Figure 11. Place the ham sock over the ham wrapped in waxless butcher paper.

Hanging the ham with the hock pointed down will help create the desired teardrop shape whereas hanging the ham with the hock pointed up will create a bullet-shaped ham.

Figure 12. A bagged cured ham. Notice how the seam of the ham sock is over the hock of the ham to help create the desirable teardrop shape.

Box-Cured Method

The techniques used for the box-cured method are similar to the bag-cured method. The green hams are covered with cure and placed in a well-drained container. The container can be made of any material as long as it allows for drainage. The box-cured method requires more labor but allows the curer to see the ham during curing and to add cure when needed.

Steps

1. Calculate the amount of cured needed for the weight of ham and then divide amount by three, creating three equal piles.
2. Rub the first third of the cure into the ham using the same techniques for curing the hock as described in the bag-cured method.
3. Stack the hams on top of each other in the box and rotate weekly.
4. Seven days later add the second third of the cure mixture.
5. Seven days later add the remaining mixture.
6. Let the ham cure for the appropriate amount of time. The cure will penetrate the ham approximately an inch per week; therefore, a 7-inch-thick (at the thickest portion) ham will take seven weeks to cure.
7. After the ham has cured, suspend the ham, hock pointed down, in a ham sock.

Ambient cured hams must be cured during the cold winter months, usually December through early February. Ambient temperatures will fluctuate throughout the day and can rise above typical refrigeration temperatures (>45°F). Monitor the internal temperature (in the thickest portion) of the ham and do not panic until the internal temperatures are consistently (3 to 4 days in a row) above 40°F to 45°F. If this occurs, the ham(s) can be moved to a refrigerator during the warm daytime and moved back in the cooler night temperatures. During the curing process, the ham must stay cold (<40°F). Although the daytime temperature during the winter can reach greater than 55°F, the night temperatures will decrease to safe curing levels. Due to the mass of the ham, the internal temperature will not fluctuate very much unless there are several days above 55°F.

On the other hand, if hams freeze during an extremely cold winter, do not panic. Once the ham thaws it will continue to absorb cure.

Figure 13. Hams being cured via the boxed method.

Salt Equalization (Springtime)

Salt equalization is a term used to describe the period after curing when the salt and sugar migrate throughout the ham. This period is springtime for ambient cured hams, when the temperature rises (50°F to 60°F), allowing the hams to warm as well. This step is extremely important as a ham must contain at least 4 percent salt to be labeled a country ham. Past research has indicated that after the curing process, not all parts of the ham are at 4 percent salt but will achieve this benchmark after salt equalization.

Salt equalization is the time to "shuck" the hams. Remove the old paper from bag-cured hams and brush off the excess cure for both bag-cured and box-cured hams. Some curers will wash the ham after the excess cure is removed; however, this step is a personal preference. Do not reapply butcher paper after shucking the ham because air must reach the surface of the ham to aid in the drying process. Place the ham in a new stockinet and suspend it from a secure object. Historically, hams were hung from rafters in the attic or in smokehouses.

Figure 14. Excess cure and mold are common on ham. The cure and the mold can be removed before the ham is re-socked for the springtime and the summer sweat.

Figure 15. When re-socking hams for smoking and/or aging, make sure the seam is directly across the cut surface of the hock to give the ham the desired teardrop shape.

Smoking

Smoking hams is a personal preference, but care should be exercised during the process. Country hams should be cold smoked; a hotter smoke (greater than110°F) will destroy the enzymes responsible for flavor and aroma. The duration of smoking is a personal preference; the majority of hams are smoked for 12 hours or more.

All meats, including country hams, should be smoked using only hard woods such as hickory, cherry, apple, or maple. Avoid soft woods such as pine because they produce harsh, bitter flavors. Corn cobs have been used in the past as a substitute for hard woods, but they too can produce bitter flavors. If corn cobs are used, they should be diluted with a hard wood. Experiment with blending hard woods to produce different flavors.

Aging, or the Summer Sweat

Country hams develop their characteristic flavor and aroma during the hot summer months. The longer the hams age, the more intense the flavor. Novice ham consumers may not appreciate the complex flavors of an older country ham, so the length of aging is of personal preference. During the summer sweat the hams will slowly continue to lose moisture while the salt concentration increases. Most traditional country hams are 9 to 12 months old.

A ham must have lost at least 18 percent of its green weight and contain at least 4 percent salt to be labeled country ham, according to the USDA. Salt concentration requires expensive testing equipment, but tracking weight loss can be easily accomplished for the home curer.

Mold Growth

The curing environment—warm temperatures with high humidity—is ideal for mold growth. Mold growth is common, but the mold is harmless and should not cause illness.

Figure 16. A smoked country ham during the aging process, or the summer sweat.

Professional curers maintain a lower humidity (<60% relative humidity) in their ham houses to control mold growth, but the amateur curer may not have the technology to control humidity. Some home curers will lightly coat the ham in cooking oil before the summer sweat to help retard mold growth, whereas others do not consider a ham ready until it has a healthy growth of mold on the surface. A scrub brush and a mild vinegar and warm water solution can be used to remove the mold.

Small black dots or spots have been reported on the surface after the mold has been removed. These spots are caused by a species of mold that is difficult to remove from the surface; chances are the spots are harmless.

Figure 17. Mold growth is common on country hams.

Insects and Rodents

All food products are susceptible to insects and rodents, but ambient cured hams are especially vulnerable. Country hams should be produced, aged, and stored in a secure location where all seams of the building are caulked and the openings covered with a fine mesh (<32 mesh).

Insects are a minor nuisance, but some will damage aging hams. The following are insects of concern on country hams.

- **Larder beetles** are dark brown to black with a wide cream- or tan-colored band with six dark spots over the upper third of the wing. The adults are ¼ to ⅝ inch long; the larvae are tan and dark brown to black stripped with a somewhat fuzzy appearance. The larvae cause the most damage to the ham, feeding just below the surface, mainly causing cosmetic harm. The damaged parts of the ham can be trimmed and discarded.
- **Ham mites** are the most common insect infestation on dry-cured hams, infesting over 60 percent of the professionally produced crop. This tiny (1/32 inch long) insect is difficult to see with the naked eye, but an infested ham will develop a powder on the surface, which is made of waste material, dead mites, and shed coverings. A minty odor can be detected with extreme infestations. Ham mites cause cosmetic damage, which can be trimmed before consumption.
- **Skippers** or **cheese skippers** are smaller than a house fly and have a black body with bronze tinting and red eyes. They lay and hatch their eggs before feeding on the muscle and connective tissue of the ham. The maggots will burrow into the muscle tissue of the ham. The ham can be consumed when all the larvae and maggots have been removed, but removal can be difficult due to the burrowing of the insect. Most curers will discard the ham after a skipper infestation.
- **Red legged ham beetles** are very rare. These greenish-blue beetles (¼ inch) have red legs and prefer to burrow into the fat of the ham. The ¼-inch-long purplish larvae consume more of the ham than the adults. These beetles cause cosmetic damage that can be removed prior to eating.

There are several home remedies for preventing or stopping insect infestations on country hams; however, only a few are approved by the Food and Drug Administration and the United States Department of Agriculture. ***If you are using chemical pesticides to control insects, please make sure they are approved for use on country hams. Currently, only Methyl bromide and Sulfuryl floride (trade name Profume) are approved to use on country hams.*** Other non-chemical methods, such as freezing after an infestation is observed or coating with cooking oil, can be used to prevent or destroy insect infestations.

Rodents will always be a problem in areas where food is produced, and in the processing of country hams they are no exception. Traps should be placed along walls as mice and rats have very poor eyesight and prefer to move along vertical surfaces. The traps need to be checked often and cleaned periodically to prevent any contamination from the ensnared rodents.

Insects and rodents will also be present but periodic cleaning of the floor, well-trimmed grass around the ham house, and the removal of trash and debris will prevent or discourage infestations. Furthermore, people and pets can unknowingly carry pests, so their movement should be restricted around aging country hams.

Figure 18. The larvae of larder beetles cause the most damage to country hams.

Figure 19. Larder beetles can chew through paper and tape to gain access to the country ham.

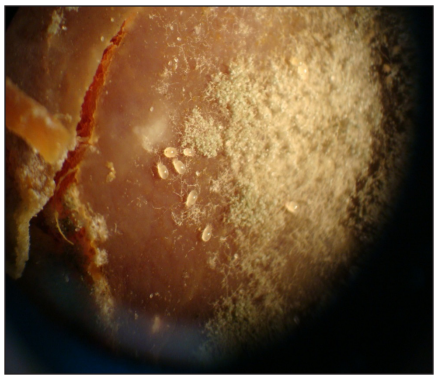

Figure 20. Ham mites are the most common pest that infests country hams. They are very difficult to see with the naked eye because of their small size. Picture courtesy of Mississippi State University.

The Finished Country Ham

After the ham has gone through curing and salt equalization (3 to 4 months), it is ready for the dinner table. This type of ham is very mild and may be best for novice country ham connoisseurs. Country hams that have been aged through the summer (≥ 9 months) are preferred by experienced consumers. Regardless of your preference, a home cured ham cannot legally be sold. **Only USDA-inspected country hams can be sold to the public. You are breaking the law if you sell a home cured ham to the public!**

Why can country hams be stored without refrigeration?

Country hams must have lost at least 18 percent of their green weight and contain at least 4 percent salt. The vast majority of the 18 percent weight loss is water, which bacteria need for growth and survival. In addition, very few bacteria can grow in a 4 percent salt concentration. The combination of lower water content (referred to as water activity) and high salt concentration makes country hams shelf-stable. Basically, country hams are a bacterial desert that cannot support life.

Cooking Country Hams

Before cooking your country ham should be thoroughly cleaned to remove excess cure and mold. Specific country ham recipes can be found on the internet; however, there are some basic cooking methods that will work well for home-curers.

Whole Hams

Once your ham has completed the summer sweat (length of time is personal preference) it is ready for the dinner table. Some prefer to cook a whole country ham for a large party or a-family get-together. Whole country hams can be cooked two different ways: baked or boiled.

Baked Country Ham

1. Clean the ham to remove excess cure and mold.
2. Place the ham in a container and cover the ham with tap water and change the water every 8 to 12 hours for the next 24 hours. This process will help pull some of the salt out of the ham. *Tip: Ice chest–type coolers with drain plugs work best for soaking country hams.*
3. Preheat the oven to 350°F. Place the ham in a large roasting pan and fill the container with water, leaving 1 to 2 inches at the top of the pan and cover with aluminum foil. *Tip: Large disposable aluminum pans work best, and instead of water you can use apple juice or soda.*
4. Cook for 30 minutes to 1 hour at 350°F. Reduce the temperature to 300°F and cook for another 1½ hours.
5. Turn the ham over after step 4 is complete and insert an oven safe thermometer into the thickest part of the ham. Cook for an additional 1½ hours or until the internal temperature reaches 140°F.
6. Allow the ham to cool for 30 or more minutes before slicing thin (< ¼ inch) and enjoy.

Boiled Country Ham

1. Clean the ham to remove excess cure and mold.
2. Place the ham in a container and cover the ham with tap water. Change the water every 8 to 12 hours for the next 24 hours, which will help pull some of the salt out of the ham. *Tip: Ice chest–type coolers with drain plugs work best for soaking country hams.*
3. Place the ham in a large pot and completely cover with water.
4. Bring the water to a boil and reduce the heat to a simmer. Cover the container. Simmer the ham for 20 minutes per pound. *Tip: Do not boil.*
5. Once cooked, remove the container from the heat and cool.
6. Once cool enough to handle, remove ham from water, remove the rind, fat, and bone.
7. Slice the ham (< ¼ inch) and serve, or cool overnight then slice.

Sliced Ham

Fried country ham has a different flavor and texture compared to baked or boiled hams. For experienced connoisseurs this is the only way to enjoy country ham.

1. Clean the ham to remove excess cure and mold.
2. Slice the ham (< ¼ inch). Some grocery stores will slice the ham for you.
3. Fry in a cast iron skillet, 45 seconds to 1 minute per side, then serve. *Tip: Try frying country ham slices on an outdoor grill.*

Slicing Country Ham

Some meat processors and grocery store meat departments will slice whole country hams upon request; however, very few are allowed to do so because of government regulations. Slicing a country ham can be a challenge, but the job is easier with a meat hand saw and a deli slicer. Both items can be purchased from the internet or an outdoor sportsmen's store.

Conclusion

Food provides nutrients for life. It is a source of comfort and the focus of celebrations. Food often identifies a culture. Kentucky and the southeast's food cultures include the country ham. Traditionally, country hams were ambient cured and relied on Mother Nature to provide refrigeration and heat. Today they may be cured in an artificial environment using mechanical refrigeration to create the desired temperatures. No matter what method is used, do-it-yourselfers who want to start their own family traditions will find that with a few easy-to-find ingredients and a secure storage area, country hams are not difficult to make.

Mention or display of a trademark, proprietary product or firm in text or figures does not constitute an endorsement and does not imply approval to the exclusion of other suitable products or firms.

Issued 3-2014