



Making safe jerky at home: THE BASICS



Food preservation by drying has been practiced for centuries. North American Indians dried strips of meat in the sun or over a fire to make “Ch’arki.”

Modern commercial jerky is made with lean meat, salt, and seasonings. Traditional jerky is cut with the grain to produce a tough, stringy product. Salt functions as a preservative and flavoring agent. Seasonings usually include one or more kinds of pepper – most commonly ground black pepper and crushed or ground red pepper. The seasoned meat is then cooked, smoked, and dried to produce a somewhat tough, dry, salty, shelf-stable product not requiring refrigeration.

Food safety is a concern in making jerky. Several food-borne disease outbreaks since the mid-1990s have identified jerky as the cause. The most common pathogens identified are salmonellae and *Escherichia coli* O157:H7. The trichinae parasite has

been identified in Idaho cougar jerky. Meat sources include domestic and wild game species, and outbreaks have occurred from consuming both commercially and home-processed jerky products.

A series of events must occur for jerky to cause a food-borne outbreak. First, the meat source must be contaminated with a pathogenic organism; second, the meat product is usually treated in a manner that promotes bacterial growth; and third, the product is consumed by a susceptible individual. Investigations reveal many jerky recipes don’t heat meat hot enough to kill pathogens present on raw meat. Simply drying meat is not sufficient to kill pathogens.

Food Microbiology and Jerky Products

Several food microbiology principles can be applied to the jerky-making process to ensure a safe product. The first, and one of the most important principles, is to follow good sanitary practices. This includes using clean and sanitized utensils and other equipment and practicing good personal hygiene.

Additional principles include using fresh, wholesome meat that has been processed in a sanitary manner. This will ensure a low initial load of bacteria. Salt functions as an antimicrobial ingredient in foods such as dried meat, but some people try to decrease the saltiness of their jerky by using less salt in the recipe. This is dangerous because a minimum level of salt is necessary to inhibit microbial growth during the drying process.

A lower pH, or increased acidity, is also effective. Do not eliminate the acidic ingredient from jerky recipes because the product will not have similar antimicrobial properties. Some jerky recipes call for various food-grade acids such as vinegar (acetic acid), citric acid (common acid in citrus fruits), or ascorbic acid (vitamin C).



Keeping game meat clean and cooling it as quickly as possible to less than 40°F will help minimize the initial microbial load of the meat. The hunter who harvested this animal followed good practices (quartering, bagging, hanging in a cool place with adequate air circulation) to ensure high-quality meat from a young bull elk.

Finally, cooking temperatures are an effective method to kill pathogenic bacteria. A temperature of 160 degrees Fahrenheit is recommended. For product quality, heating raw meat to 160 degrees F is generally better before drying at a decreased temperature. Placing a calibrated meat thermometer between two slices of jerky can more accurately measure average product temperature.

Making Safe Jerky at Home

Important safety guidelines

1. Wash hands often and thoroughly when handling meat, especially after handling raw meat. Hands should be in contact with warm, soapy water for at least 20 seconds.
2. Do not cross-contaminate properly heated and dried meat with raw meat or unclean utensils. Keep raw meat, cutting surfaces, and equipment that have touched raw meat separate from dried meat, other ready-to-eat foods, and other work surfaces and equipment.
3. Sanitize cutting surfaces and equipment such as tongs, knives, and drying racks with a solution of 2 tablespoons of chlorine bleach in one gallon of water. Sanitize before and after use.
4. Use an approved or tested recipe. See recipe #1 and #2.

Jerky Drying

Use a calibrated thermometer to monitor the circulating air temperature of the dehydrator or oven. Preheat the dehydrator or oven to 145° F for 15 to 30 minutes. Using clean tongs, arrange meat strips in single layers on the drying trays without touching each other. Place the filled trays in the preheated dehydrator leaving enough open space on the racks for air to circulate around the strips. Let the strips dry for 10 to 14 hours or until the pieces are adequately dry. Test for dryness. Properly dried jerky is chewy and leathery. It will

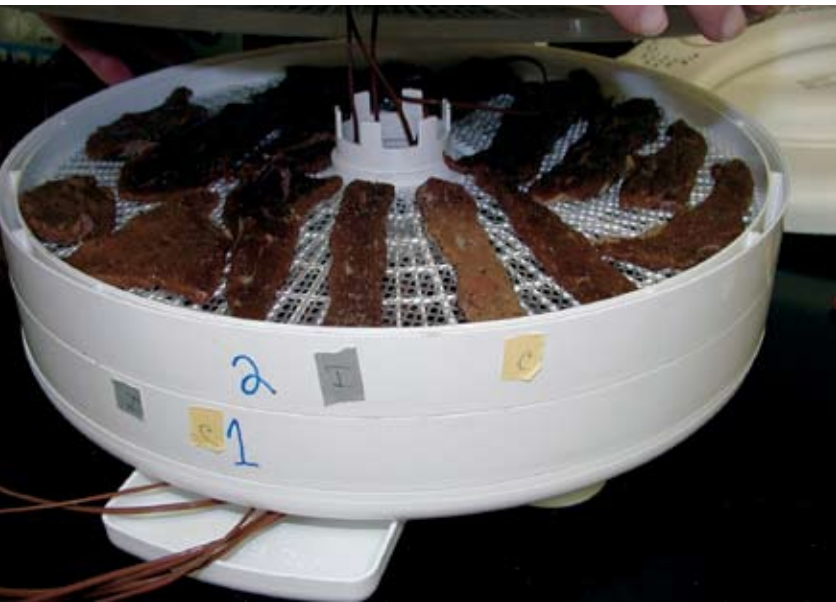
Recipe #1: Hot Pickle Cure Jerky *

Use fresh lean meat free of fat and connective tissue. Yield: Five pounds of fresh meat should weigh approximately 2 pounds after drying or smoking.



1. Slice 5 pounds of meat into 1/4-inch strips with the grain, not crosswise. Spread meat and sprinkle on 3 tablespoons salt, 2 teaspoons ground black pepper, and 2 tablespoons sugar. Place the meat in a pan or dish, and place in refrigerator 24 hours.
2. Pound the meat on both sides to work in the spice. Optional: Dip strips of meat in a liquid smoke solution (5 parts water to 1 part liquid smoke) for one to two seconds for added flavor.
3. Make a brine solution by dissolving 3/4 cup salt, 1/2 cup sugar, and 2 tablespoons ground black pepper in one gallon of water. Stir to dissolve the salt and sugar.
4. Bring the brine to a low to medium boil. Immerse the fresh meat strips (a few at a time) into the boiling brine until they turn gray (approximately one to two minutes). Remove meat from brine using clean tongs or other utensils that have not contacted raw meat.
5. Spread meat on a clean dehydrator rack or on a clean rack in the top half of a kitchen oven. If using a kitchen oven, open the oven door to the first or second stop to allow moisture to escape. Heat at 150°F to 200°F for nine to 24 hours or until desired dryness is reached. Remove jerky from oven before becoming too hard or brittle. Properly dried jerky should crack when bent in half but should not break into two pieces.
6. Store in clean jars or plastic bags or wrap in freezer paper and freeze. Properly dried jerky will keep for approximately two weeks in a sealed container at room temperature. It will keep for 3 to 6 months in the refrigerator and up to one year in the freezer. Check occasionally to be sure no mold is forming.

*Source of recipe: *You and Your Wild Game*, 1984, by R.A. Field and C.A. Raab, University of Wyoming Agricultural Extension Service, B-613, p. 58. Copies may be obtained on the Web at www.uwyo.edu/CES/PUBS/Jerky.htm or by e-mailing the College of Agriculture's Resource Center at bixbyd@uwyo.edu, calling the center at (307) 766-2115, or writing to the University of Wyoming, College of Agriculture, Department 3313, 1000 E. University Ave., Laramie, WY 82071.



Proper placement of raw meat strips in a food dehydrator is important for good air flow and efficient drying. Individual jerky pieces should not touch or be stacked.

bend like a green stick but won't snap like a dry stick. To test for dryness, remove a strip of jerky from the oven or dehydrator. Let cool slightly then bend the jerky; it should crack but not break when bent. When jerky is sufficiently dry, remove the strips from the drying racks to a clean surface. Pat off any beads of oil with absorbent paper towel, and let cool.

Storage

Place cooled jerky strips in an airtight plastic food bag or jar with a tight-fitting lid. Pack jerky with the least possible amount of air trapped in the container. Too much air causes off-flavors and rancidity. Label and date packages. Store jerky in a cool, dry, dark place or the refrigerator or freezer. Properly dried jerky will keep for approximately two weeks in a sealed container at room temperature. It will keep for 3 to 6 months in the refrigerator and up to one year in the freezer. Check occasionally to be sure no mold is forming.

Recipe #2: Vinegar-Marinate Preparation Method **

Ingredients per 2 pounds of lean meat slices:

Pre-treatment dip:

2 cups vinegar

Marinade ingredients:

1/4 cup soy sauce

1 tablespoon Worcestershire sauce

1/4 teaspoon black pepper

1/4 teaspoon garlic powder

1/2 teaspoon onion powder

1 teaspoon hickory smoked salt



Directions:

Place 2 cups vinegar in 9×11-inch cake pan or plastic storage container. Add meat strips to container making sure vinegar covers all strips. Let soak 10 minutes, stirring occasionally to ensure distribution of vinegar on strips. Combine all marinade ingredients and place in a 1-gallon resealable plastic bag. Add lean meat slices to bag; seal bag and massage pieces to thoroughly distribute marinade over all meat strips. Refrigerate bag 1 to 24 hours. Remove meat slices from bag, and place flat without touching each other on clean dehydrator trays, oven racks, or other drying trays. Place trays in preheated dehydrator, and dry at 145° F for 10 to 14 hours or until slices are adequately dry.

**Source of recipe: *Leathers and Jerkies*, CSU Bulletin 9.311; P. Kendall, Ph.D., R.D., Colorado State University (CSU) Cooperative Extension food science and human nutrition specialist and professor, food science and human nutrition; J. Sofos, Ph.D., CSU professor, animal sciences. March 2003 and updated July 2006. Available at www.ext.colostate.edu/PUBS/foodnut/09311.html

Warrie Means is a University of Wyoming Cooperative Extension Service (UW CES) meats specialist and an associate professor in the College of Agriculture's Department of Animal Science. He can be reached at (307) 766-5283 or means@uwyo.edu. Suzy Pelican is a faculty member of the Department of Family and Consumer Sciences and is a food and nutrition specialist with the UW CES. She can be reached at (307) 766-5177 or pelican@uwyo.edu.