COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF ALASKA FAIRBANKS

Making Jerky

FNH-00262

Jerky can be made from almost any lean meat, including beef, pork or game.

Making jerky is easy, but there are some important steps to follow to help ensure a safe product.

The Food Safety and Inspection Service (FSIS) of the United States Department of Agriculture recommends that you take certain steps to destroy harmful parasites and bacteria in the meat:

DEEP FREEZE THE MEAT (0°F) to destroy parasites such as the Trichina worm and the tapeworm.

- Freeze meat that is less than 1 inch (2.5 cm) thick for at least one month.
- Freeze meat that is thicker than 1 inch (2.5 cm) for at least two months.

The length of time the meat must be in the freezer depends partly on how fast the meat can get frozen all the way to the center of the thickest piece. It will take longer for the meat to freeze through to the middle if you are putting many packages in the freezer at the same time. Nevertheless, freezing will not kill microbes and may not kill parasites. Only thoroughly cooking will destroy all parasites.

HEAT THE MEAT to destroy bacteria, such as Salmonella, Listeria, and *E. coli*. Use either the marinade method or the dry-cure method to kill bacteria and parasites and dry the jerky. (See next page for heating directions).

CAUTION: Freezing and heating treatment may not be sufficient to kill parasites in bear meat. To be safe, do not use bear meat for jerky. Use bear meat for roasts, stews and other dishes in which extra cooking will not damage its quality and will still kill parasites and bacteria. Cook bear meat until it is well done. The internal temperature should be 185°F (85°C).

PREPARING THE MEAT

To keep initial bacterial contamination of meat down, wear clean plastic gloves, or use a fork or tongs when handling meat. This is especially important if there should be a cut or sore anywhere on your hands.

If meat is partially frozen, it will be easier to slice. Trim visible fat and connective tissue from the meat. Fat develops off-flavors quickly during storage, so the less fat, the fresher the flavor.

Slice the trimmed meat into long thin strips - about ¼ inch (0.6 cm) thick. One-fourth inch is the maximum thickness these strips should be. Slice with the grain for a chewy jerky; slice across the grain for a tender, brittle jerky. Then treat the sliced meat according to either of the sample recipes given below. You may vary the ingredients or the amounts of ingredients in the marinade or cure. For safety, do not vary temperature or time of heating.

Drying in Home Ovens

The rapid, but variable heat produced by microwaves makes it difficult to determine whether the jerky slices have been heated enough to destroy harmful bacteria and parasites — even when the meat is dry to the touch and even when using microwave ovens with turntables. Drying jerky should be done in a conventional oven as microwave ovens, in general, cannot be relied upon to make a safe product.

Marinated Jerky
Meat is marinated for flavor and tenderness. Ingredients for marinades may include salt and an acid product such as vinegar, lemon juice, soy sauce or wine. The following is an example of a jerky marinade. Try it or use it as a guideline.

¼ cup	soy sauce	60 mL
1 tablespoon	Worcestershire sauce	15 mL
¼ teaspoon	pepper	1 mL
¼ teaspoon	garlic powder	1 mL
½ teaspoon	onion powder	2 mL
1 teaspoon	hickory smoke-flavored salt	4 mL

This should be enough marinade to cover about 1 pound (454 g) of lean meat.

Combine all ingredients. Place strips of meat in a shallow dish and cover with marinade. Cover and refrigerate 1 to 2 hours or overnight, depending on taste.

Heat meat in marinade to 160°F (71°C). Heat to boiling 212°F (100°C) for game meat. Add water or more marinade, if necessary to cover all the meat.

After heating, immediately remove meat strips from the marinade, drain on absorbent toweling and arrange on dehydrator trays or cake racks placed on baking sheets. Place the slices close together but do not overlap.

Arrange oven shelves so that the meat is no closer than 4 inches (9.6 cm) from the top source of heat and no closer than 4 inches from bottom source of heat.

Place the trays of meat in an oven preheated to 160°F (71°C). Use an oven thermometer to ensure accurate temperature.

Dry-Cured Jerky

3 pounds	meat	1360 gm
½ t	liquid smoke	2.5 mL
	in 2 tablespoons of water	30 mL
	salt and pepper as desired	

Lay sliced meat into a large bowl or crock. Dab each piece with a brush dipped in the water and liquid smoke. Salt generously on one side only. Sprinkle with pepper if desired.

Place strips, layer on layer, in a large bowl or crock. Cover with plastic wrap and let stand in refrigerator overnight or at least 6 hours. Remove meat strips from bowl and pat dry with paper towels.

Arrange meat strips on cake racks placed on baking sheets. Place slices close together but not do overlap. Leave some space on the racks to allow for air circulation in the oven.

Arrange oven shelves so that the meat is no closer than 4 inches (9.6 cm) from the top source of heat and no closer than 4 inches (9.6 cm) from bottom source of heat.

Place meat in a 160°F (71°C) oven to begin the drying. Toward the end of the drying process, turn the oven up so that temperature registers 180°F to 200°F (82°C to 94°C) on the oven thermometer for at least one hour. For the remainder of the drying time, meat may be dried at either 160°F or 180°F (71°C to 82°C).

Jerky is done when a test piece cracks but does not break when it is bent.
It will take around 3 to 4 hours or longer to dry.

Remove jerky strips from the racks. Pat off any beads of oil with absorbent toweling. Cool.

Package in glass jars or heavy plastic bags.

Refrigerate or freeze the dried jerky.

Dried jerky takes up moisture readily. Even if you dry jerky enough to prevent growth of microorganisms, over time, the meat could take up enough moisture to allow microorganisms to grow again. So keep the jerky cold.

Drying in Home Dehydrators

Many home dehydrators do not heat higher than 140°F (60°C). The 140°F is not high enough to kill bacteria on meats. Hamburgers cooked to 140°F have caused illness and death.

Here are some suggestions for drying meat in a home dehydrator.

1. Check the temperature of each tray of your dehydrator with a thermometer after turning it on as high as it will go. If the inside of your dehydrator can attain and hold temperatures of 180°F to 200°F (82°C to 94°C), then it is safe to use just as you would the oven. Follow directions for oven-drying, using either the marinade or dry cure method.

2. If your dehydrator does not reach the 180°F to 200°F (82°C to 94°C) temperature range, then proceed as follows:

Use the marinade method to preheat the meat.

Turn dehydrator thermostat as high as it will go.

a. If dehydrator can attain and hold a temperature of 160°F (71°C), then arrange meat that has been heated in the marinade on dehydrator racks and proceed with drying.

b. If dehydrator does not heat as high as 160°F (71°C) but has a fan, then for safety, preheat meat in the marinade and give a second high heat treatment toward the end of the drying period.

   To do the second heating, remove jerky from dehydrator, arrange on rack placed on a cookie sheet and put in a conventional oven set at 200°F (94°C) for one hour. Use oven thermometer.

   If meat is not dry after this heat treatment, turn oven down to 160°F (71°C) and complete drying. *To avoid cross contamination, do not return meat to dehydrator.*

These heat treatments should destroy much of the initial microbial population and kill microbes that may have grown while drying at the lower temperature.

Note: If your dehydrator does not heat to 160°F (71°C) and does not have a fan to aid in drying, for safety's sake, it should not be used for drying meat.

It May Be Tricky At First

When drying jerky, it is important to:

• Heat the meat **slowly** enough to dry it without overcooking it. If you heat it too fast, the outside gets crusty and the inside may not dry thoroughly.

• Heat the meat **quickly** enough to get the moist meat out of the "danger zone" (40°F to 140°F, 4°C to 60°C) as quickly as possible so that harmful microorganisms will not get a good chance to grow.

• Heat the meat **hot** enough to kill microorganisms that can cause illness.

You can take a lot of guesswork out of the job by using an oven thermometer.

Trying to heat the meat hot enough but not too hot may be tricky at first. But, if you know what you are aiming for, you soon can find the time and temperature combination for your oven that will produce a flavorful, chewy and **safe** dried jerky.

Abbreviations

t=teaspoon pt=pint oz=ounce mg=milligram mL=milliliter mm=millimeter T=tablespoon qt=quart lb=pound g=gram
L=liter cm=centimeter C=cup gal=gallon F=Fahrenheit k=kilogram c=Celsius m=meter
KPa=thousand Pascals per square centimeter

Additional information on making jerky is available at the following Web sites:

www.fsis.usda.gov/Fact_Sheets/jerky_and_food_safety/index.asp
www.fsis.usda.gov/Fact_Sheets/Focus_On_Freezing/index.asp

Research on food preservation is an ongoing process.

The United States Department of Agriculture and the Cooperative Extension Service continuously apply new research findings to their recommendations for food preservation techniques. The guidelines in this publication may be revised at any time additional knowledge is gained that may increase the margin of safety or improve the quality of home preserved products.

Please consult your local Cooperative Extension Service annually for updated information.

For more information, contact your local Cooperative Extension Office or Bret Luick, Extension Food and Nutrition Specialist, at 907-474-6338 or bluick@alaska.edu. *This publication was written by Barbara E. Greene, Extension EFNEP Coordinator, and Ken Krieg, Extension Livestock Specialist, in 1991. It was revised in 2004 by Bret Luick.Thanks to Brian Paust, Marine Advisory Program Agent, University of Alaska Fairbanks, for his helpful input into the revisions of this publication.*

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417/11/91/BG&KK-BL/500 October 2010

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