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**UNIVERSITY OF MINNESOTA**  
**AGRICULTURE**

# **Consumer Questions About Meat**

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## INSPECTION

### QUESTION:

### ANSWER:

1. Who inspects meat in the state of Minnesota?  
The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, inspects live animals and their carcasses to make sure that (1) the animals are healthy and (2) their carcasses and edible organs are a wholesome source of meat. This inspection occurs in all plants that buy animals from one person or firm and sell meat to another. USDA inspection also takes place in plants that process meat and ship this meat across state lines. The Minnesota Department of Agriculture inspects at retail stores to make sure that the stores comply with certain rules and regulations relating to processing, storage, handling, labeling, advertising, and sale of certain meat products. Some municipalities also inspect at the retail and restaurant levels for sanitation, temperature control, etc.
2. Are all animals and carcasses described in question 1 USDA-inspected?  
Yes. Each carcass and all edible organs are examined by qualified inspectors to insure that the products are wholesome sources of food. All meat sold must have been inspected by the USDA. Animals processed at "custom-exempt" plants are not inspected by the USDA.
3. Are all animals and carcasses analyzed for every possible contaminant, such as antibiotics, heavy metals, etc.?  
No. The USDA does this on a sampling basis, and if an occurrence of this problem is found, further extensive examinations of carcasses and organs for the specific contaminant are conducted.
4. Are the approximately 2,000 retail stores in Minnesota under continuous day-by-day inspection?  
No. The retail stores are spot checked. They are also inspected because of consumer complaints. These consumer complaints may vary from such things as overly fat hamburger to canned hams stored on shelves when the labeling states refrigeration is required.
5. Who pays inspection costs?  
The taxpayer.
6. Is inspection mandatory?  
Yes, unless you or your firm are exempt. Exempt persons or firms ("custom" plants) are those which slaughter animals but the resulting meat is not sold (the meat is returned to the owner of the animal). Also exempt from USDA inspection are certain retail establishments which buy federally inspected meat and process that meat in their own shops. Although these latter operations are exempt from USDA inspection, they are subject to periodic inspection by the State of Minnesota, Department of Agriculture.
7. Who can be contacted about meat inspection questions?  
USDA—Don Burright, Food Safety and Inspection Service, P.O. Box 554, South St. Paul, Minnesota 55075. Phone (612) 290-3371.  
STATE—Mr. Tom Masso, Chief, Meat, Poultry and Food Division, Minnesota Department of Agriculture, 90 W. Plato Blvd., St. Paul, Minnesota 55107. Phone (612) 296-2627.

## GRADING (carcasses and wholesale cuts)

1. Is grading mandatory?  
No. Grading is strictly voluntary and up to the individual packers. They can have carcasses graded by the USDA, Meat Grading Service, or they can establish their own "house grades."
2. Who pays for grading?  
The participating packer or processor who requests the grading must pay the USDA an hourly rate to cover the cost of grading.
3. Which species are graded most frequently?  
Lamb and beef are graded the most frequently, whereas pork is seldom graded by USDA meat graders.
4. What are the USDA grades of beef and what do they mean?  
QUALITY GRADES (qualitative from highest to lowest grade)  
Prime (highest)  
Choice  
Select  
Standard  
Commercial  
Utility  
Cutter  
Canner (lowest)

The quality grades for beef predict the relative palatability of beef with respect to flavor, juiciness, tenderness, and overall eating satisfaction. The higher the grade, generally the more desirable the eating quality.

**YIELD GRADES** (quantitative from highest to lowest yield of meat)

- Yield Grade 1 (meaty)
- Yield Grade 2
- Yield Grade 3
- Yield Grade 4
- Yield Grade 5 (fattest)

The yield grades predict the amount of meat that one can normally obtain from a beef carcass. A yield grade 1 will yield approximately 82 percent of its carcass weight (hanging weight) in semi-boneless retail cuts. A yield grade 3 beef carcass will yield approximately 73 percent whereas a yield grade 5 will yield approximately 64 percent.

5. How are these grades determined?

**Quality Grades**—USDA meat graders objectively evaluate the beef carcass for maturity and marbling. The standards are complex and have specific requirements of maturity and marbling for each grade. Essentially the maturity classification breaks carcasses into groups of either young cattle or old cattle. Carcasses that are young are graded either Prime, Choice, Select, or Standard. Carcasses that are in the old maturity classification are graded Commercial, Utility, Cutter, or Canner. Once the maturity of a beef carcass is established, there are certain marbling requirements for each grade. For example, USDA Prime requires a slightly abundant amount of marbling, USDA Choice requires a small amount of marbling, and USDA Select requires slight marbling. The degrees of marbling, from highest to lowest, that are recognized in the specifications are Abundant, Moderately Abundant, Slightly Abundant, Moderate, Modest, Small, Slight, Traces, Practically Devoid, and Devoid. Remember that as the marbling (and consequently usually the quality grade) increases, the percentage of protein decreases.

**Yield Grades**—The yield grades are determined by USDA meat graders by considering four factors: (1) hot carcass weight, (2) fat thickness over the ribeye, (3) the amount of kidney, pelvic, and heart fat, and (4) the size of the ribeye area. For more information on grading beef, ask your local extension office for *Determining USDA Beef Carcass Grades*, AG-FO-0676.

6. Which quality grade of beef is the most popular?

USDA Choice, because it is a compromise between the more desirable flavor of Prime and the higher nutritional value (protein content) of Select. However, Select grade beef (or its equivalent) is becoming more popular because of its lower-fat content and because processing techniques are improving tenderness.

**HOW MUCH MEAT?**

1. What carcass yield (dressing percent) can I expect from a live animal?

Beef—60-63 percent; Pork—68-75 percent; Lamb—48-54 percent.

The dressing percent is the hot carcass weight divided by the live weight. The hot carcass will shrink about 2 percent in the cooler because of dehydration during the chilling process.

2. How much meat will I get from the carcass?

Beef—60-85 percent, depending on the levels of fatness and muscling.

Pork—50-90 percent, depending on the levels of fatness and muscling.

Lamb—78-92 percent, depending on the levels of fatness and muscling.

The above figures are based on a semiboneless method of cutting, half of the cuts have the bone in and half of the cuts have the bone out. It's further based on a standard trimming procedure, which may vary from plant to plant.

3. How will I know how much meat I will get from a side, forequarter, or hindquarter of beef?

Ask about the yield grade of that side, forequarter, or hindquarter of beef and use that information in the following table:

Yield Grade	Side % Retail Yield	Forequarter % Retail Yield	Hindquarter % Retail Yield
1	82.0	84.0	79.9
2	77.4	79.0	74.9
3	72.8	75.6	69.9
4	68.2	71.4	64.4
5	63.6	67.2	59.9

## TRICHINOSIS

1. What is trichinosis? Trichinosis is a disease that is caused by consuming improperly cooked pork which is infected with the live organism *Trichinella spiralis*.
2. Can trichinosis be fatal? Yes. However, the average mortality rate for individuals developing clinical symptoms is about 5 percent because of successful medical treatment with the drug Thiabendazole.
3. Is all pork infected with trichinosis? No. Recent figures show that only about 1 of 11,000 pork carcasses is infected with the live *Trichinella spiralis* organism. This is because the incidence of feeding garbage, especially uncooked garbage, to pigs is minimal and has decreased significantly in recent years.
4. If the organism is present, how is the organism destroyed so that the pork is safe to eat? *Trichinella spiralis* is destroyed in pork products by cooking the pork product to a uniform internal temperature of 137°F. All consumers are urged to use a meat thermometer to make sure that all pork is cooked to an internal temperature of 137°F. The actual recommended internal temperature of cooked fresh pork is 170°F, because pork cooked to 137°F just doesn't taste as good as it can. One other method of destroying *Trichinella spiralis* is freezing for certain lengths of time as follows: (This method is monitored by the USDA in meat processing plants when pork is to be incorporated into uncooked sausages.)

Temperature °F.	Days of frozen storage	
	Products not thicker than 6 inches	Products 6 to 27 inches in thickness
5	20	30
-10	10	20
-20	6	12

## PROCESSING

1. What are "water-added" hams? The brine used in curing is, of course, mostly water. The large amount of water uniformly distributes the curing ingredients throughout the ham in a short period of time. During the curing, smoking, and cooking processes, all of the added water is normally lost. However, some hams do not lose all of the water from the brine. USDA regulations require processors to label hams with different names if more than a normal amount of water is retained after processing. The requirements for labeling are based on a minimum protein content of the ham after taking into account the fat content (this is known as protein fat-free or PFF). The following are the names allowed for various minimum PFF percentages: Ham, 20.5; Ham With Natural Juices, 18.5; Ham Water Added, 17.0; Ham and Water Product \_\_\_X% of Weight is Added Ingredients, less than 17.0.
2. Should I buy a "water-added" ham? The decision depends upon eating preference and/or price. Some consumers prefer the extra juiciness provided by the additional water. Others do not. Hams with additional water normally sell for a lower price per pound as purchased than regular ham. The amount of extra water in Ham With Natural Juices and Ham Water Added is approximately 5 to 10 percent, respectively. A Ham and Water Product \_\_\_X% of Weight is Added Ingredients will have the percentage listed. Subtract the percentage of added water from 100, move the decimal two places to the left and divide this figure into the price per pound. The resulting price can then be compared with the price per pound of regular ham. The lower calculated figure is the best protein buy, assuming the fat trim is equal.
3. Are tenderizers safe? Yes. However, some people occasionally respond adversely to large intakes of the monosodium glutamate (MSG) in some tenderizers. MSG is used as a flavor enhancer. If you are sensitive to MSG contained in some tenderizers, use other methods of tenderizing meats such as acid marinades. Do not use any tenderizer in excess. Follow directions on the package.
4. What about the use of soy products in ground beef? Certain soy products are added to ground beef to lower the cost per pound. Currently the retail regulations require that such products not have "burger" in the name and also contain a list of ingredients on the label. Unless fortified or otherwise processed, soy products are usually lower in B vitamins, certain minerals (available iron and phosphorous), and the amino acid methionine and higher in sodium than the meat product that the soy product is mixed with.

5. What ingredients are added to meat and are they safe? Ingredients or additives added to meat must be identified on the label. The ingredients must be listed in order by weight. The ingredient present in the largest quantity is listed first, followed by the second most plentiful ingredient, etc. The safety of meat ingredients is determined by the Food and Drug Administration of the federal government. The extent of the use of ingredients (including labeling) is monitored by the various meat inspection agencies.
6. What about nitrates and nitrites used in curing? Are they safe? Yes. The use of nitrates and nitrites is approved by the Food and Drug Administration and is monitored by the USDA. For more information, obtain *Nitrite in Meat*, AG-FS-0974, from your local extension office.
7. How long should beef be aged? Aging time is a personal taste preference; a minimum time is 5 days and an average time is 7 to 10 days. For more information, obtain *Aging Beef*, AG-FS-0968, from your local extension office.
8. What about processing meat in the home? It is legal if you do not sell the meat. For more information and recipes, obtain *Processing Meat in the Home*, AG-FS-0972, from your local extension office.

## SELECTION

1. How can I adequately identify the names of meat products? Minnesota state rules and regulations now require that prepackaged meat sold at retail must contain on the price-weight label the following information: (1) specie, (2) wholesale cut, and (3) "recommended" retail cut name. The recommended retail cut names do not include the so-called fanciful names, such as "Penthouse," "Family," "Bronco," "Spencer," etc. For more information, obtain *Names of Retail Meat Cuts*, AG-BU-0502, from your local extension office.
2. Can fanciful names still be used? Yes. Fanciful names may appear on any part of the package *except* the price-weight label. Therefore, always check the price-weight label first.
3. How can I tell how much beef is in "Beef with Gravy" as compared to "Gravy with Beef," etc.? Write to U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Washington, D.C. 20250, and ask for the publication entitled *Standards for Meat and Poultry Product—A Consumer Reference List*.
4. What color is the most desirable in fresh beef? A bright, cherry red color is most desirable and usually will give you optimum eating satisfaction and little shrinkage. Occasionally, you will find very dark colored beef. This beef is from an animal that has been stressed before slaughter. The juiciness of this beef may be better than normal. This product will shrink less during storage, processing, and cooking. This dark colored beef is not to be confused with beef from an old animal (commercial grade) or beef that has been in the retail case too long. For more information on dark-cutting beef, contact your local extension office and ask for *Dark-Cutting Beef*, AG-FO-0688.
5. How can I tell when ground beef is not fresh? This is complicated, because many color changes occur in ground beef during storage. In general, look for a bright, cherry red color. For more information, ask for *Selecting and Storing Ground Beef*, AG-MI-0823, at your local extension office.
6. Are all meat products code dated according to "freshness?" No. Code dating is not currently required by law. If you want to know how long a product has been processed or displayed, ask your meat retailer about that specific product.
7. What color is the most desirable in fresh pork? A bright grayish-pink or darker color is most desirable. Excessively pale, soft, and watery pork is more apt to lose more juices during storing and cooking.
8. What level of marbling is the most desirable? Marbling contributes to flavor and somewhat to juiciness. As marbling increases, flavor and juiciness also increase. However, there is a point beyond which excessive amounts of marbling do not contribute any more flavor or juiciness but result only in a tallowy or oily feeling in the mouth while chewing. Additionally, one should avoid buying beef, pork, or lamb with no marbling because it is more apt to dry out during the cooking process and will lack flavor and juiciness. It may however, contain less calories. Select cuts of beef, pork, and lamb with small to moderate amounts of marbling for the combination of adequate flavor and adequate nutritional value.

## PRICING

1. Why are meat items priced differently?

Cuts of meat are priced differently because they have different flavor and tenderness characteristics and thus, varying consumer demands. For example, filet mignon is never tough if cooked properly, but cuts from the chuck or round occasionally lack tenderness. Also, certain cuts require more processing—cutting and trimming, curing, etc.—and this extra cost must be added on to the price. Pricing differential is also caused by the demand for specific cuts. Some cuts are more expensive because the local demand is great. Also, there are only so many rib steaks, club steaks, T-bones, etc., per carcass. The retailer prices each cut at the price at which it will sell.

2. How can I get the most meat for my dollar?

Figure cost per serving.

$$\text{Cost per serving} = \frac{\text{Price per pound as purchased}}{\text{Number of 4 ounce servings of lean per pound}}$$

Use the following guide:

<u>Type of cut</u>	<u>Servings per pound</u>
Ground meats	4
Boneless	3
Semi-boneless	2
Bony and fat	1
Example—Cut A, boneless, \$3.30 per pound	
Cost per serving = $\frac{\$3.30}{3} = \$1.10$ per serving	
Cut B, bony, \$1.80 per pound	
$\frac{\$1.80}{1} = \$1.80$ per serving	

For more information, obtain *Buying Meat By Cost Per Serving*, AG-FS-0970, from your local extension office.

3. How should I price hamburger, ground beef, and similar items?

First, you must understand the difference between hamburger, ground beef, lean ground beef, and extra lean ground beef. **Hamburger:** Hamburger is chopped fresh or frozen beef *with or without* added beef fat as such or seasoning. It does not contain more than 30 percent fat. Water is not added. It does not contain binders, extenders, hearts, beef cheeks, tongue, tongue meat, or other by-products. When beef cheek meat (trimmed beef cheeks) is used in the preparation of hamburger, the amount of cheek meat is limited to 25 percent and its presence is declared on the label in the ingredient statement, if any, or otherwise near the product name.

**Ground beef,** regular ground beef, or chopped beef: Ground beef, regular ground beef, or chopped beef consists of ground or chopped fresh or frozen beef with or without seasoning and *without* the addition of beef fat as such. It does not contain more than 30 percent fat. Water is not added. It does not contain binders, extenders, hearts, beef cheeks, tongue, tongue meat, or other by-products. When beef cheek meat (trimmed beef checks) is used in the preparation of chopped or ground beef, the amount of cheek meat is limited to 25 percent and its presence is declared on the label in the ingredient statement, if any, or otherwise near the product name.

**Lean ground beef,** lean regular ground beef, or lean chopped beef: Lean ground beef, lean regular ground beef, or lean chopped beef meets the requirements of ground beef but does not contain more than 22 percent fat.

**Extra lean ground beef,** extra lean regular ground beef, or extra lean chopped beef: Extra lean ground beef, extra lean regular ground beef, or extra lean chopped beef meets the requirements of ground beef but does not contain more than 15 percent fat.

Summary:	Maximum fat %	Fat can be added	Water can be added
Hamburger	30	yes	no
Ground beef	30	no	no
Lean ground beef	22	no	no
Extra lean ground beef	15	no	no

To price the different categories of ground beef, calculate how much fat and protein you are buying per pound:

Hamburger and ground beef	30 percent fat, 17 percent protein
Lean ground beef	22 percent fat, 19 percent protein
Extra lean ground beef	15 percent fat, 21 percent protein

You must recognize, however, that as the percent fat decreases, flavor and juiciness also decrease.

4. Does marbling influence price?

In beef and lamb, marbling influences price to the extent that marbling influences grade (higher grades have more marbling and higher grades, Prime and Choice, are usually higher priced than the Good grade). Marbling has little effect on the price of fresh pork.

**STORAGE**

1. How should I store fresh meat?

At 30°-32°F in your refrigerator. Meat stored at this lower temperature will have a longer shelf life than meat stored at 40°-45°F. This is because the growth of microorganisms, which are always present in some quantity on all meat, occurs more rapidly at higher temperatures than at lower temperatures. Growth of microorganisms is responsible for discoloration and subsequent spoilage of meat products. Do not be afraid to store meat at 30°-32°F, because meat freezes at 28.6°F, not 32°F. To set your refrigerator at 32°F, place a paper cup half full of water in the part you will store meat. When a partial ice formation is observed, the temperature is 32°F. For more information, contact your local extension office and ask for *Storing Meat In Your Refrigerator*, AG-FO-0593.

2. Should I rewrap fresh meat before putting it into the refrigerator?

Not necessarily. Rewrapping only introduces the possibility of further microbial contamination from your hands, cutting table, and various utensils. The clear packaging material that fresh meat is packaged in is permeable to oxygen so that it maintains its bright bloom, but is impermeable to moisture from the inside out so that the meat will retain all its moisture.

3. How long will meat stay fresh in the refrigerator?

This depends on the temperature of your refrigerator and upon the sanitary conditions of the retailer that you purchased the meat from. Normally, by storing meat at 30-32°F. you can expect a refrigerator life of 5-7 days. However, so many factors influence refrigerator life, especially temperature of the refrigerator, that guidelines are often inaccurate. Additionally, in the case of fresh beef, the amount of aging that a carcass has undergone at the processing plant or the retail store before cutting strongly influences refrigerator life of fresh beef (especially ground beef), making guidelines almost worthless. You should consume the product before it turns to a brownish-red color or develops off odors.

4. Should hams be stored in the refrigerator?

Definitely yes!! Only hams that are specifically labeled "Does not require refrigeration" should remain at room temperature. Otherwise, all canned hams and definitely all uncanned hams must be refrigerated at all times. If canned hams that require refrigeration are not refrigerated, it is *possible* that botulism could result.

5. How should meat be frozen in the home?

Use a high quality freezer wrap to freeze meat in the home. Remove the store wrap, wrap the meat tightly with the freezer wrap (preferably wrap twice) and place in the freezer. Be careful not to overload your freezer.

6. What variables influence the freezer life of frozen meat?

The freshness of the product before freezing, the quality of the packaging material (should be water and oxygen impermeable), the tightness of the packaging, and the temperature of the freezer (should be 0°F or lower) all influence how long meat products can be frozen and still maintain optimum taste. The maximum recommended length of storage of certain meat items at various temperatures for the preservation of optimum quality is as follows<sup>1</sup>:

Item	- 12°C + 10°F	- 18°C 0°F	- 24°C - 11°F	- 30°C - 22°F
	Months			
Beef	4	6	12	12
Lamb	3	6	12	12
Veal	3	4	8	10
Pork (fresh)	2	4	6	8
(cured, unsliced) <sup>2</sup>	0.5	1.5	2	2
Variety meats (liver, heart, tongue) <sup>3</sup>	2	3	4	4
Ground beef and lamb	3	6	8	10
Seasoned sausage <sup>4</sup> (pork, bulk)	0.5	2	3	4

<sup>1</sup>Forrest, J. C.; Aberle, E. D.; Hedrick, H. B.; Judge, M. D.; and Merkel, R. A.; *Principles of Meat Science*. Kendall/Hunt Publishing Company, Dubuque, Iowa, 1989.

<sup>2</sup>It is not recommended that sliced bacon and sliced luncheon meat products be frozen because the air incorporated during slicing, together with the salt effect, leads to the development of rancid flavors in a matter of weeks.

<sup>3</sup>It is not recommended that brains and sweetbreads be frozen because texture is adversely affected.

<sup>4</sup>It is not recommended that pork sausage links and patties, and other sausages (such as bologna, franks, and braunschweiger) be frozen because salt enhances the development of rancidity during frozen storage.

## THAWING

1. How should frozen meat be thawed?

Frozen meat should be thawed in the **refrigerator** because you do not want to risk leaving a frozen product on the counter top too long because excessive microbial growth might occur. It will take longer to thaw the product in the refrigerator, especially if one sets it at 32°F. (where it should be), but it is much safer to thaw in the refrigerator. If time does not allow you to thaw properly, try cooking the frozen meat. People often are confused and worried about cooking frozen meat, but there is nothing wrong with this procedure and you will avoid keeping the product at room temperature for excessive periods of time. Cooking in the frozen state will require about 20 percent more cooking time. Unless you are very careful, it is not recommended that frozen steaks be broiled because they may burn on the outside before they are cooked properly internally. If you must thaw meat at room temperature, leave the wrapper on to minimize moisture loss. Cook within 3 hours after placing the product at room temperature!

2. Are thawing and refreezing all right?

Meat that is thawed properly in a refrigerator set at 30°-32°F. can be refrozen. Each time meat is frozen and thawed, it loses some juices. However, nothing is wrong with refreezing meat thawed in this manner.

## COOKING

1. What happens when meat is cooked?

Muscle protein toughens and connective tissue softens. Therefore, cook cuts with low amount of connective tissue, e.g., rib and loin steaks, by using dry heat and cooking rapidly. The objective is to cook the meat cuts that are low in connective tissue to the lowest degree of doneness that appeals to you so that toughening of the muscle proteins and water loss will be minimal. For cuts with high amounts of connective tissue, e.g., chuck roasts, use low heat and a moist cooking method, so that the large amount of stronger connective tissue of these cuts is converted to gelatin, and thus becomes more tender. The result is a more tender product than the same product cooked with dry heat.

2. What is the most common mistake in cooking meat?

The most common mistake in cooking meat is that meat is cooked for too long at too high a temperature. This can be prevented, especially in roasts, by using a meat thermometer and avoiding oven temperatures above 325°F. Buy a good meat thermometer, not a cheap one.

3. What is the proper way to use a meat thermometer?

Insert the thermometer into the thickest part of the cut making sure that the tip of the thermometer does not touch deposits of fat or bone.

4. What temperature should meat be cooked to?

Beef:	Rare	135-140°F.
	Medium	150°F.
	Well	160°F.
Pork:	Fresh	170°-175°F.
	Cured	150°F.
Lamb:	Medium-well	170-175°F.

5. How can I prevent steaks and chops from buckling and curling on the grill?

Cut the edge of the fat and connective tissue on the outside of the muscle two or three places before cooking. Do not cut into the muscle.

## EATING CHARACTERISTICS

1. What influences flavor?

Marbling influences general flavor; as marbling levels increase, the flavor increases. As the animal becomes older, the flavor also increases in intensity. Genetics also influence flavor. What the animal eats, especially the pig, can influence flavor. Also, degree of doneness and method of cooking influence flavor. Broiled or fried pork will be browner than pork cooked with moist heat at a low temperature. This latter procedure can result in pork with a "piggy flavor."

2. What influences tenderness?

Tenderness is influenced by the age of the animal; the older animal is less tender. Additionally, muscles vary in their tenderness. Muscles that are used strictly for supportive functions in the animal tend to be more tender than muscles that are used for locomotive and supportive functions. Locomotive muscles, such as those in the forelegs, will be less tender because of the composition, amount, and nature of the connective tissue. Also, the genetics of the animal influence tenderness. Aging beef for 7 to 10 days or more increases tenderness. As already mentioned, method of cooking also influences tenderness. Perhaps the factor most important to meat tenderness is final internal meat temperature; meat is more tender at lower temperatures. What the

animal is fed has little influence on tenderness! For more information obtain *Meat Tenderness*, AG-FO-0856, from your local extension office.

3. What influences juiciness? The state of the fresh product before cooking influences juiciness. For example, dark, firm and dry beef, pork, or lamb will be expected to retain more juices during cooking than a pale, soft, and watery product. More important, juiciness is influenced by the final internal temperature of the meat product. Meat is more juicy at lower meat temperatures and when high oven temperatures (above 325°F.) are avoided.
4. What is "sex odor"? "Sex odor" is a strong onion-like or perspiratory-like odor given off from cooked pork products that have been derived from sexually mature males, late castrated males, or cryptorchids. If you have observed "sex odor" ("boar odor") in a fresh or cured pork product during cooking, return that product to your retailer immediately and tell him of the problem.
5. What causes fishy odor in pork? Pigs that have been fed unusually large amounts of fish or fish meal. Additionally, a fishy odor can be absorbed in meat that has been stored in, around, or on fish.

**NUTRITIONAL VALUE**

1. What is the composition of the muscle portion (excluding trimmable fat and bone) of uncooked meat?

	<u>Average percentage</u>
Moisture	70
Protein	20
Fat	8
Vitamins, minerals, and carbohydrates	<u>2</u>
	100

2. How does this composition change?

Marbling influences the composition considerably:

Item	Heavily marbled	Practically devoid
	percent	
Moisture	68	74
Protein	18	20
Fat	12	4
Minerals, vitamins, and carbohydrates	<u>2</u>	<u>2</u>
	100	100

Cuts low in fat (marbling) include shank, flank steak, and round (beef), foreshank and ham (pork), and foreshank and leg (lamb).

3. Do some species contain more saturated fatty acids than others?

Yes. Although beef, pork, and lamb all contain both saturated and polyunsaturated fat, there are differences because of species, location of the fat deposit (internal fat vs. subcutaneous fat), composition of diet, etc. In general, ranking by species from high to low saturated fatty acid content would be as follows:

- Lamb
- Beef
- Pork

For detailed information, obtain Agriculture Handbooks 8-10, 8-13 and 8-17 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

4. What is the relationship between nutritional value and taste of meat products?

Inverse. As the amount of fat decreases and protein increases, usually the flavor also decreases. This is why Choice grade beef is preferred by most consumers. Prime usually has optimum flavor but has a lower nutritional value caused by a higher fat content and lower protein content. Select grade beef has optimum nutritional value but isn't usually as tasty. Therefore, Choice is between the higher flavor of Prime and the higher nutritional value of Select.

5. Are certain meat products high in salt?

Cured meat products contain salt, some more than others. If you are on a low-salt diet, contact the dietitian at your local hospital or write directly to the processor of the meat item in question.

6. What is the cholesterol content of meat?

The milligrams of cholesterol present in 100 grams of edible tissue of meat varies slightly by specie as follows:

Pork—65  
Beef—60  
Lamb—71  
Veal—71

For more information, obtain *Amount of Fat and Cholesterol in Meat*, AG-FO-0682.

### STORING COOKED MEAT PRODUCTS

1. How should cooked meat products be stored?

If not eaten, immediately store cooked meat products either above 140°F or in the refrigerator. After cooling in the refrigerator, wrap the meat product in a freezer wrap or other impermeable material to prevent air from coming into contact with the meat. This is necessary to minimize oxidative rancidity which leads to a warmed-over flavor. Beef and pork, when reheated, almost always have a "left-over" flavor. The reason for this and preventative measures are not well understood. It is known that meat cured with sodium nitrite does not exhibit a warmed-over flavor.

**PRACTICAL INFORMATION ON MANY SUBJECTS IS AVAILABLE FROM THE MINNESOTA EXTENSION SERVICE.  
CONTACT THE COUNTY EXTENSION OFFICE NEAREST YOU.**

Aitkin (NE) Courtthouse 209-2nd St. NW Aitkin, MN 56431 (218) 927-2102	Cottonwood (SW) RR2-Box 123 Windom, MN 56101 (507) 831-4022	Kandiyohei (SC) 905 W. Litchfield P.O. Box 977 Willmar, MN 56201 (612) 235-1485	Mower (SE) Courtthouse 201 NE 1st St. Austin, MN 55912 (507) 437-9552	Ramsey (EC) 2020 White Bear Ave. St. Paul, MN 55109 (612) 777-8156 HE & HORT (612) 777-1327 ADM & 4-H	Stevens (WC) Colonial Square 208 Atlantic Ave. Morris, MN 56267 (612) 589-2588
Anoka (EC) Anoka Activity Center 550 Bunker Blvd. NW Anoka, MN 55304 (612) 755-1280	Crow Wing (WC) County Service Bldg. Brainerd, MN 56401 (218) 828-3980	Kittson (NW) Courtthouse-Box 369 Hallock, MN 56728 (218) 843-3674	Murray (SW) County Courts Bldg. Slayton, MN 56172 (507) 836-6148	Red Lake (NW) Courtthouse Red Lake Falls, MN 56750 (218) 253-2895	Swift (SW) Courtthouse P.O. Box 305 Benson, MN 56215 (612) 843-3796
Becker (WC) Ag Service Center 1000-8th St. SE Detroit Lakes, MN 56501 (218) 847-3141	Dakota (EC) Fairgrounds 4100-220th St. W. Farmington, MN 55024 (612) 463-3302	Koochiching (NE) Courtthouse Int'l Falls, MN 56649 (218) 283-6282	Nicollet (SC) 501 S. Minnesota Ave. St. Peter, MN 56082 (507) 931-6800	Todd (WC) Courtthouse Annex 119 3rd St. S. Long Prairie, MN 56347 (612) 732-4435	Traverse (WC) Courtthouse Wheaton, MN 56296 (612) 563-4515
Beltrami (NW) Courtthouse Bemidji, MN 56601 (218) 759-4150	Dodge (SE) Box 159 Main St. Dodge Center, MN 55927 (507) 374-6435	Lac Qui Parle (SW) Courtthouse Madison, MN 56256 (612) 598-3325	Nobles (SW) P.O. Box 758 Worthington, MN 56187 (507) 372-8210	Redwood (SW) Courtthouse P.O. Box 46 Redwood Falls, MN 56283 (507) 637-8323	Wabasha (SE) 254 W. Main St. Wabasha, MN 55981 (612) 565-2662
Benton (EC) Courtthouse Foley, MN 56329 (612) 968-6254	Douglas (WC) Courtthouse Alexandria, MN 56308 (612) 762-2381	Lake (NE) Courtthouse 601 3rd Ave. Two Harbors, MN 55616 (218) 834-8377	Norman (NW) 101 W. 3rd Ave. Ada, MN 56510 (218) 784-7183	Renville (SC) Courtthouse Olivia, MN 56277 (612) 523-2522	Wadena (WC) Courtthouse Wadena, MN 56482 (218) 631-2332
Big Stone (SW) 20 SE 2nd St. Ortonville, MN 56278 (612) 839-2518	Faribault (SC) Faribault Co. Office Bldg. 412 N. Nicollet Blue Earth, MN 56013 (507) 526-2138	Lake of the Woods (NW) Courtthouse P.O. Box 598 Baudette, MN 56623 (218) 634-1511	Olmsted (SE) 1421-SE 3rd Ave. Rochester, MN 55904 (507) 285-8250	Rice (SE) Courtthouse Faribault, MN 55021 (507) 334-2281	Washington (EC) 1825 Curve Crest Blvd. # 202 Stillwater, MN 55082 (612) 439-0101
Blue Earth (SC) County Government Ctr 410 S. 5th St. Mankato, MN 56001 (507) 387-8325	Fillmore (SE) Masonic Bldg. Preston, MN 55965 (507) 765-3896	Le Sueur (SC) Courtthouse P.O. Box 206 Le Center, MN 56057 (612) 357-2251	Otter Tail-E (WC) 222 2nd Ave. SE Perham MN 56573 (218) 346-5750	Rock (SW) 110 N. Oakley Luverne, MN 56156 (507) 283-4446	Waseca (SC) 122-3rd Ave. NW Waseca, MN 56093 (507) 835-0600
Brown (SC) 300-2nd Ave. SW Sleepy Eye, MN 56085 (507) 794-7993	Freeborn (SE) 200 Post Office Bldg. Albert Lea, MN 56007 (507) 373-1475	Lincoln (SW) P.O. Box 130 Ivanhoe, MN 56142 (507) 694-1470	Otter Tail-W (WC) Courtthouse Fergus Falls, MN 56537 (218) 739-2271	Roseau (NW) 308 Center St. W. Roseau, MN 56751 (218) 463-1052	Watsonwan (SC) Courtthouse P.O. Box 68 St. James, MN 56081 (507) 375-3341
Carlton (NE) Carlton Civic Center P.O. Box 307 Carlton MN 55718 (218) 384-3511	Goodhue (SE) Courtthouse-Room 105 Red Wing, MN 55066 (612) 388-8261	Lyon (SW) Ag Service Center 140 E. Lyon St. Marshall, MN 56258 (507) 537-6702	Pennington (NW) Courtthouse Box 616 Thief Riv. Falls, MN 56701 (218) 681-2116	St. Louis (NE) Washburn Hall-Rm. 109 2305 E. 5th St. Duluth, MN 55812 (218) 726-7512	Wilkin (WC) Courtthouse P.O. Box 30 Breckenridge, MN 56520 (218) 643-5481
Carver (EC) 219 E. Frontage Rd. Waconia, MN 55387 (612) 442-4496	Grant (WC) Courtthouse Elbow Lake, MN 56531 (612) 685-4820	McLeod (SC) 804 E. 11th St. Courtthouse West Glencoe, MN 55336 (612) 864-5551	Pine (NE) 105 Fire Monument Rd. P.O. Box 370 Hinckley, MN 55037 (612) 384-6156	St. Louis (NE) Washburn Hall-Rm. 109 2305 E. 5th St. Duluth, MN 55812 (218) 726-7512	Winona (SE) 202 W. 3rd St. Winona, MN 55987 (507) 457-6440
Cass (WC) Courtthouse Walker, MN 56484 (218) 547-3300	Hennepin (EC) 701 Decatur Ave. N.-105 Minneapolis, MN 55427 (612) 542-1427	Mahnomen (NW) Courtthouse Mahnomen, MN 56557 (218) 935-2226	Pipestone (SW) P.O. Box 218 119-2nd Ave. SW Pipestone, MN 56164 (507) 825-5416	Virginia (MN) 55792 (218) 749-7120	Wright (EC) Courtthouse Buffalo, MN 55313 (612) 682-3900
Chippewa (SW) Courtthouse Montevideo, MN 56265 (612) 269-6521	Houston (SE) Courtthouse Caledonia, MN 55921 (507) 724-5211	Marshall (NW) Courtthouse 208 E. Colvin Ave. Warren, MN 56762 (218) 745-5232	Polk-E (NW) P.O. Box 69 Municipal Bldg. McIntosh, MN 56556 (218) 563-2465	Scott (EC) 123 1st St. E. Jordan, MN 55352 (612) 492-2370	Yellow Medicine (SW) 1004-10th Ave. Box 128 Clarkfield, MN 56223 (612) 669-4471
Chisago (NE) 38694-6 Flink Ave. North Branch, MN 55056 (612) 257-2982	Hubbard (NW) Courtthouse Park Rapids, MN 56470 (218) 732-3391	Martin (SC) 827 E 1st St. Fairmont, MN 56031 (507) 235-3341	Polk-W (NW) 1500 University Ave. P.O. Box 556 Crookston, MN 56716 (218) 281-1751	Sherburne Sherburne Co. Gov't. Ctr. 13880 Hwy. 10 P.O. Box 311 Elk River, MN 55330 (612) 441-8665	
Clay (WC) Courtthouse Moorhead, MN 56560 (218) 299-5020	Itasca (NE) Courtthouse Grand Rapids, MN 55744 (218) 327-2849	Meeker (SC) Courtthouse Litchfield, MN 55355 (612) 693-2801	Pope (WC) Courtthouse Glenwood, MN 56334 (612) 634-5301	Sibley (SC) Courtthouse, Box 207 Gaylord, MN 55334 (612) 237-5531	
Clearwater (NW) Route 1-Box 18 Bagley, MN 56621 (218) 694-6151	Jackson (SW) 419 Main St. Box 308 Lakefield, MN 56150 (507) 662-5293	Mille Lacs (NE) County Office Bldg. Milaca, MN 56353 (612) 983-2561	Stearns (EC) 2700 1st St. N. #205 St. Cloud, MN 56303 (612) 255-6169	Steele (SE) County Adm. Annex 590 Dunnell Dr. P.O. Box 890 Owatonna, MN 55060 (507) 451-8040	
Cook (NE) Courtthouse Grand Marais, MN 55604 (218) 387-2282	Kanabec (NE) Courtthouse 18 N. Vine Mora, MN 55051 (612) 679-3010	Morrison (WC) Administrative Bldg. Little Falls, MN 56345 (612) 632-2941			