



# Meat and Poultry Packaging Materials

*Consumers may see packaging as an attractive and informative container for fresh and processed meat and poultry. However, because it touches the food, packaging is considered an indirect additive. That's because chemicals in packaging can migrate into the food. The following information explains various types and uses of meat packaging materials and how their safety is regulated by government agencies.*

(A "Glossary of Packaging Terms" can be found at the end of this publication.)

## Who approves packaging materials for meat and poultry products?

The U.S. Food and Drug Administration (FDA) approves all food packaging materials. Any material intended for use in food packaging must be formulated in compliance with FDA requirements for its intended use. The manufacturer of a new material must petition FDA and provide data proving the material is safe to use if it is not already regulated for the proposed use.

Meat and poultry products may not be packaged in a container composed of any substances that may adulterate the contents or be injurious to health. Packaging materials entering a meat or poultry plant must be accompanied or covered by a guaranty or statement of assurance from the packaging supplier. The guaranty must state that the material complies with the Federal Food, Drug and Cosmetic Act (FFDCA). It must also state the brand name, supplier, and conditions for use, including temperature and other limits.

## How are materials monitored?

USDA's Food Safety and Inspection Service (FSIS) monitors the use of packaging material in all meat and poultry plants. The plants must maintain a file containing guaranties for all packing materials in the plant. This file must be open to FSIS officials at all times.

To verify guaranties, FSIS randomly selects packaging materials for review. If the Agency determines a packaging material does not comply with Federal food laws and regulations, the material is disapproved and its use in federally-inspected meat and poultry plants may be denied.

Inspectors may question a packaging material's performance or other physical aspects; for example, a food is discolored by what appears to be ink coming from the packaging, or the food has developed a "chemical" odor after contact with the packaging material.

## Must packaging materials be approved for irradiation?

Yes, they must be approved by FDA under the Federal Food, Drug and Cosmetic Act (FFDCA). The packaging comes into direct contact with food so it cannot be composed of substances that might migrate into the food as a consequence of the irradiation process.

In addition, these packaging materials cannot demonstrate detectable radioactivity as a result of irradiation. FDA regulations specify a maximum absorbed dose level of irradiation that the packaging material can be safely subjected to.

### Must irradiated poultry and pork be packaged?

USDA/FSIS irradiation regulations require poultry to be irradiated in the package in which it will be sold to the consumer. Irradiated poultry is available in a limited number of geographic areas in the U.S.

USDA/FSIS pork irradiation regulations allow for unpackaged pork to be irradiated because the radiation treatment is for the destruction of trichinae, a parasite which is not air-borne. Post-process contamination of the irradiated pork with trichinae larvae would not likely occur. No irradiated pork is available in the U.S. at this time.

Irradiated foods can be recognized by the presence of a "Radura," the international symbol for irradiation, on the packaging along with the words "Treated with Radiation," or "Treated by Irradiation."



### What packaging materials are approved for irradiation?

Under the Federal Food, Drug and Cosmetic Act (FFDCA), the FDA approves packaging materials that come into direct contact with food. To see a lengthy list of the packaging materials approved for use in irradiation, go to "Packaging Materials for Irradiated Foods" in the Code of Federal Regulations, Title 21, Volume 3, Section 179.45 (cited as: 21CFR179.45), revised as of April 1, 2013. [www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm](http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm)

The packaging materials listed in this section may be safely subjected to irradiation subject to the provisions and to the requirement that no induced radioactivity is detectable in the packaging material itself.

### What is vacuum packaging and modified atmosphere packaging?

Oxygen in the air hastens both the chemical breakdown and microbial spoilage of many foods. To help preserve foods longer, scientists have developed ways to help overcome the effects of oxygen. Vacuum packaging, for example, removes air from packages and produces a vacuum inside. Modified atmosphere packaging (MAP) and controlled atmosphere packaging (CAP) help to preserve foods by replacing some or all of the oxygen in the air inside the package with other gases such as carbon dioxide or nitrogen.

### Is it safe to freeze meats in grocery store packaging?

Yes, it is safe to freeze meat or poultry directly in its supermarket wrapping, but this type of wrap is permeable to air. Unless you will be using the food in a month or two, overwrap packages with airtight heavy-duty foil or freezer wrap. This should protect the product from freezer burn for longer storage.

### Is food in damaged or discolored cans dangerous?

Possibly. While extremely rare, a toxin produced by *Clostridium botulinum* is the worst danger in canned goods. NEVER USE food from containers that show possible "botulism" warnings: leaking, bulging, or badly dented cans; cracked jars or jars with loose or bulging lids; canned food with a foul odor; or any container that spurts liquid when opening. DON'T TASTE SUCH FOOD! Even a minuscule amount of botulinum toxin can be deadly.

Can linings might discolor or corrode when metal reacts with high-acid foods such as tomatoes or pineapple. As long as the can is in good shape, the contents should be safe to eat, although the taste, texture and nutritional value of the food can diminish over time.

### Do cans contain lead?

No. The U.S. canned food industry, which began phasing out the use of lead-soldered cans in 1979, stopped using lead-soldered cans in 1991. In 1995, the Food and Drug Administration issued a final rule prohibiting the use of lead solder in all food cans, including imported products.

Metal cans, which are made of sheet steel—sometimes with a coating of tin—are now welded closed at the seams. The inside of the can may also have an enamel or vinyl protective coating.

### When cans freeze, is food safe to use?

Cans that freeze accidentally, such as those left in a car or basement in sub-zero temperatures, can present health problems. If the cans are merely swollen — and you are sure the swelling was caused by freezing — the food may still be usable. If seams have rusted or burst, throw the cans out immediately. Discard frozen cans that have been allowed to thaw above 40 °F (4.4 °C).

Let the intact can thaw in the refrigerator before opening. If the product doesn't look and/or smell normal, throw it out. Do not taste it! If the product does look and/or smell normal, thoroughly cook the contents right away by boiling for 10 to 20 minutes. Products can then be refrigerated or frozen for later use.

### What are consumer packaging materials?

Packaging that can be purchased or is available to use in grocery stores (such as produce or meat bags) have been approved by the FDA for food contact. These include:

**Plastic Wraps and Storage Bags** - Consumer plastic wraps and bags are made from three major categories of plastics: polyethylene (PE), polyvinylidene chloride (PVDC) and polyvinyl chloride (PVC). The plastic resins are petroleum derivatives. Plasticizers, colorants or anti-fog compounds may be added.

**In-store Produce Bags** - Typically made from polyethylene or other plastic film, these bags are used for consumer in-store packaging of fruits and vegetables. Do not use for cooking; the thin plastic may melt or burn.

**Oven Cooking Bags** - Both the bags and their closure ties are made from heat-resistant nylon. They can be used in a microwave oven or in a conventional oven set no higher than 400 °F (204.4 °C).

**Aluminum Foil** Foil is 98.5% aluminum with the balance primarily from iron and silicon to give strength and puncture resistance. The molten alloy is rolled thin and solidified between large, water-cooled chill rollers. During the final rolling, two layers of foil are passed through the mill at the same time. The side coming in contact with the polished steel rollers become shiny; the other side comes out dull. It does not make any difference which side of the foil contacts the food.

**Freezer Paper** - white paper coated on one side with plastic to help keep air out of frozen foods, thus protecting against freezer burn and loss of moisture.

**Parchment Paper** - an odorless and tasteless paper made from cotton fiber and/or pure chemical wood pulps. It may be waxed or coated and is greaseproof or grease resistant. Parchment paper is primarily used in baking as a pan liner or to wrap foods in for cooking.

**Wax Paper** - a triple-waxed tissue paper; made with a food-safe paraffin wax which is forced into the pores of the paper and spread over the outside as a coating.

### Is it safe to use grocery bags for cooking?

No. Grocery bags are not intended or formulated for cooking foods. Levels of components such as metal fragments, glue and chemicals may be present at higher-than-acceptable limits and can migrate into the food. These bags may not necessarily be sanitary, particularly since they may be stored under a variety of conditions.

The use of plastic trash bags for food storage or cooking is also not recommended because they are not food grade plastic and chemicals from them may leach into the food.

### **If aluminum foil pits, is food endangered?**

No. Pinholes in foil or a blue liquid that may form on the food that has come in contact with the foil are not harmful. These reactions can occur when salt, vinegar, highly acidic or highly spicy foods come in contact with aluminum foil. The product is a harmless aluminum salt and presents no safety problem if consumed, however it can be trimmed off to improve the food's appearance. Some aluminum salts are used in antacid medicines for the treatment of stomach disorders.

### **Can chemicals from packaging migrate into food?**

Yes, small amounts of chemicals from packaging materials can migrate into foods. It is for this reason that each packaging material must be regulated for a specific use by the FDA. However, sometimes consumers misuse packaging materials in ways not intended or anticipated when the material was regulated for food use.

For example, cold food storage containers—such as cottage cheese cartons and margarine tubs—used for refrigerator or freezer storage of foods are intended for those uses only. They have not been tested or approved for any other use, including cooking. Do not use these types of containers for heating food. They are not heat stable and chemicals from the plastic may migrate into the food during heating.

### **Should foods be microwaved in packaging materials?**

Microwave food in packaging materials only if the package directs, and then use only one time. Materials suitable for microwaving include oven bags, wax paper and plastic wrap. Do not let the plastic wrap touch the food, and do not reuse the wrap.

Foam insulated trays and plastic wraps on fresh meats in grocery stores are not intended by the manufacturer to be heated and may melt when in contact with hot foods, allowing chemical migration into the food. In addition, chemical migration from packaging material to a food does not necessarily require direct contact. Excessive heat applied to a closed container may drive off chemical gases from the container that can contaminate the enclosed food.

These types of plastic products should not be used in a microwave oven because they are subjected to heat when thawing or reheating. To avoid a chemical migration problem, remove meats from their packaging.

### **If packaging is accidentally cooked in a conventional oven, is the food safe to eat?**

Plastic packaging materials should not be used at all in conventional ovens. They may catch on fire or melt, causing chemical migration into foods. Sometimes these materials are inadvertently cooked with a product. For example, giblets may be accidentally cooked inside the turkey in their packaging or a beef roast may be cooked with the absorbent pad from the fresh meat packaging underneath.

The giblet bag and the absorbent pad are clearly not intended to be cooked, however if this happens and the packaging materials remain unaltered (that is, do not melt or come apart) the cooked meat will not pose an imminent health hazard. If the packaging materials have melted or changed shape in some other way, do not use the product.

### **Could bacteria cross contaminate when packaging materials are reused?**

Yes. Plastic wrap, foam meat trays, convenience food dishes, and egg cartons have been approved for a specific use and should be considered one-time-use packaging. Bacteria from foods that these packages once contained may remain on the packaging and thus be able to contaminate foods or even hands if reused.

### **How long can meat and poultry be stored in various packaging?**

Storage times of meat and poultry products vary depending upon their processing method and packaging. Fresh meat in foam trays and shrink wrap, and opened packages of lunch meats may be refrigerated 3 to 5 days; ground meats, poultry and variety meats, 1 to 2 days. Unopened packages of hot dogs and lunch meats can be stored 2 weeks. If processed meat and poultry products bear "use-by" dates, observe them.

Canned meats should be stored in a cool, dry place. Stored under these conditions, the products should remain at best quality for 2 to 5 years and are safe to consume indefinitely. The same applies to retort packages such as military MREs (Meals Ready to Eat). Discard canned foods or retort pouches showing signs of swelling, rusting or leakage.

Frozen foods will be safe indefinitely but the quality may suffer with lengthy storage.

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**Special thanks to the National Food Processors Association.**

### GLOSSARY OF PACKAGING TERMS

**Absorbent packing:** Material within a package which absorbs liquids from product; pad in meat trays is made from paper and has a plastic liner.

**Aseptic packaging:** A technique for creating a shelf-stable container by placing a commercially sterile product into a commercially sterile container in a commercially sterile environment. The sealed container is designed to maintain product sterility until the seal is broken.

**Bacon wrapper paper:** A glassine, greaseproof, or vegetable parchment paper, or a laminated product made from these papers and other materials, used for wrapping bacon.

**Blister packaging:** The item is secured between a preformed (usually transparent plastic) dome or "bubble" and a paperboard surface or "carrier"; also referred to as a "bubble pack." (example: bologna package hanging on a peg in a supermarket's refrigerated case).

**Boil-in-bag:** A sealed container made of heat-resistant material designed to hold a food product and permit the ultimate user to bring the bag and product to boiling temperature in preparation for eating before the product is removed from the bag. (example: frozen entrees or vegetables).

**Breathing package:** Packaging material made in such a manner that air may enter or leave under varying conditions, including temperature changes, with or without a drying agent to remove moisture from entering the package. Most wrap used for fresh red meat allows enough air to pass through to keep the proper color in the meat.

**Can:** A receptacle generally having less than 1-gallon capacity (consumer or institutional sizes); also means to pack a product in a can or a wide-mouth glass container for processing, shipping or storage.

**Cardboard:** Term erroneously used for "paperboard." A stiff, moderately thick paperboard; heavier than paper. (example: used for frozen entrees).

**CAP (controlled atmosphere packaging):** A packaging method in which selected atmospheric concentrations of gases are maintained throughout storage in order to extend product shelf life. Gas may either be evacuated or introduced to achieve the desired atmosphere. Normally used for fruits and vegetables, not meat products.

**CPET (crystallized polyethylene terephthalate):** A heat-tolerant plastic that can be molded into multi-compartment and single frozen food containers; can be heated in the microwave or conventional oven.

**Delicatessen paper:** Used as an inner wrap for meats and for soft foods to retain the moisture in the food and to prevent the outer wrapper from becoming water- or grease-soaked; made from bleached chemical wood pulp and may be given a dry paraffin wax treatment of about 10 to 20-percent of the weight of the paper.

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**Fiberboard can:** A rigid container constructed almost completely of lightweight fiber stock; may be lined, treated or coated; ends of can may be made of paperboard or metal (composite can). (examples: packaging used for juice concentrates, potato sticks and onion rings).

**Flexible container:** Bags, envelopes, pouches or wraps which can be changed in shape or bent manually; made of materials such as paper, plastic film, foils, etc., or combinations of them.

**Foam trays and other foam shapes:** Made from expanded polystyrene (EPS); formed when foaming agents are added to polystyrene and passed through a die. (examples: trays for fresh meat; egg cartons) Styrofoam [trade mark] is an insulation used in building materials; it's not used in packaging.

**Frozen foods paper:** A type of high moisture and water vapor resistant paper used for inner liners in frozen food packaging; usually specially treated glassine or bleached chemical wood papers, waxed papers, or plain or coated vegetable parchment paper; pliable and strong to resist cracking at freezing temperatures and for high wet strength.

**Glassine:** Smooth, dense, transparent or semi-transparent paper manufactured primarily from chemical wood pulps; is grease resistant and has a high resistance to the passage of air. May be waxed, lacquered or laminated to be impervious to the transmission of moisture vapor. White and colors.

**Meat wrapping paper:** A specially treated odorless and tasteless paper that resists meat juices, fat and grease, and is easy to remove from any kind of meat.

**Metal can:** A rigid metal container made of steel sheet or plate, 27 gauge or less in thickness, or a similar container made of aluminum, copper or other metal. (example: food cans).

**Migration:** Transfer of a component of a packaging material into the product contained, or loss of a component of the product into the packaging material.

**MAP (modified atmosphere packaging):** A packaging method in which a combination of gases such as oxygen, carbon dioxide and nitrogen is introduced into the package at the time of closure. Purpose is to extend shelf life of the product packaged. (example: lunch meat in a blister package).

**Netting (plastic):** Continuous extruded net of flexible plastic material, most commonly polyethylene, which can be made into bags, sleeves or wraps. (example: net over a frozen turkey package).

**Nylon:** Nylon is a versatile family of thermoplastic resins that vary from relatively flexible products to tough, strong and stiff materials; resistant to oils and greases; widely used for meat and cheese packaging, for boil-in-bags and pouches.

**Ovenable board:** A paperboard that can be placed in an oven (microwave or conventional) to serve as the cooking utensil for food; typically a solid, bleached sulphate board coated with polyester terephthalate. (example: frozen entrees).

**Packaging:** The enclosure of products in a wrap, pouch, bag, box, cup, tray, can, tube, bottle or other container form to perform one or more of the following functions: 1. containment for handling, transportation and use; 2. preservation and protection of the contents for required shelf and use life; 3. identification of contents, quantity, quality and manufacturer; 4. facilitate dispensing and use.

**Plasticizer:** Material added during the manufacturing process to increase flexibility; for example, the plasticizer ATBC (acetyl tributyl citrate), used in such DowBrands™ as Saran™ and Handiwrap™, is made from citric acid which is commonly present in citrus fruit.

**Polyester, thermoset:** Filled plastic which is heated to harden into a shape and does not soften when heated during normal cooking temperatures; example: plastic dishes in frozen dinner entrees; can be heated in the microwave or conventional oven.

**PET (polyethylene terephthalate):** A thermoplastic polyester used in beverage bottles and food trays designed for microwave and conventional ovens.

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**Polyethylene film:** The most-used transparent flexible packaging material; made from polyethylene, a synthetic clear compound formed by subjecting ethylene, a gas found in coal, to pressure. It is low cost, transparent, tough, heat sealable, moisture-proof and resistant to low temperatures. Examples: Glad® & Handi-Wrap™.

**PVC (polyvinyl chloride):** Replaced cellophane as the preferred meat wrapping used in supermarkets; a member of the vinyl family made from a compound found in petroleum. Low cost, protects against moisture loss, but has some oxygen permeability so it allows meat to “bloom” (stay red and fresh looking).

**Polypropylene:** A synthetic resin plastic packaging material used for microwave-only heating of foods with low fat and sugar content; not heat stable for use in conventional ovens.

**Polyvinylidene Chloride:** (“polly-vanilla-deen”) A thermoplastic polymer which can withstand higher temperatures than polyethylene; especially useful for covering utensils when microwaving foods; moisture-proof and transparent. (example: Saran Wrap™)

**Retort packaging (flexible):** A flexible container typically formed from aluminum foil and plastic laminants. Can withstand in-package sterilization of the product, and, like metal food cans, can provide a shelf-stable package for foods.

**Shrink wrapping:** Plastic film that shrinks when heated, producing a tight, neat fit; the most popular form of grocery store meat packaging is PVC wrapping with foam trays.

**Vacuum packaging:** Rigid or flexible containers from which substantially all air has been removed before sealing. Carbon dioxide or nitrogen may be introduced into the container. This process prolongs shelf life, preserves the flavors and retards bacterial growth.

### References:

- Glossary of Packaging Terms, Sixth Edition, Compiled and Published by The Packaging Institute International, 1988, ISBN 0-86512-951-7.
- Packaging Foods with Plastics, by Wilmer A. Jenkins and James P. Harrington, Technomic Publishing company, Inc., 1991, ISBN 87762-790-8.

## Food Safety Questions?

### Call the USDA Meat & Poultry Hotline

If you have a question about meat, poultry, or egg products, call the USDA Meat and Poultry Hotline toll free at **1-888-MPHotline (1-888-674-6854)**. The Hotline is open



Monday through Friday from 10 a.m. to 4 p.m. ET (English or Spanish). Recorded food safety messages are available 24 hours a day. Check out the FSIS Web site at **www.fsis.usda.gov**.

Email questions to **MPHotline.fsis@usda.gov**.

### AskKaren.gov

FSIS' automated response system can provide food safety information 24/7 and a live chat during Hotline hours.



Mobile phone users can access **m.askkaren.gov**.

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