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Food Facts For You!

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Update on CWD and Consumption of Venison; Using Carbon Monoxide to Extend Shelf Life of Meat; Teflon Cookware; Is There a Bug in my Drink?; New Activa™ Yogurt: What's so Special?, What's On Your Mind? (pizza for breakfast, fighting peanut allergy with apple protein)

Update on CWD and Consumption of Venison

An article was published in the February 24, 2006 issue of *Science* indicating that prions, the infectious agent in chronic wasting disease (CWD), might be found in skeletal muscle of deer with CWD. This is a disturbing finding. Previous research had shown prions to be associated with brain and spinal tissue, lymph glands and other high-risk materials, but muscle tissue (unless contaminated) of deer was considered free of infectious prions. A summary of this research follows:

Background: Prions are transmissible proteinaceous agents of mammals that cause fatal neurodegenerative diseases of the central nervous system. The presence of infectivity in skeletal muscle of experimentally infected mice raised the possibility that dietary exposure to prions might occur through meat consumption. Chronic wasting disease (CWD) is a contagious prion disease of North American cervids (deer and elk). The interspecies transmission of BSE (mad cow disease) to humans as variant Creutzfelt-Jakob disease (vCJD) has raised concerns about a similar transfer of CWD to humans.

Methodology: To test whether skeletal muscle of diseased cervids contained prion infectivity, the brains of genetically engineered mice were injected with extracts from the muscle of CWD-affected deer. All skeletal muscle extracts from CWD-affected deer induced progressive neurological dysfunction in the mice within 18 months. In contrast, skeletal muscle from CWD-negative deer did not induce disease in the mice.

Study results: The authors concluded that the results show that in a mice model-system, skeletal muscle as well as central nervous system tissue of deer with CWD contains infectious prions. Analysis of muscle of BSE-affected cattle has not revealed high levels of prion infectivity. Similarly, analysis of the muscle tissue of deer naturally infected with CWD has not revealed the presence of infectious prion proteins. The authors note that while the risk of exposure to CWD infectivity is decreased due to ineffective prion transmission via the oral route (eating), their research suggests that humans consuming or handling meat from CWD-infected deer may be at risk to prion exposure.

Implications: Safe handling and consumption guidelines for venison will continue to be important. http://www.uwex.edu/ces/ag/issues/fmd/index.html Donation of venison to food pantries is being reviewed; although the public health community has indicated that any real risk to humans from consumption of CWD-positive muscle would be extremely small. The work reported in *Science* was done on a mouse model-system. The full implications of this research for humans consuming the muscle (venison) from deer and elk contracting CWD in the wild is not yet known. UW-Extension policies and

guidelines are currently being reviewed and will be revised, as necessary, before the fall 2006 hunting season. For a full text of the *Science* article, see Prions in Skeletal Muscles of Deer with Chronic Wasting Disease, R.C. Angers, et al., SCIENCE, volume 311, 24 February 2006, p. 1117; www.sciencemag.org

Using Carbon Monoxide as a Treatment for Red Meat

Controversy erupted in February with news reports that some meat companies had adopted a practice of treating red meat with carbon monoxide to help meat retain its pink hue. Information on this controversy follows.

What causes meat to be a particular color? Myoglobin, a protein, is responsible for the majority of the red color in red muscle tissue. Myoglobin is fixed in muscle cells and in its native form it is **purple-red** in color. When muscle tissue is cut or ground so that it is exposed to air (oxygen), the myoglobin becomes oxymyoglobin and turns a bright, **cherry-red** color. This is the color of much of the meat that we buy in the grocery store. Exposure of muscle tissue to oxygen for a prolonged period of time further changes the color. The muscle is no longer a bright, cherry-red color, but becomes a **brown-red,** and the pigment is then known as metmyoglobin. Consumers often associate this brown-red color with meat that is spoiled. Other changes take place to the color of uncured meat as it is cooked; the meat changes to a **gray-brown**.

Does a change in meat color indicate spoilage? Change in color alone does not mean that meat is spoiled. Color changes are normal for fresh product. Fresh meat can remain a purple-red color if vacuum packaged, or become cherry-red if covered in a thin plastic film in the grocery store. With spoilage there can be a change in color – often a fading or darkening. In addition to color change, meat that is spoiled will develop an off-odor and will often be slightly sticky or tacky to the touch, or it may be slimy.

Meat can even be more than one color, cherry-red on the outside and a purple-red or brownish-gray on the inside. The brownish-gray in this case can be due to a lack of oxygen penetrating below the surface. This meat is perfectly safe to consume if properly cooked.

Why treat red meat with carbon monoxide? Color is the primary indicator to consumers of the freshness of meat, with consumers most often choosing to buy meat that is a bright red color. Carbon monoxide reacts with myoglobin to produce a long-lasting cherry-red color, remaining red even after several days at room temperature and after weeks in the refrigerator. The carbon monoxide does not add color to the meat; it reacts with the native meat pigment and 'fixes' the pigment in the oxygmyoglobin form. Those who oppose the use of carbon monoxide suggest that carbon monoxide not only artificially prolongs the bright red color of meat, it also suppresses odors and the production of slime, removing cues that consumers use to tell that meat is spoiled.

The meat industry argues that the use of carbon monoxide to help meat retain its pink hue helps consumers to save money. Large sums of money are wasted when grocery stores and other establishments throw away meat that is still safe to eat but that it not attractive because it is slightly brown.

Is it safe to treat meat with carbon monoxide? Carbon monoxide has been approved by the Food and Drug Administration for use in small amounts in the packaging of case-ready meat and pork. Adding a small amount of carbon monoxide, a gas, to the air surrounding meat in a package is all that it takes for the surface of the meat to remain

bright red. Since 2002, the FDA has allowed three meat producing or packaging firms to use carbon monoxide. Carbon monoxide is not approved for use by smaller plants. Carbon monoxide is not a color additive. It has been given GRAS status (Generally Recognized as Safe) based on research results that meat companies submitted to the FDA for review.

I have heard the term 'modified atmosphere' used to refer to carbon monoxide packaging. What does that mean? Modified atmosphere (MA) packaging is the technology used to manipulate the make-up of the gas/atmosphere that surrounds a food. MA packaging is rather common-place. Potato chips packed in a 'pillow pack' are packed with nitrogen in the package rather than air. Fresh pasta in a tray in the store is also flushed with nitrogen to remove air and thus prevent mold growth. Some cookies or crackers are also packed under nitrogen to prevent fat from going rancid, thus extending the shelf life. Once these packages are opened, however, the 'air' around the food is no longer modified and the product may begin to change and eventually spoil. In the case of meat packing, a small amount of carbon monoxide can be mixed with the air that is in a package. Just a small amount of carbon monoxide is sufficient to set the oxymyoglobin pigment.

Why are certain consumer groups worried about this technology? Certain consumer groups are worried that this technology will mask spoilage, leading consumers to handle, prepare, and eat meat that is not fit for consumption. The American Meat Institute (a meat industry trade group) argues that packing meat with a small amount of carbon monoxide benefits the manufacturers, retailers and consumers by preventing them from discarding meat that has darkened slightly but is still safe to eat.

Consumer groups are also concerned because meat that is MA-packed with carbon monoxide does not have to be labeled as such; leaving consumers not knowing that meat has been treated and possibly increasing the risk of foodborne illness.

What should consumers do? Consumers can help to ensure meat safety by properly handling, storing and cooking meat at home. Always follow the 'sell by' or 'use by' date that appears on most packages of meat. Once meat has been brought home from the grocery store, it must be kept refrigerated at 40°F or below. Meat should not be stored in the refrigerator for more than 2 to 3days, or until the date marked on the package. For extended storage, meat can be wrapped and frozen at 0°F for 3 to 12 months.

Cook all meat to a safe internal temperature: 160°F for ground beef, and 145°F for chops, roasts and steaks.

You may wish to ask at your local grocery store if the meat that they sell is packed under carbon monoxide. If so, then it will be very important to follow the date marked on the package as an indicator of shelf life.

Teflon Cookware – Is there a cancer risk?

For home cooks and professional chefs, Teflon might be the best kitchen innovation since sliced bread became a cliche. A pan with the non-stick coating makes easy-to-lift omelets and cleans up like a dream. But an article in the February 20, 2006 issue of the *Los Angeles Times* has consumers thinking more than 'easy clean-up' when the name 'teflon' is mentioned. The *LA Times* reported that an advisory group of the Environmental Protection Agency (EPA) asked regulators in late January to examine whether a

chemical that gets slippery Teflon and similar coatings to bond to a pan can cause cancer. The chemical, perfluorooctanoic acid (PFOA), has been shown to cause cancer, low birth weight and a suppressed immune system in laboratory animals exposed to high doses of the chemical. Studies have shown the chemical to be present at low levels in the bloodstream of 9 out of 10 Americans, and in the blood of most newborns. How the chemical is transmitted to humans is unclear, and there is **no evidence** that nonstick cookware is to blame. Both the EPA and Teflon-maker DuPont have said that cooks have little to worry about.

Teflon for decades has been considered essential in non-stick and stain-resistant products. In addition to cookware, it is used by the aerospace, transportation, textile and electronics industries for such products as wiring and fabrics. While there currently there is no indication that Teflon cookware is unsafe, and all indication is that under normal use Teflon cookware **is safe**, some basic safety precautions will help consumers ensure the safety of the food that they prepare.

Using Nonstick Cookware Safely

- Never leave nonstick pans unattended on an open flame or other heat source
- While cooking, don't let temperatures get hotter than 450 degrees
- Don't use metal utensils on nonstick cookware
- Wash nonstick cookware by hand using nonabrasive cleaners and sponges (do not use steel wool)
- Don't stack nonstick cookware on top of each other

For more information, see lowfatcooking.about.com

Is There a Bug in my Drink (or my yogurt)?

I will be eating yogurt for lunch today with a special additive, not fruit or nuts but the shells of small beetles ground up for color. No, this isn't a natural foods product (it's a Berry yogurt from Dannon); the yogurt that I will have for lunch has a natural colorant known as **'carmine'**. This natural colorant is the purified form of a colorant known as **cochineal**. Cochineal, or cochineal extract, is also used as a natural colorant in food products. Cochineal and its derivatives come from the bodies of female cochineal beetles. The shells of these beetles can be ground and a colorant extracted with water and alcohol that is used as to color items pink, red, or purple - foods ranging from ice cream and yogurt to fruit drinks and the aperitif Campari, as well as to pharmaceuticals and cosmetics. Cochineal extract in a purified form is known as carmine that is water insoluble. Both of these color additives have been used for many years as natural colorants.

A web search yielded an interesting history to these colorants: *These colorants come from the female Dactylopius coccus, a beetle that inhabits a type of cactus known as Opuntia. Dactylopius coccus was the source of a red dye used by Aztecs and Mexican Indians for centuries before the arrival of the Spaniards. Those indigenous peoples would collect cochineal insects, briefly immerse them in hot water to kill the beasties and dissolve the females' waxy coating, and then dry them in the sun. The desiccated insects would then be ground to a fine powder.*

The Spaniards immediately grasped the potential of the pigment, so these dried insects became one of the first products to be exported from the New World to the Old. Europeans took to the beautiful, bright scarlet color immediately both for its vibrant hue

and for its extraordinary colorfast properties, ensuring that boatloads of cochineal insects would make the trans-Atlantic trek.

Today cochineal has been surpassed as a dye for cloth by a number of synthetic pigments, but is still widely used as a coloring agent for a number of foodstuffs, beverages, and cosmetics (because many of those synthetic dyes proved dangerous to humans when taken internally or allowed to leach into the body through the skin). It takes about 70,000 insects to make one pound of cochineal. See http://www.snopes.com/food/ingredient/bugjuice.htm

As natural colorants, cochineal and carmine do not have to be listed by name on a food label. A food label can simply state 'natural color'. Recently, on January 30 2006, the Food and Drug Administration (FDA) proposed new labeling requirements for cochineal extract and carmine by requiring their declaration on the label of all food and cosmetic products that contain these color additives. The proposed rule responds to reports of severe allergic reactions, including anaphylaxis, to cochineal extract and carmine-containing food and cosmetics and would allow consumers who are allergic to these color additives to identify and thus avoid products that contain these color additives. A final ruling on this proposal is due out later this year.

As long as you are not allergenic to these colorants, continued consumption does not present a risk to health.

Dannon™'s New Activa™ Yogurt: What's so Special?

Dannon™ has been heavily advertising it's new Activa™-brand yogurt. Dannon™ claims that this yogurt helps to regulate the digestive system if consumed over a period of 14 days due to the presence of a particular bacterium *Bifidus Regularis™.* Following is a review of some basic information on the production of yogurt and the bacteria commonly found in this product.

How is yogurt made? Yogurt is a cultured dairy product that can be made from whole, lowfat or skim milk. Although most yogurt in the United States is made from cow's milk, any type of milk can be used, and yogurt made from the milk of goats or sheep is increasing in popularity.

Yogurt is made by adding bacteria to heated and cooled milk. One standard process for making yogurt calls for heating pasteurized milk, to which nonfat dry milk is added, to 190° F and holding the milk at this temperature for 10 to 20 minutes. The heating changes the structure of some of the milk proteins so that they form a better gel. Once the heated milk is cooled to 115°F, a 'starter' culture is added. If making yogurt at home, the starter is most commonly a tablespoon or two of unflavored yogurt from the grocery store, or yogurt from a previous batch. In a food manufacturing facility, the starter is a mix of bacterial species added to the cooled milk. The mixture of milk and bacterial culture is incubated at 108° to 115°F for 4 to 8 hours, by which time the milk has gelled into yogurt.

Why are bacteria added to the milk when yogurt is made? The bacterial starter culturr produces acid as it grows in the incubating milk. This acid, along with the initial heating step, allows the milk proteins to set and gel. There are two different types of bacteria used in the manufacturing of yogurt: *Lactobacillus bulgaricus* and *Streptococcus thermophilis*.

What is special about the bacteria in the new yogurt? In addition to the standard bacteria used in the manufacture of yogurt, some companies add other bacterial strains that are referred to as 'probiotic' cultures. Probiotics are beneficial microorganisms which contribute to human health. Many containers of yogurt will include the words 'live and active yogurt cultures' on the package as an indication that probiotics have been added. Probiotic cultures are known to survive passage through the stomach and to colonize the gut (large intestine).

The human large intestine normally provides a home to bacterial species. These bacteria nourish themselves with portions of food that have not yet been digested and absorbed by the body. This bacterial metabolism releases some calories from food, and produces some vitamins (B vitamins and vitamin K).

Research has shown that consuming probiotics can aid health by establishing **healthful** bacterial species in the gut. Some of the probiotics used in yogurts such as the Stonyfield Farm brand include *Lactobacillus casei, Lactobacillus acidophilis* and *Bifidobacterium* species. The new Dannon™ Activa™ product introduces yet another probiotic – known as *Bifidus Regularis ™*.

According to Dannon™'s web site for this product http://www.activia.com/

> Each 4oz. serving of Activia contains billions of beneficial probiotic cultures, including the exclusive *Bifidus Regularis*™, which is clinically proven to remain live and active in the digestive tract where it exerts its effect…Activia® works by helping to reduce long intestinal transit time – the time it takes food to pass through the digestive system. Studies have shown that this reduction in transit time has reached up to 40 percent, depending on levels consumed and the demographic profile. For individuals whose digestive system is functioning regularly, Activia has no adverse effects and provides all the benefits expected of a traditional yogurt.

So, for individuals suffering from irregularity (defined by Dannon™ as not going to the bathroom for two or more days) this new yogurt, when consumed daily, is reported to increase regularity. Product consumption must continue for the healthful effects to be felt. For individuals not suffering from irregularity, Dannon™ suggests that Activa™ provides the general benefits of yogurt consumption.

What's On Your Mind?

Cold Pizza for Breakfast!! Alice Henneman of the University of Nebraska has done it again! Cold Pizza for Breakfast is a powerpoint food safety program aimed at Teens and Tweens who cook. Recommendations are based on guidelines as outlined in MyPyramid. If you program with Teens and Tweens, check out this resource http://lancaster.unl.edu/food/pizza.shtml

Fighting peanut allergies with apples? We often compare apples and oranges, but apples and peanuts? Research from the USDA's Agricultural Research Service (ARS) indicates that apples may hold the key to reducing the allergenicity of peanuts--great news for the estimated 1.5 million Americans and other folks worldwide who suffer from peanut allergies.

ARS scientists at the Southern Regional Research Center, New Orleans, La., discovered that adding a natural compound from apples--polyphenol oxidase, or PPO--to

extracts from chopped-up peanuts alters the allergenic properties of some peanut proteins. PPO is an enzyme (protein) found naturally in apple tissue that catalyzes the natural browning of cut apples. The scientists have begun working with laboratory animals to confirm the apple protein's allergen-fighting actions. The scientists caution that simply eating apples won't control peanut allergens. Maybe a snack of apples and peanut butter is next.

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