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## Food Facts For You!

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**National Recall of Peanut Butter: What Does It Tell Us?; Influence of Processing and Preservation on the Retention of Health Promoting Compounds in Broccoli; Foodborne Botulism from Home Prepared Tofu – An Old Disease Found in New Food Products; Spring Cleaning Means a New Web Identity; Spring Holidays & Egg Safety; What’s On Your Mind? (food dating for food pantries, NEW resources! Selecting and Preparing Ham and Turkey; testing dial gauges on pressure canners)**

### **National Recall of Peanut Butter: What Does It Tell Us?**

It was on February 14, 2007 that the nation learned of a recall of certain jars of Peter Pan and Great Value peanut butter due to possible *Salmonella* contamination. The Food and Drug Administration (FDA) warned consumers not to eat jars of Peter Pan peanut butter or Great Value peanut butter with a product code beginning with the number '2111' due to risk of contamination with *Salmonella* Tennessee. Consumers having jars of this peanut butter that had been purchased since May 2006 were warned to discard it. Following are the answers to some pertinent questions about this outbreak.

**How did the government first discover this outbreak?** Certain types of infectious illnesses are reported by public health departments into a national database. PulseNet is a national system of tracking and typing foodborne diseases. In this case, officials identified a slow rise in the number of *Salmonella* Tennessee cases last fall. We have all heard of the bacterium *Salmonella* and 'Tennessee' is one type of *Salmonella*. PulseNet is operated by the Centers for Disease Control and Prevention (CDC), and officials at the CDC noticed the slow rise in cases of *Salmonella* Tennessee beginning last August. Once they noticed this trend, they worked for several weeks to identify the food vehicle.

**How was peanut butter implicated in the outbreak?** The CDC initiated an epidemiologic study that implicated peanut butter in the outbreak. An epidemiologic study is concerned with the health and illness of populations. In this case, investigators compared records of foods that were eaten by people who got sick and those who did not. This study found that consumption of Peter Pan peanut butter and Great Value peanut butter were both statistically associated with illness and therefore the likely source of the outbreak. Later product testing confirmed the presence of the outbreak strain of *Salmonella* Tennessee in **opened jars of peanut butter obtained from ill persons**. The CDC reports results of their study to the FDA on February 13<sup>th</sup>, and the FDA issued a nationwide recall on February 14<sup>th</sup>. On February

**How can health officials tell that it is *Salmonella* making people sick?** Each microorganism has a unique 'fingerprint,' or pattern, on DNA testing. In this case, officials were able to find organisms with the same fingerprint in the peanut butter and in

the stool samples of people who got sick after eating the peanut butter. This is a good way to tell that it was contaminated peanut butter making people sick.

**Shouldn't processing peanuts into peanut butter make it safe to eat?** Food industry persons would assume that the roasting of peanuts for peanut butter and/or the heating of the peanut butter before packing into jars would destroy any *Salmonella* present. So either the *Salmonella* survived the heating, or the contamination entered the product late enough in processing so as to avoid any heating/roasting steps. At this time, we don't know exactly how the product became contaminated.

**Are other brands of peanut butter of concern?** No. An epidemiological review of the reported illnesses implicated only Peter Pan peanut butter and Great Value brand peanut butter that was manufactured in ConAgra's Sylvester, Georgia plant.

**If consumers have eaten only a small amount of peanut butter, can they get sick?** Yes. Eating even small amounts of contaminated peanut butter can cause illness. Sometimes it takes several days for symptoms to develop. But even if consumers don't get sick, any jars of the implicated peanut butter (opened or unopened) should be discarded.

**What are the symptoms of salmonellosis? How long do the symptoms last?** Symptoms of salmonellosis, the disease caused by *Salmonella*, include diarrhea, fever, and abdominal cramps and typically emerge 12 to 72 hours after one eats an infected food. The illness usually lasts 4 to 7 days, and most persons recover without treatment. However, in some persons the diarrhea may be so severe that the patient needs to be hospitalized. The elderly, infants, and those with impaired immune systems are more likely to have a severe illness. In persons with poor underlying health or weakened immune systems, *Salmonella* can invade the bloodstream and cause life-threatening infections.

**How long will *Salmonella* stay in your system after exposure?** In most cases *Salmonella* will be present in an individual's intestine for up to 3 days before they exhibit symptoms of illness. During the time one is actually sick they will continue to harbor the bacteria. For most people this is a period of 4 to 7 days, barring further complications. Occasionally the bacteria can linger in the intestines for a while even after the symptoms have resolved.

**What do consumers need to know?** In addition to being kept up-to-date on the recall, a recall presents an excellent opportunity to educate consumers on the 5 basic steps to safe food handling and preparation (Fight BAC!)

[www.fightbac.org](http://www.fightbac.org)

- Clean: Wash hands and surfaces often
- Chill: Refrigerate promptly
- Cook: Cook to proper temperatures
- Separate: Prevent cross-contamination
- Store: Store foods properly



## Influence of Processing and Preservation on the Retention of Health-Promoting Compounds in Broccoli

**Background:** According to research forthcoming in the Journal of Food Science, the method of preservation and preparation can have a significant effect on the nutrient content of broccoli. According to the article, epidemiological data have shown that a diet rich in cruciferous vegetables such as broccoli can reduce the risk of cardiovascular diseases and cancer. These vegetables are rich in sulfur-containing glucosides called glucosinolates, and when the plant tissue is damaged – such as when you chew broccoli or during certain processing steps (e.g. chopping/cutting) - the glucosinolates are converted into bioactive breakdown products such as sulforaphane, a potent cancer-fighting component. Broccoli is also a rich source of vitamin C, which is considered one of the most important antioxidants because of its activity against free radicals, carcinogenesis, and cardiovascular diseases as well as in stimulating the human immune system. Overall, the nutritional quality of vegetables such as broccoli depends not only on the nutrient content when harvested but also on the changes occurring during postharvest handling, storage conditions, processing, and preparation.

Scientists in this study evaluated the effects of common household practices - chilling, freezing, and cooking (5 methods) - on vitamin C retention and the release of sulforaphane in broccoli. The household practices were:

- Refrigerated storage at 43°F for up to 35 days
- Freezing at 0°F for up to 60 days following a steam blanch (3 minutes)
- Cooking – one of 5 methods [no storage time]
  - Boiling (15 minutes)
  - Steaming (23 minutes)
  - Pressure-cooking (2 minutes)
  - Microwave cooking (11 minutes)
  - Pressure cooking in special microwave cookware (7 minutes)

### **Results:**

<b>Processing &amp; Preparation</b>	<b>Impact on Vitamin C</b>	<b>Impact on Sulforaphane</b>
Refrigeration (43°F)	<ul style="list-style-type: none"> <li>• 18% loss in week 1</li> <li>• 39% loss over 5 weeks</li> </ul>	<ul style="list-style-type: none"> <li>• No decrease in week 1</li> <li>• 29% decrease over 5 weeks</li> </ul>
Freezing (0°F)	<ul style="list-style-type: none"> <li>• 32% loss on blanching; no further loss on freezing</li> </ul>	<ul style="list-style-type: none"> <li>• 13% loss on blanching; no further loss</li> </ul>
Boiling	<ul style="list-style-type: none"> <li>• 34% loss</li> </ul>	<ul style="list-style-type: none"> <li>• -- (none detected)*</li> </ul>
Steaming	<ul style="list-style-type: none"> <li>• 22% loss</li> </ul>	<ul style="list-style-type: none"> <li>• -- (none detected)*</li> </ul>
Pressure cooking	<ul style="list-style-type: none"> <li>• 8% loss</li> </ul>	<ul style="list-style-type: none"> <li>• 17% loss</li> </ul>
Microwave cooking	<ul style="list-style-type: none"> <li>• 9% loss</li> </ul>	<ul style="list-style-type: none"> <li>• 39% loss</li> </ul>
Pressure/microwave cooking	<ul style="list-style-type: none"> <li>• 0% loss</li> </ul>	<ul style="list-style-type: none"> <li>• 3% loss</li> </ul>

**\*none of this health-promoting chemical detected in cooked broccoli**

**Conclusions:** Extended storage in the refrigerator resulted in significant loss of the health-promoting components vitamin C and sulforaphane. Storing of broccoli for even 1 week decreased vitamin C significantly. Freezing stabilized both vitamin C and sulforaphane content; but a prior blanch (required to retain quality on frozen storage) caused loss of both compounds. Of the cooking methods studied, boiling and steaming caused significant vitamin C losses, 34% and 22%, respectively, but there was minimal vitamin C lost with the other cooking methods. Sulforaphane was most affected by boiling, steaming and microwave cooking, but cooking using a microwave pressure cooker did not significantly affect sulforaphane.

**What should consumers know?** Various handling and preparation methods affect the nutrient content of food. To ensure the greatest access to nutrients, consume fruits and vegetables as close to the time of harvest as possible; even refrigerated storage (during transit from the field, in a warehouse or grocery store, at home) can result in significant loss of nutrients. Freezing stabilizes nutrients, and a commercial freezing process (not investigated in this study) is likely to retain more nutrients than exhibited in the home freezing process investigated in this study. Rapid cooking (high temperature/short time) will retain more nutrients than will a slower cooking process. Overall, consumers should eat a variety of fruits and vegetables, both fresh and processed. In this way the impact of food handling or processing methods on overall nutrient intake will be minimized.

**Reference:** Galgano et al. 2007. *The Influence of Processing and Preservation on the Retention of Health-Promoting Compounds in Broccoli*. Journal of Food Science. MS20060428.

### **Foodborne Botulism from Home Prepared Tofu – And Old Disease Found in a ‘New’ Food Product**

*Foodborne botulism poisoning has historically been linked to improperly home-canned foods. In recent years, however, a wider variety of foods have been implicated in botulism poisoning, for example: improperly cooled foil-wrapped baked potatoes, frozen food from a warehouse selling damaged food items, and fermented sausage made with an unsafe recipe. The CDC reported in January on a case of foodborne botulism in December 2006 linked to home-prepared fermented tofu. Details follow:*

In December 2006, the Orange County Health Care Agency (OCHCA) and California Department of Health Services (CDHS) were notified of two potential cases of foodborne botulism in an older Asian couple who had consumed home-prepared fermented tofu (soybean curd).

According to the **Bad Bug Book**, <http://www.cfsan.fda.gov/~mow/chap2.html> *Clostridium botulinum* is a spore-forming bacterium that produces a potent neurotoxin. The organism is anaerobic, meaning that it survives and grows only in the absence of oxygen. The spores that this organism produces are heat-resistant and can survive in foods that are incorrectly or minimally processed. Consuming food contaminated with the toxin can result in botulism poisoning.

The incidence of botulism poisoning is low, but the disease is of considerable concern because of its high mortality rate if not treated immediately and properly. Most of the 10 to 30 outbreaks that are reported annually in the United States are associated with inadequately processed, home-canned foods, but occasionally commercially produced foods have been involved in outbreaks. Sausages, meat products, canned vegetables and seafood products have been the most frequent vehicles for human botulism. The bacterium and its spores are widely distributed in nature, so it's easy for harvested foods to come in contact with the bacterium or its spores. They occur in both cultivated and forest soils, bottom sediments of streams, lakes, and coastal waters, and in the intestinal tracts of fish and mammals, and in the gills and viscera of crabs and other shellfish.

A very small amount (a few nanograms) of toxin can cause illness. [A nanogram is one-billionth of a gram or  $10^{-9}$  gram; a gram is about ¼ teaspoon; so the amount of toxin to cause illness would be roughly 0.0000000025 teaspoons – not very much!] Onset of symptoms in foodborne botulism is usually 18 to 36 hours after ingestion of the food containing the toxin, although cases have varied from 4 hours to 8 days. Early signs of intoxication consist of marked lassitude, weakness and vertigo, usually followed by double vision and progressive difficulty in speaking and swallowing. Difficulty in breathing, weakness of other muscles, abdominal distention, and constipation may also be common symptoms. If left untreated, the toxin causes nerve paralysis, breathing stops

and death results. Treatment is limited to injection of an anti-toxin which binds to the toxin. If administered in time, the antitoxin can be effective at preventing or mitigating symptoms; permanent paralysis is most often the result of poisoning where antitoxin is not administered soon enough.

On November 28, 2006, a woman aged 67 years had onset of double vision, followed the next day by bilateral ptosis (drooping eyelids). An ophthalmologist attributed these symptoms to long-standing diabetes mellitus. On December 4, she visited her primary-care physician because of double vision, ptosis, dizziness, difficulty swallowing, slurred speech, drooling, and right arm weakness. Physical examination revealed limitation of upward gaze, bilateral ptosis, sluggish tongue movement, and mild right upper extremity weakness. The woman's husband, aged 75 years, reported 3 days of worsening double vision, dizziness, and difficulty swallowing. On physical examination, he also had mild right ptosis and sluggish tongue movement. Both patients were admitted to an intensive care unit. On December 5, physicians suspected foodborne botulism, notified OCHCA, and collected clinical specimens for testing. CDHS dispatched botulinum antitoxin to the hospital, and it was administered to the couple. Both patients were hospitalized for more than 1 week with no further symptom progression. *Clostridium botulinum* type A was detected in enrichment cultures of the stool samples of both patients. Both patients have some blurred vision but otherwise have recovered.

On December 5, OCHCA visited the couple's home and identified multiple potential sources of intoxication. The patients reported they recently had been eating a new batch of home-prepared fermented tofu. The tofu was a commercially packaged product purchased at a retail market. In the home, the tofu was boiled, towel dried, and cut into cubes. The cubes were placed in a bowl, covered with plastic wrap, and stored at room temperature for 10--15 days; pH of the product was 6.8. The tofu was then transferred to glass jars with chili powder, salt, white cooking wine, vegetable oil, and chicken bouillon to marinate at room temperature for 2--3 more days. Finally, the fermented tofu was stored and eaten at room temperature.

*C. botulinum* spores exist widely in the environment, but proper food-preparation practices inhibit spore germination and toxin production. Environmental conditions that facilitate spore germination and growth include a pH of greater than 4.6, anaerobic conditions, low salt or sugar content, and temperatures greater than 40°F. In the case described in this report, the growth of *C. botulinum* and production of toxin might have been facilitated by several factors: 1) the low acidity of the fermented tofu (pH=6.8), 2) boiling the tofu, potentially creating an environment with no oxygen (anaerobic), and 3) room temperature (approximately 68°F--77°F) storage of the product for days during and after preparation.

For a full report: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5605a2.htm>

References: More information on *C. botulinum* can be found in our 'new' Food Facts archives (see next article): [http://www.wisc.edu/foodsafety/index2\\_ff\\_sub.htm](http://www.wisc.edu/foodsafety/index2_ff_sub.htm)

- Botulism (CDC)
- Botulism: It Only Takes a Taste
- Botulism Risk: More than Just Canned Food
- Botulism Toxin: A Poison that Can Heal
- Clostridium botulinum (FDA)
- Infant Botulism (Kids' Health)

## **Spring Cleaning Means a New Web Identity**

Based on feedback from educators and working as a team with other extension specialists in Food Science, **our web presence is being re-defined**. The web address for content that I share primarily with consumers and Family Living educators (you!) will remain here: [www.wisc.edu/foodsafety](http://www.wisc.edu/foodsafety) (you will soon be notified of a new address: [foodsafety.wisc.edu](http://foodsafety.wisc.edu)). The pages that my project team designs and manages for other specialists will be moving to new addresses. This will allow resources on consumer food safety and quality to be more clearly defined and effectively managed. The first change that you will notice is that the Food Facts **subject archive** has already changed: [http://www.wisc.edu/foodsafety/index2\\_ff\\_sub.htm](http://www.wisc.edu/foodsafety/index2_ff_sub.htm) You will now be able to find an expanded list of resources; not just Food Facts topics, but also links to other helpful sites all in one index. We will be working to improve links to food preservation information, UWEX publications, and teaching resources all from the home page: [www.wisc.edu/foodsafety](http://www.wisc.edu/foodsafety). As we move forward, please let me know if there is content that you would like to see included or if you have ideas for better managing the many web-based resources for educators and consumers. Thank you!

## **Spring Holidays and Egg Safety**

### *Safe Handling and Storage of Eggs*

- **Fresh eggs should be refrigerated.** Temperature fluctuation is critical to safety. With the concern about *Salmonella*, eggs gathered from laying hens should be refrigerated as soon as possible. After eggs are refrigerated, they need to stay that way. A cold egg left out at room temperature can sweat, facilitating the growth of bacteria. Refrigerated eggs should not be left out more than 2 hours.
- **Store eggs in the carton, not in the door.** Eggs should be stored in the coldest part of the refrigerator for longest shelf life and improved safety; on lower shelves at the back. Do not store eggs out of the carton and/or in the door of the refrigerator where it is warmer.
- **Eggs should not be washed before being refrigerated.** When the egg is laid, a protective coating is put on the outside by the hen. At the plant, government regulations require that USDA-graded eggs be carefully washed and sanitized using special detergent. Then the egg is coated with a tasteless, natural mineral oil to protect it. Washing an egg before storage removed the protective coating and may allow bacteria on the shell to enter the egg.
- **Use fresh, uncracked eggs.** Bacteria can enter eggs through cracks in the shell. Never purchase cracked eggs. However, if eggs crack on the way home from the store, break them into a clean container, cover it tightly, keep refrigerated, and use within 2 days. If eggs crack during hard cooking, they are safe.
- **Follow safe handling guidelines:**
  - Don't keep eggs out of the refrigerator more than 2 hours.
  - Raw eggs and other ingredients, combined according to recipe directions, should be cooked immediately or refrigerated and cooked within 24 hours.
  - Serve cooked eggs and dishes containing eggs immediately after cooking, or place in shallow containers for quick cooling and refrigerate at once for later use. Use within 3 to 4 days.
  - Wash hands, utensils, equipment, and work areas with hot, soapy water before and after contact with eggs.

## **Preparing Special Holiday Dishes with Eggs -- Uncooked Ice Cream Base, Hollandaise Sauce or Royal Icing**

Homemade custard ice cream; lemon meringue pie, and Hollandaise sauce. These are family favorites. Care must be taken in preparing egg-based dishes and toppings so that your family meal is a 'food safe' event.

### **Cooking Whole Eggs for Use in Recipes**

As a nutritious combination of egg whites and yolks, whole eggs should be fully cooked for assured safety in recipes such as **ice cream base** that call for raw or lightly cooked eggs. The following method can be used with any number of eggs and works for a variety of recipes.

In a heavy saucepan, stir together the eggs and either sugar, water or other liquid from the recipe (at least 1/4 cup sugar, liquid or a combination per egg). Cook over low heat, stirring constantly, until the egg mixture coats a metal spoon with a thin film or reaches 160°F. Immediately place the saucepan in ice water and stir until the egg mixture is cool. Proceed with the recipe.

### **Cooking Egg Yolks for Use in Recipes**

Because egg yolks are a fine growth medium for bacteria, cook them for use in **mayonnaise, Hollandaise sauce, Caesar salad dressing, chilled souffles, chiffons, mousses** and other recipes calling for raw egg yolks. The following method can be used with any number of yolks.

In a heavy saucepan, stir together the egg yolks and liquid from the recipe (at least 2 tablespoons liquid per yolk). Cook over very low heat, stirring constantly, until the yolk mixture coats a metal spoon with a thin film, bubbles at the edges or reaches 160°F. Immediately place the saucepan in ice water and stir until the yolk mixture is cool. Proceed with the recipe.

### **Cooking Egg Whites for Use in Recipes**

Cooking egg whites before use in all recipes is recommended for full safety. The following method can be used with any number of whites and works for **meringue pie, chilled desserts, Seven-Minute Frosting, Royal Icing and other frosting recipes** calling for raw egg whites.

In a heavy saucepan, the top of a double boiler or a metal bowl placed over water in a saucepan, stir together the egg whites and sugar from the recipe (at least 2 tablespoons sugar per white), water (1 teaspoon per white) and cream of tartar (1/8 teaspoon per each 2 whites). Cook over low heat or simmering water, beating constantly with a portable mixer at low speed, until the whites reach 160°F. Pour into a large bowl. Beat on high speed until the whites stand in soft peaks. Proceed with the recipe.

[Note: you must use sugar to keep the whites from coagulating too rapidly. Test with a thermometer as there is no visual clue to doneness. If you use an unlined aluminum saucepan, eliminate the cream of tartar or the two will react and create an unattractive gray meringue.]

Making an **Italian meringue** by adding hot sugar syrup to egg whites while beating them does not bring the egg whites to much above 125° F and is not recommended except for dishes that are further cooked. If, however, you bring the sugar syrup all the way to the hardball stage (250° to 266° F), the whites will reach a high enough temperature. You can use a sugar syrup at hardball stage for **Divinity** and similar recipes.

**News releases on egg safety** can be found in the Extension new release archives: <http://www.uwex.edu/ces/news/> . Other information on Eggs can be found in the Food Facts index: [http://www.wisc.edu/foodsafety/index2\\_ff\\_sub.htm](http://www.wisc.edu/foodsafety/index2_ff_sub.htm)

- American Egg Board
- An Egg Story, Does the Date Mean 'Too Late'?
- Egg Products and Food Safety
- Egg Product Preparation
- Shell Eggs from Farm to Table

### **What's On Your Mind?**

**My local food pantry wants to know if food can be distributed after the package date.** This request has come into my office several times over the last few weeks. Excellent resources on food safety for food pantries can be found on Purdue University's **Safe Food for the Hungry** web site: <http://www.cfs.purdue.edu/safefood/sfhungry.html>

**Selecting and Preparing a Turkey; Selecting and Preparing a Ham.** Two excellent references have been prepared for Family Living by **Dr. Jeff Sindelar**, new extension meat science specialist. These brochures are **posted online**: [www.wisc.edu/foodsafety](http://www.wisc.edu/foodsafety) and will be added to our Food Facts index. Press releases that highlight the information in each of these brochures will be forthcoming. Please feel free to distribute these bulletins or use them when programming for our upcoming spring holidays.

**Time to start thinking home canning!** Many county offices have Presto pressure canner tester units on hand to test dial gauge pressure canner lids. These testers are available for purchase from Presto <http://www.uga.edu/nchfp/educators/Prestotester.pdf> . These gauges should be calibrated **every year**. These testers have been improved in the last year so that they now are **even more accurate**; make sure you test all dial canner gauges, even ones that haven't been used in a while in a accuracy as adjustments in your canning processes may need to be made. Here's a quick summary for consumers:

#### **What should consumers do?**

- Consumers should still test dial-gauges **every year**. Presto recommends testing dial gauges at 6 and 11 pounds (only) as these are the pressures that will be recommended in canner recipes. A dial-gauge testing form is available from the Center for Home Food Preservation <http://www.uga.edu/nchfp/educators/GAUGEinspect04.pdf>
- Canner gauges that are **off by 1 to 2 pounds** should be replaced. Presto sells replacement gauges. The USDA recommends replacing dial gauges that are off by more than 1 pound; Presto recommends replacing gauges off by more than 2 pounds. Presto cautions that canner gauges are simply not manufactured well enough to be replaced when only off by 1 pound. The decision should be left up to the consumer. My experience in ordering a gauge last year for workshop demonstrations is that new gauges are very likely to be off by at least 1 pound.
- Literature from Presto recommends that you **only test Presto-supplied canners/gauges** using the bicycle pump tester that they manufacture. (I think this is for liability reasons. Several educators have found that other canner lids do not fit on the Presto unit anyway.)
- Please note that the **All American canners** are not dial-gauge canners. These canners (at least the newer ones) have a dial gauge for reference purposes only but are really weighted-gauge canners.