

Pennsylvania Department of Agriculture  
Bureau of Food Safety and Laboratory Services  
717-787-4315  
[www.EatSafePA.com](http://www.EatSafePA.com)

**CANNING OF ACID, ACIDIFIED, OR FERMENTED FOODS & BEVERAGES  
GUIDANCE FOR PA LIMITED FOOD ESTABLISHMENTS**

**✚ BEVERAGES / DRINKS / JUICES**

Some beverages and drinks can possibly be made from a limited food establishment. This may include Root Beer, Lemonade, Lemon Ice Tea, Kombucha\*, and other acidic or fermented drinks. pH must be tested on all drinks/beverages to assure the pH is less than 4.6. However, producers of bottled or canned fermented beverages should aim for a pH level of 4.2 or below.

Fermented drinks that are 'bottled' or 'canned' need some type of processing step that impedes or stops the fermentation process. Employing refrigeration alone to control the continuing fermentation will not be approved for limited food establishments. Pasteurization at 180°F is one confirmed option for fermented drinks limited processors.

\* See "Guidelines for brewing/bottling Kombucha" for more information. The document can be found [HERE](#) under Publications Tab.

This category does not include freshly brewed coffee and tea. They are considered TCS food due to their high pH (>4.6).

**Juice Requirements**

FDA defines juice as the aqueous liquid expressed or extracted from one or more fruits or vegetables, purees of the edible portions of one or more fruits or vegetables, or any concentrates of such liquid or puree. (100% percent juice under 21 CFR 101.30, or a concentrate of that juice for subsequent beverage use).

Juices processed in a limited food establishment must be tested for pH to determine whether they are non-TCS foods (shelf stable). Only juices with a pH of 4.6 or below can be allowed in this type of establishments.

Juices produced in a limited food establishment may ***only be sold directly to the consumer*** from either the production site or from a satellite of the production site, such as a farmer's market or roadside stand owned by the producer.

Juices produced in a limited food establishment are subject to the labeling regulation in 21 CFR 101.17(g), which requires a warning statement on fruit and vegetable juice products that have not been processed in the manner to prevent, reduce, or eliminate pathogenic microorganisms. These products shall bear the following warning statement:

***WARNING: This product has not been pasteurized and, therefore, may contain harmful bacteria that can cause serious illness in children, the elderly, and persons with weakened immune systems.***

**NOTE: Product testing as described below under "Canning of Acid/Acidified/Fermented Foods" would be applicable to canned or vacuum sealed beverages/drinks and juices.**

## ✚ CANNING OF ACID/ACIDIFIED/FERMENTED FOODS

Limited Food Establishment Producers may only “can” food products that reach a pH of 4.6 or less upon completion of the recipe (a combination of pH (acid level) and Available Water ( $a_w$ ) may also be tested). Examples of Types of food products that might be approved for canning include:

- ✓ Naturally acidic foods (e.g. most fruits like apples, peaches, lemons, etc.),
- ✓ Fermented foods (e.g. Korean kimchi, sauerkraut, pickles, green olives, etc.) or,
- ✓ Acidified foods (e.g. salsa, chow-chow, pickled beets/ vegetables, hot sauces, and BBQ sauce).

### **Definitions:**

**Acid foods** are foods that have a natural pH of 4.6 or below.

**Low-acid foods** have an equilibrium pH above 4.6 and water activity above 0.85.

**Acidified foods** are defined by the FDA as low-acid foods to which acid(s) (vinegar or lemon juice) or acid food(s) are added and which have a finished equilibrium pH of 4.6 or below and a water activity ( $a_w$ ) greater than 0.85.

Producers of Acidified Foods must have written recipes / formulas and procedures. You will need to provide a Process Flow for your products and have it approved by your Food Inspector prior to registration and sale of your product. If you are unsure if your product is considered an Acid, Acidified or Fermented Food, please discuss with your Food Inspector.

### ❖ INITIAL PRODUCT TESTING

Initially, the producer shall have each unique recipe/product tested by an independent **commercial food laboratory** and test results submitted with the application for review. Producers of acidified/ fermented foods or beverages will be approved only if testing results for equilibrium pH show that their products fall within safe ranges of **pH 4.6 or below**. However, producers of acidified/fermented foods or beverages should aim for a pH level of 4.2 or below as an extra precaution.

### ❖ ONGOING PRODUCT TESTING & RECORD KEEPING

- If your final equilibrium pH is 4.0 or below, you must have either a properly calibrated pH meter or **pH test strips** to verify your pH of every batch produced.
- If your final equilibrium pH is between 4.0 and 4.2, you must have a properly calibrated **pH meter** and check the pH of every batch produced.
- If your final equilibrium pH is between 4.2 and 4.6, you must have your product flow, recipe and process evaluated and approved by a **Process Authority**.  
A process authority is a qualified person who has expert knowledge acquired through appropriate training and experience in the acidification and processing of acidified foods.)  
For a list of subject matter experts (SME) and process authorities, click [HERE](#).
- If your final equilibrium pH is above 4.6 (and  $a_w$  above 0.85), see the “low acid canned foods or beverages” section below.

All records pertaining to monitoring pH as the critical process control (pH log sheets) must be kept showing production date, batch number, pH and any corrective actions taken to correct deficiencies noted if pH was 4.6 or above. Records showing verifications and calibration of the pH meter must also be kept.

### **How to properly test for equilibrium pH**

Equilibrium pH is the final pH in the food product after the acidic brine or ingredient acidifies and balances with the other ingredients.

For a proper pH reading, you should test the pH of the product roughly 24 hours after processing, once the containers have cooled to room temperature and stabilized. Do not take the pH of a product just before or right after canning because it will not be an accurate measure of the equilibrium pH.

- *If a food is homogeneous*, that is of uniform consistency (apple sauce, barbeque sauce, ketchup, etc.), then the pH of any portion may be considered to be representative of the whole.
- *If the food is semi-solid* (e.g. puddings, chunky salsas, and very thick sauces), these foods should be blended to a uniform paste before testing. If additional liquid is required to blend the samples, use distilled water (20 parts of distilled water/100 parts of food).
- *If the food consists of a mixture of liquid/solid foods* (e.g. pickled vegetables, etc.), then you need to purée this in a blender, with distilled water if necessary, into a slurry. The solid portion may differ in acidity from the covering liquid (brine). Therefore, it is necessary to test both components in order to determine the equilibrium pH. This can be done either by blending fractions of both solid and liquid portions in the same ratio as found in the original container or simply by blending the entire contents of the container to a uniform paste and then test for pH.

### **pH meter purchase guidance**

Click for guidance about [purchasing a pH meter](#).

Our general pH meter recommendations are if you are producing a food product with a pH of 4.0 or higher, it is best to purchase a pH meter with an accuracy rating of 0.01 + pH units. If producing an acidified food with a pH below 4.0, it would be best to purchase a pH meter that has an accuracy rating of 0.1 + pH units.

### **❖ THERMAL PROCESS & RECORD KEEPING**

All recipes of acidified foods must incorporate a thermal process (cooking) to ensure its safety and shelf stability by destroying the pathogenic and spoilage microorganisms that might be present in the product.

For acidified canned foods, safety can be achieved by employing one of the following methods:

- a. **Hot-fill-hold process** – the product is cooked and filled at a temperature of 180°F (or above) and a closure or lid is applied. The sealed container is inverted and held for 1 minute or longer to ensure pasteurization of the container headspace and inside surfaces. The container is then turned right side up and allowed to air cool. Processors may choose to hold the inversion longer to ensure safety and that a strong seal is achieved on the container.

This type of process is mostly used for foods with smooth consistency (e.g. sauces, salsa, etc.)

- b. **Water bath or steam (canning) process** – the preheated product is filled into the container and the closure is applied. The container is subjected to boiling water bath or steam canning until the coldest spot in the container reaches 180°F or above for 25 seconds or longer.

Processors may choose other scientifically approved time/temperature combinations.

- c. **If the recipe does not allow for a heat treatment** (e.g. oil based formulation, emulsions, etc.), an alternative process where safety can be assured without a heat process may be employed if the following conditions are met:

- ✓ Final pH is adjusted to 3.3 or below.
- ✓ Acetic acid (i.e. vinegar) is used as the primary acidulant and/or benzoic acid is added as a preservative.
- ✓ Product must be held at 77°F or higher for a minimum of 48 hours prior to distribution.

It is the combination of the specific killing effect of acetic acid, benzoic acid, low pH and hold temperature and time that ensures safety.

All records pertaining to monitoring of the thermal process (e.g. time, temperature) must be kept for each batch produced as well as records of verifications (thermometer calibration, etc.) and corrective actions taken to correct deficiencies noted on the process records.

❖ **Other requirements for canning:**

- ✓ Anytime a recipe is altered or a new recipe is developed, the final product must be tested as described above.
- ✓ Use only clean and sanitary equipment/ utensils and adhere to good manufacturing and personal hygiene practices (to prevent cross-contamination and allergen cross-contact).
- ✓ Use only new lids. Re-used jars may be allowed but they must be thoroughly washed and sanitized.
- ✓ All labeling requirements on the containers must be met (see labeling section pg.5).
- ✓ *Processors wishing to sell their products interstate (which include internet sales), or using ingredients obtained from interstate may be required to register with the US Food & Drug Administration (FDA). If you are unsure of federal regulations that apply to your situation, contact your local [FDA Small Business Representative](#).*
- ✓ *FDA may require Acidified Food recipes to be reviewed by a Process Authority, to file processes with FDA, and to batch test all products under their jurisdiction, regardless of pH level.*

*These requirements should be discussed with FDA, especially if you intend to sell products in interstate commerce. For more information contact FDA at [1-800-216-7331](tel:1-800-216-7331) or [301-575-0156](tel:301-575-0156).*

✚ **LOW ACID CANNED FOODS OR BEVERAGES**

Generally, any food/beverage with a finished equilibrium pH greater than 4.6 and a water activity greater than 0.85, is considered a low-acid food. Low acid canned foods or beverages may only be processed in a commercial establishment using steam retort system. They may **NOT** be made from a limited food establishment or in any residential-style kitchen. This would include, for example, most soups, gravies, unpickled vegetables, and fruits in syrups.

*For more guidance on acidified and low-acid canned foods  
Please visit the FDA's [Acidified & Low-Acid Canned Foods \(LACF\)](#) website.*

✚ **OTHER FOODS**

Other types of foods may potentially be approved for processing, handling, re-packing or storage in a limited food establishment; however, only those foods considered non-TCS foods are permitted to be produced/held in this type of setting. Product testing for pH and water activity ( $a_w$ ) may be required on a case by case basis for questionable foods to determine whether they are a TCS food. If you have an unusual food product, discuss this product with your Food Inspector.

For more information, contact:

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