

Regulations for Selling Safe Canned Foods in Missouri

Extension Fact Sheet - May 2023



Many small-scale food processors make and sell some type of canned, shelf-stable foods, such as pickles, jams and jellies or salsa. Such products offer a great way to add value and extend the shelf life of local produce. However, processors must ensure that these products are produced in a hygienic environment and follow local and federal food safety regulations. Some of the most frequently asked questions regarding selling safe canned foods are listed below:

1. Which regulations do I need to follow for selling canned foods?

Where are you <i>processing</i> ?	Regulations to follow
A city or county with a food ordinance ¹	Local and state regulations The product will be inspected by a local inspector acting under <i>local</i> authority.
A county without a food ordinance (generally less populated counties)	State regulations The product will be inspected by a local Public Health Agency inspector acting under <i>state</i> authority.
Where are you <i>selling</i> ?	Regulations to follow
In Missouri	Missouri state and local food processing regulations ² More information on regulations for specific products is listed below. Always check with the local public health inspector in the area where you are processing and selling as regulations may vary in different localities.
Outside Missouri	Food and Drug Administration (FDA) ³ , state and local regulations Low-acid and acidified canned shelf-stable foods, regardless of size of operation, require a process review.
Grocery stores, distributors	Missouri food processor regulations In addition, check with your buyer as their requirements may be stricter than government regulations.
Missouri farmers markets	Missouri retail food regulations, as well as requirements of the farmers market where you are selling ⁴

2. Why are we so concerned about *Clostridium botulinum* in canned foods?

The big concern with *C. botulinum* is that it grows in the absence of oxygen, such as in canned food products. It can form heat-tolerant spores which can produce a deadly toxin of which only a few nanograms can cause paralysis and death. Temperatures of 250°F (above the boiling point of water, thus requiring pressure to obtain that temperature) are required to kill spores under neutral pH conditions.

3. Why is the acidity of food important to its safety?

Most microorganisms, including *C. botulinum* do not like to grow in foods that are acidic (thus having a lower pH value). A pH of less than (<) 4.6 reduces the temperature requirement to kill *C. botulinum* to 212°F (boiling point of water). Most fruits⁵ have a pH of 3 to 4, while tomatoes have a pH of 4 to 5. Other vegetables, beans, meat and fish have a pH of greater than or equal to (\geq) 5. Lemon juice and vinegar have a pH less than or equal to (\leq) 3, while pure water has a pH of 7.0.

4. How do I measure product pH?

PH test strips can be used to estimate pH and can be legally used for products with a pH below (<) 4.0. For more accurate measurements and for products with pH above (>) 4.0, a calibrated pH meter should be used. A good, easy-to-use pH meter⁶ can be purchased for about \$100. The pH meter must be calibrated at least weekly and the product should be at room temperature when checking the pH to ensure accuracy.

5. What processing methods can I use for various types of food?

Method	What it does	Maximum temp	Use for:
Boiling water bath	Destroys most microorganisms of concern, including yeasts and molds*	212°F	High-acid foods: home canning and commercial applications
Hot fill	Same as above; need to use sterilized jars	190°F	High-acid foods: requires a commercial steam kettle
Pressure canning	Destroys ALL microorganisms of concern, including <i>C. botulinum</i> spores	250°F	Low-acid foods: home canning; must use a commercial retort for selling low-acid foods

*Note that yeasts and molds cause product spoilage and can grow at pH of less than or equal to (\leq) 4.6. If present, they can raise product pH to a level allowing *C. botulinum* growth.

6. Does someone need to check the safety of the canned foods that I sell?

Depending on the natural and final levels of acidity of the food product, certain foods require a "process review" by a process authority.

Classification	Characteristics	Examples	Sale requirements
Acid Food (shelf stable)	Natural pH of product ≤ 4.6 ⁷	Most fruits, naturally fermented foods (sauerkraut)	NO process review, but must keep pH records; made in inspected facility
Acidified Food (shelf stable)	< 90% naturally acidic ingredients (pH ≤ 4.6) ⁷ acidified w/ vinegar or lemon juice ⁸	Pickled vegetables, pickled eggs, pickled meats, <u>usually</u> salsa, hot sauces	Process review, Better Process Control School (BPCS); made in inspected facility
Low Acid Food (shelf stable)	Natural pH > 4.6	Canned beans, canned meat, cream soups	Process review, BPCS, commercial retort canning; inspected facility

Classification	Characteristics	Examples	Sale requirements
Refrigerated canned products	Foods sold refrigerated and labeled as "keep refrigerated"	Refrigerated canned salsa, sauces, pesto, etc.	Monitor refrigeration. NO process review. Made in inspected facility
Fruit Jams and Jellies, Honey (shelf stable)	If < \$50,000 sales/year AND sold directly to the consumer, ⁹ then exempt	Strawberry jam, grape jelly, honey	If exempt, inspected facility NOT required, but must be labeled as "not inspected" ¹⁰ ; if not exempt, inspected facility
LOW SUGAR Fruit Jams and Jellies (shelf stable)	*Products containing artificial sweeteners must have pH tested in a laboratory. $pH < 4.0$	Varies	No inspected facility required, but recipe (which had its pH tested) must be followed exactly.
	pH between 4.0 and 4.6	Varies	Must be made in inspected facility; pH of every batch must be tested with a pH meter and records kept
	$pH > 4.6$	Pepper jelly, tomato jelly	Acidified or low-acid food; BPCS, process review and inspected facility required
Jellies Made with Juice (shelf stable)	*these products must be tested in a laboratory for pH and water activity (a_w) ¹¹ $pH < 4.0$	Varies	Inspected facility not required
	If $pH > 4.0$: also test water activity (a_w) $a_w < 0.80$	Varies	Inspected facility not required, but recipe and process tested must be followed exactly.
	a_w between 0.80 and 0.85	Varies	Manufacture in inspected facility; monitor a_w
	$a_w > 0.85$	Varies	Low acid/acidified food; inspected facility, BPCS, process review
Low Water Activity Foods (shelf stable)	Foods with water activity (a_w) ≤ 0.85	Chocolate sauce (sold shelf stable)	Monitor a_w . NO process review; Manufacture in inspected facility
Canned Beverages	Carbonated or alcoholic beverages	Beer, soda	NO process review; inspected facility; for alcohol, follow Mo. Department of Public Safety regulations ¹²

7. What is a process review?

A recognized process authority will do a careful evaluation of your product formulation, processing steps and the safety characteristics of your product. They will then provide a "scheduled process" for the product which includes the product formulation, critical control points, processing steps, storage, distribution and sales conditions which are required to keep the product safe.

8. Who or what is a process authority?

This is a person or institution with an FDA-recognized expert who has knowledge and experience in the microbiology and processing requirements for canned foods. Food processors in Missouri can contact the MU-Food Processing & Safety laboratory to test their products (e.g., pH, water activity etc.) and for process authority services.

9. Why should I get a process review?

It is a regulatory requirement if you are selling canned products that require a process review. The process authority can make very useful suggestions for you to improve the safety of your product, particularly if you make any changes to your process or ingredients. It also provides a documentation of safety for your customers.

10. How do I get a process review?

- i. Send in completed form along with a sample of product to a process authority for testing (pH and possibly a_w)
- ii. Click here to access the analytical service and process authority request forms. (<https://extension.missouri.edu/services/food-processing-and-safety-lab-services>)
- iii. Also need to meet Missouri regulations, as well as FDA regulations if selling out of state
- iv. Someone who has attended Better Process Control School must be in the facility while processing.
- v. For more information, please contact the Missouri process authority (Ichannaiah@missouri.edu).

11. Where can I take Better Process Control School (BPCS)?

The University of Missouri¹⁶ offers the BPCS training. Please check the "MU-Food Processing and Safety Lab" for the latest information. Other universities and other entities also offer the course in-person and online.¹⁶

12. What information do I need to submit along with a sample of my product to get a process review?

The process authority will likely have a form to be completed. The information needed generally includes:

- Exact formulation of product by weight
- Precise directions for the process, including packaging to be used
- Intended distribution temperature: Refrigerated, frozen, or shelf stable
- Your name, address, phone number, email

13. What do I do once my process review is completed?

- When processing, need to follow approved process exactly as written
 - Must maintain records of relevant critical control points for every batch (pH, temperature, etc.)
- Review approved process periodically to see if changes are necessary or have been made



Prepared by:

Londa Nwadike, Ph.D

University of Missouri/ Kansas State University Extension Consumer Food Safety Specialist
nwadikel@missouri.edu, and updated by Kantha Channaiah (Ichannaiah@missouri.edu).
Tel: 816-482-5860; 105 E. 5th St, Suite 200, Kansas City, MO 64106

Please note that this is the author's best understanding of the regulations.
Please contact your local public health inspector or the Missouri Department of Health
(contact info available from <http://health.mo.gov/safety/foodsafety/index.php>)
for more information.

- ¹ More information is available from: <https://health.mo.gov/safety/foodsafety/industryfoods/retailfoods/authority.php>
- ² Generally, if selling product directly to the consumer (such as at a Farmers Market), Retail food regulations apply and if NOT selling directly to the consumer (through a grocery store or distributor, etc.), Food Processor regulations apply. More information on both these types of regulations is available from: <https://health.mo.gov/safety/foodsafety/industryfoods/>
- ³ More information: <https://www.fda.gov/food/guidance-documents-regulatory-information-topic-food-and-dietary-supplements/acidified-low-acid-canned-foods-guidance-documents-regulatory-information>
- ⁴ Missouri Grown Farmers Market Handbook is available from: <https://missourigrownusa.com/farmers-market-handbook.pdf>
- ⁵ List of approximate pH of foods: <https://extension.okstate.edu/fact-sheets/the-importance-of-food-ph-in-commercial-canning-operations.html>
- ⁶ Tips on buying a pH meter are available here: <https://extension.okstate.edu/fact-sheets/choosing-and-using-a-ph-meter-for-food-products.html>
- ⁷ The legal pH limit is ≤ 4.6 , but for an added safety measure, process authorities will generally require a final product pH of ≤ 4.2 .
- ⁸ Note that every component of the food must be < 4.2 pH within 24 hours of thermal processing
- ⁹ Note that this does NOT include taking an order and shipping the product to their customer.
- ¹⁰ More information on labeling requirements for food products is available from: <https://extension.missouri.edu/publications/n1305>
- ¹¹ Water activity is a measurement of the water available for the growth of microorganisms. It is affected by moisture content, as well as salt and sugar content of the product. It ranges from 0 to 1 (distilled water is a_w 1).
- ¹² Licensing information is available from MO DPS Alcohol and Tobacco Control: www.atc.dps.mo.gov/licensing/
- ¹³ Information on Kansas State University Process Authority: <https://www.ksre.k-state.edu/kvafll>
- ¹⁴ Information on University of Arkansas Process Authority:
- ¹⁵ Information on University of Nebraska Process Authority: http://fpc.unl.edu/lab_services
- ¹⁶ MU Food Processing and Safety Lab: <https://extension.missouri.edu/programs/food-safety/food-processing-and-safety-lab>



University of Missouri Extension

University of Missouri, Lincoln University, U.S. Department of Agriculture and Local Extension Councils Cooperating.
MU Extension is an equal opportunity/access/affirmative action/pro-disabled and veteran employer.

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

Kansas State University, County Extension Councils, Extension Districts, and U.S. Department of Agriculture Cooperating. K-State Research and Extension is an equal opportunity provider and employer.