How NOT To Die From Botulism
what home canners need to know about the world’s most deadly toxicant

Hello, My Name Is: Clostridium Botulinum

How Bad Is Botulism, Really?

Well, a pint jar filled with pure Botulinum Toxin would be enough to kill every man, woman and child in the entire world.

Yeah, not even a Quart, just a Pint. It’s that bad.

Sealing food in a jar, as we do when we water-bath can or pressure can food creates a moist, oxygen-free environment.

This is exactly the environment C. Botulinum spores are looking for to reanimate into their toxic-profiling form.

Scared yet?

So Am I Just Rolling The Botulism Dice Every Time I Make Jam?

Not at all. Canning food at home is not complicated, and it doesn’t have to be dangerous, either. You just have to pay attention to acidity and temperature and follow established food handling and processing standards.

The Home Canner has two options to ensure a botulism-free and safe-to-eat product. The first involves controlling the acidity of the product so C. Botulinum Spores never germinate, the second involves heating the product enough to kill the Spores themselves. Let’s look at each of them in turn.

1. Acid Level (stop spore germination)

The Spores that cause botulism will not germinate in a strongly acid environment. If the Spores never germinate, they cannot make the Botulinum Toxin. Food that has a pH of 4.6 or less is considered strongly acid and is safe to can in a Water Bath Canner.

Some foods are naturally high enough in acid to safely can in a Water Bath Canner. These include most fruits, which as we know jams, preserves, jellies and fruit in syrup are safe to can in a Water Bath Canner.

Vegetables, most legumes and dairy naturally have a pH of 4.6 or above and are therefore Low Acid. These foods CANNOT be safely canned in a Water Bath Canner. Instead we would create the low acid, anaerobic environment which would allow the C. Botulinum Spores to germinate and produce the Botulinum Toxin.

Low Acid foods can be made safe for Water Bath Canning if they are pickled (that is, made much more acidity) with the addition of strongly acid things like Vinegar, Lemon Juice, Citric Acid or (in the case of Fermentation) Lactic Acid. This is how natures - low acid and not safe to Water Bath Can - are turned into pickles - high acid and SAFE to Water Bath Can.

Because home canners do not generally have the equipment necessary to accurately determine the pH of their high-acid canned product, tested recipes should be followed.

2. Temperature (kill spores outright)

The C. Botulinum spores that can germinate and then create the Botulinum Toxin can survive temperatures of 212 degrees F, 120 degrees C. This is why Water Bath Canning low-acid foods can create dangerous, Botulinon friendly environments.

However, even the Spores give out eventually. If you get them up to 240 degrees F, 115 degrees C and keep them there long enough, the Spores will die. The FDA, commercial guidelines for most canned low and acid foods require a “Botulism cook” at 250 degrees F, 120 degrees C for three minutes, which reduces the chance of a C. Botulinum Spore surviving to one in a trillion.

At home, temperatures above 212 F/100 C can ONLY be achieved in a pressure canner (not the same as a pressure cooker!). Because home canners cannot be absolutely sure how long it takes for every bit of the internal temperature of a jar of food to reach the necessary temperature, official guidelines for processing time when using a pressure canner must be followed. Never skimp on processing time, ever.

Happy Canning! Have Fun, Eat Well and Stay Safe.

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