pH reference: Which side of pH 4.6 is your food on?

One number sits at the center of every home canning safety decision: pH 4.6. These tables sort common foods into three categories – high acid, borderline, and low acid. The values here have been checked against original literature, not copied from tables that cite each other.

High-acid foods: Bucket 1

Below pH 4.6, *Clostridium botulinum* spores can't germinate. They may survive the heat treatment, but the high-acid environment will prevent them from waking up, growing, and producing toxin.

Food	pH Range	Source
Apples	3.33 – 3.84	1
Apricots	3.6 – 4.67*	1, 2
Blackberries	3.85 – 4.50	1
Blueberries	3.12 – 3.32	1
Cherries	3.33 – 4.54	1
Cranberry juice	2.3 – 2.5	3
Currants (black)	2.62 – 3.45	4
Currants (red)	2.86 – 3.45	4, 5
Gooseberries	2.80 – 3.10	2
Grapefruit	3.22 – 3.75	1
Grapes (various)	2.79 – 3.80	1
Jostaberry	2.90 – 3.24	4, 5
Kumquat	3.64 – 4.25	1
Lemons, lemon juice	1.98 – 2.10	1
Limes, lime juice	2.00 – 2.25	1

Food	pH Range	Source
Loganberries	2.70 – 3.50	1
Nectarines	3.92 – 4.69**	1, 6
Oranges	3.60 – 4.34	1
Peaches	3.30 – 4.62**	1, 6
Pears	3.49 – 4.08	1
Pineapple	3.20 – 3.64	1
Plums (various)	2.78 – 5.28*	1
Pomegranate	2.93 – 3.10	1
Quince	3.12 – 3.37	1
Raspberries	3.50 – 3.95	1
Rhubarb	3.20 – 3.34	1
Rose hips	4.15 – 4.45	7
Sloe (blackthorn)	3.35 – 4.22	8
Strawberries	3.32 – 3.50	1
Tangerine	3.32 – 4.48	1

* The upper end reflects older sources not reproduced in later literature. USDA and German canning traditions treat apricots and plums as high acid.
** Of 32 peach and 52 nectarine cultivars tested (6), only 1 peach and 2 nectarines exceeded pH 4.6. These were low-acid cultivars with notably high sugar content.

Borderline pH foods: Bucket 2

These foods sit at or near pH 4.6. Some samples fall below it; others above it. That variability means a borderline food may not contain sufficient acid to prevent *C. botulinum* germination and growth. Variety, ripeness, and preparation all affect where a specific food lands. Whichever canning tradition you follow, these are the variables worth knowing.

Food	pH Range	Source
Elderberry: European (*S. nigra*)	3.8 – 4.22*	9–12
Elderberry: N. American (*S. canadensis*)	3.9 – 5.19*	11, 12
Mangoes (Florida)	3.40 – 4.63	1
Peaches (white)	3.53 – 3.83, > 4.6**	6
Tomatoes	3.99 – 4.75	1

* pH data for elderberry differs by species. European elderberry (*Sambucus nigra*) appears consistently more acidic than North American elderberry (*Sambucus canadensis*), whose measured values can extend well above the 4.6 threshold.
** White peach pH above 4.6 is commonly claimed online, though no supporting data was found in the literature reviewed here. Published research (source 6) measured six Italian white peach varieties, all below 4.6. The >4.6 figure is included for completeness.

Low-acid foods: Bucket 3

Above pH 4.6, *C. botulinum* can germinate and grow. Preserving foods in this category safely requires one of two approaches: either destroy the spores through adequate heat treatment, or add sufficient measured acid to bring the pH below 4.6 and treat the food as a high-acid preserve.

Low-acid fruits

Not all fruits are acidic. Some fall above the pH 4.6 threshold.

Food	pH Range	Source
Avocados	6.47 – 6.58	1
Bananas (red)	4.58 – 4.75	1
Bananas (yellow)	4.5 – 5.29	1, 2
Cantaloupe	6.17 – 7.13	1
Coconut (fresh)	5.90 – 6.52	1
Dates	4.58 – 6.4	1, 2
Figs (various)	4.72 – 6.23	1, 15
Melon (casaba)	5.57 – 6.00	1
Melon (honeydew)	6.00 – 6.67	1
Melons (Persian)	5.90 – 6.38	1
Papaya	5.20 – 5.72	1
Pears (Asian)	3.93* – 5.66	13, 14
Persimmons	5.40 – 5.81	1
Watermelon	5.18 – 5.60	1

* The lower end reflects a single variety (Gola) measured in pulp (13). A separate study (14) measuring juice across 14 varieties found values consistently above 4.6.

Low-acid vegetables

Most vegetables are low acid. If a vegetable isn't listed, it most likely belongs in this category.

Food	pH Range	Source
Artichokes	5.70 – 6.00	1
Asparagus	6.03 – 6.16	1, 2
Beans (various)	5.50 – 6.73	1
Beets	5.23 – 5.90	1
Broccoli	6.30 – 6.52	1
Brussels sprouts	6.00 – 6.15	1
Cabbage	5.79 – 6.29	1
Carrots	5.88 – 6.00	1
Cauliflower	6.45 – 6.80	1
Celery	5.70 – 6.00	1
Chicory	5.89 – 6.05	1
Chives	5.25 – 6.31	1
Corn	6.22 – 7.04	1
Cucumbers	5.18 – 5.78	1
Eggplant	5.33 – 5.49	1
Fennel	5.48 – 6.72	1

Food	pH Range	Source
Horseradish	5.35	1
Leeks	5.51 – 6.07	1
Lettuce	5.70 – 6.13	1
Mushrooms	6.17 – 6.22	1
Olives (green, ripe)	6.8	1
Onions	5.32 – 5.85	1
Parsnip	5.40 – 5.65	1
Peas	6.22 – 6.88	1
Peppers	5.20 – 5.93	1
Potatoes	5.28 – 6.02	1
Pumpkin	4.8 – 5.2	2
Radishes	5.52 – 6.05	1
Spinach	5.1 – 7.18	1, 2
Squash (various)	5.18 – 6.49	1
Turnips	5.64 – 5.85	1
Watercress	5.88 – 6.18	1

Sources

1. Bridges MA, Mattice MR. *Am J Dig Dis*. 1939;6(7):440-449.
2. Haynes WM et al. *CRC Handbook of Chemistry and Physics*. 97th ed. CRC Press, Taylor & Francis Group; 2017.
3. U.S. FDA. *Bad Bug Book: Handbook of Foodborne Pathogenic Microorganisms and Natural Toxins*. 2nd ed. 2012.
4. Mikulic-Petkovsek M et al. *Food Chem*. 2015;173:363-374.
5. Eksi Karaagac H et al. *Food Sci and Tech (Brazil)*. 2021;41(2):304-313.
6. Petruccelli R et al. *Plants*. 2023;12(8):1618.
7. Dogan A, Kazankaya A. *Asian J Plant Sci*. 2006;5(1):120-122.
8. Bükücü ŞB et al. *Ege Üniversitesi Ziraat Fakültesi Dergisi*. 2024;61(4):401-412.
9. Vujanović M et al. *RSC Adv*. 2020;10(73):44805-44814.
10. Mustafa A et al. *Phcog Mag*. 2009;5(20):320-323.
11. Perkins-Veazie P et al. *Acta Hortic*. 2015;1061:219-224.
12. Lee J, Finn CE. *J Sci Food Agric*. 2007;87(14):2665-2675.
13. Verma A, Kushwaha A. *Int J Adv Agric Sci Tech*. 2014;2(2):85-93.
14. Kumar P. *Biochemical Characterization of Pear Varieties at Fruit Maturity and Their Ripening Behaviour*. Punjab Agricultural University Ludhiana. 2017.
15. Woodburn M. *J Food Prot*. 1982;45(13):1245-1247.