

# calcium

## Best Sources of Calcium from the *World's Healthiest Foods*

FOOD	SERVING SIZE	CALS	AMOUNT (MG)	DRI/DV (%)	NUTRIENT DENSITY	WORLD'S HEALTHIEST FOOD RATING
Tofu	4 oz	164	774.5	77.5	8.5	excellent
Collard Greens	1 cup	63	267.9	26.8	7.7	excellent
Spinach	1 cup	41	244.8	24.5	10.6	excellent
Turnip Greens	1 cup	29	197.3	19.7	12.3	excellent
Mustard Greens	1 cup	36	165.2	16.5	8.2	excellent
Beet Greens	1 cup	39	164.2	16.4	7.6	excellent
Bok Choy	1 cup	20	158.1	15.8	14.0	excellent
Yogurt	1 cup	149	296.4	29.6	3.6	very good
Swiss Chard	1 cup	35	101.5	10.2	5.2	very good
Kale	1 cup	36	93.6	9.4	4.6	very good
Cinnamon	2 tsp	13	52.1	5.2	7.3	very good
Sesame Seeds	0.25 cup	206	351.0	35.1	3.1	good
Sardines	3.20 oz	189	346.5	34.7	3.3	good
Cheese	1 oz	114	204.4	20.4	3.2	good
Cow's milk	4 oz	74	137.9	13.8	3.3	good
Cabbage	1 cup	44	63.0	6.3	2.6	good
Broccoli	1 cup	55	62.4	6.2	2.1	good
Brussels Sprouts	1 cup	56	56.2	5.6	1.8	good
Green Beans	1 cup	44	55.0	5.5	2.3	good
Oranges	1 medium	62	52.4	5.2	1.5	good
Summer Squash	1 cup	36	48.6	4.9	2.4	good
Fennel	1 cup	27	42.6	4.3	2.8	good
Parsley	0.50 cup	11	42.0	4.2	6.9	good
Asparagus	1 cup	40	41.4	4.1	1.9	good
Celery	1 cup	16	40.4	4.0	4.5	good

For more on %DRI/%DV, Density, and The World's Healthiest Foods Quality Rating System, see page 1004.

## the importance of calcium-rich foods

Calcium is a very important mineral in human metabolism, making up about 1-2% of an adult's body weight. Contrary to popular belief, you do not need to eat dairy foods to get the calcium you need in your meal plan. Calcium is provided by a wide variety of foods, and in order to get 1,000 milligrams per day [the Dietary Reference Intake, or DRI for women and men 19-50 years of age], you don't need cow's milk, yogurt, cheese, or butter. By reviewing the chart above you can see how non-dairy foods—such as vegetables, tofu, sesame seeds, and even sardines—can make a great contribution to a calcium-rich diet.

Some calcium-containing foods also contain two substances that have a long history of controversy in scientific research—oxalic acid [“oxalates,” see page 47] and phytic acid. Both can bind together with calcium and other minerals, and this binding process shows up in some studies as lowering the amount of calcium that gets absorbed from our digestive tract up into our body.

However, our digestive processes are never simple, and other studies show people to be fully healthy in terms of their calcium nourishment even when their overall meal plan contains many foods high in oxalates and phytates. As a general rule, we do not think that you need to avoid oxalate- or phytate-containing foods [many of which are plant-based foods] in your meal plan even if your primary goal is to improve your calcium intake.

## how does calcium promote health?

### support bone health

At any given time, about 99% of our total body calcium stores are found in bones and teeth. This calcium plays a critical role in maintaining structural integrity of our skeleton. Bone is very metabolically active tissue, with bone being built and broken down constantly. When our dietary calcium levels are too low, we pull calcium from the bones to keep the blood levels close to constant. If we do more borrowing from than replenishing to our calcium stores, bone can become dangerously weak.

Note that many people tend to think of low bone mineral density, or osteoporosis, as a disease of the elderly. While it is true that the bone fractures that occur tend to be in older adults, the damage that leads to osteoporosis can start very early with poor dietary choices during childhood and adolescence.

### acid/alkaline balance

Calcium is an absolutely critical nutrient in regulating acid/alkaline balance (called pH) in the blood. When blood pH starts getting low (down to 7.35 from a baseline of 7.4), calcium starts getting released from the bones to bring acid/base balance back into balance. The pH of blood is of critical importance to sustain life, and controls processes as varied as breathing rate and the ability to transport oxygen in blood cells.

### muscle and nerve function

When a muscle cell receives a signal from nerves telling it to fire that cell responds by allowing a flood of calcium into the cell. This abrupt change leads to a cascade of activity and has the effect of making the muscle cell contract. If calcium levels are abnormal, either too high or too low, this process can be interrupted, which will lead to muscle spasm. Because our bodies have such extensive calcium stores to draw upon to keep blood levels constant, it is very unlikely that simple dietary deficiencies would contribute to problems in these activities for most people.

## public health recommendations

In 2010, the National Academy of Sciences released Dietary Reference Intake (DRI) updates that included Recommended Dietary Allowances (RDA) for age and gender specific calcium intake goals. These RDAs are as follows.

- 0-6 months: 200 mg
- 6-12 months: 260 mg
- 1-3 years: 700 mg
- 4-8 years: 1,000 mg
- 9-13 years: 1,300 mg
- 14-18 years: 1,300 mg
- 19-30 years: 1,000 mg
- 31-50 years: 1,000 mg
- 51-70 years, female: 1,200 mg
- 51-70 years, male: 1,000 mg
- 70+ years: 1,200 mg
- Pregnant or lactating women, 14-18 years: 1,300 mg
- Pregnant or lactating women, 19-50 years: 1,300 mg

The Daily Value (DV) for calcium established by the U.S. Food and Drug Administration (FDA) is 1,000 milligrams. This is the value you'll find listed on food labels.

We chose the DRI for 19-50 year-old women of 1,000 milligrams as our WHFoods standard for calcium. The Nutrient Richness Chart in this chapter uses this as the comparison standard as does any food Nutrient Richness Chart where you would see calcium noted.

## impact of cooking, storage & processing on calcium in food

Calcium content of foods is remarkably stable. Calcium does not degrade or leach out of foods as they are stored, and there does not appear to be any major change in bioavailability of calcium over the shelf life of the best food sources.

## what circumstances can contribute to calcium deficiency?

Absorption of dietary calcium becomes progressively less efficient with age. Additionally, one of the biggest contributors to calcium nutrition is vitamin D. Low levels of vitamin D can impair absorption of calcium from the intestines and the ability of the kidneys and bone to maintain normal circulating calcium levels.

## can you consume too much calcium from food?

The National Academy of Sciences (NAS) in its 2010 public health recommendations for calcium noted that excessive amounts of dietary calcium are “difficult, not impossible” to achieve in normal healthy adults. In its 2010 public health recommendations for calcium, the NAS established the following maximum recommended amounts (which they call Tolerable Upper Intake Levels, or ULs) for this mineral:

- 0-6 months: 1,000 mg
- 6-12 months: 1,500 mg
- 1-3 years: 2,500 mg
- 4-8 years: 2,500 mg
- 9-13 years: 3,000 mg
- 14-18 years: 3,000 mg
- 19-30 years: 2,500 mg
- 31-50 years: 2,500 mg
- 51+ years: 2,000 mg
- Pregnant and lactating women (younger than 18 years): 3,000 mg
- Pregnant and lactating women (older than 18 years): 2,500 mg

In order for a middle-aged person to exceed this 2,500 milligram limit on calcium intake, that person would need to eat about 10 cups of spinach or collard greens (two of our “excellent” WHFoods sources of calcium). Similarly, a person would need to consume about 6 cups of yogurt to go over this amount.