

## The Oxalate Content of Food

The oxalate content of food can vary considerably between plants of the same species, due to differences in climate, soil quality, state of ripeness, or even which part of the plant is analyzed. Variations also may be caused by the different methods used for measuring oxalate in food. Published values for some foods can vary from negligible amounts to moderately high, so the foods have been grouped into broad ranges based on the higher values reported for each food.

These food tables were compiled using the most up to date information available as of May 2004. They may be grouped differently to that of other oxalate food lists, because they are based on more recent data. In using these tables, it is very important to pay attention to the serving sizes listed.

A low oxalate diet is usually defined as less than 50mg oxalate per day. However, dietary oxalate restrictions will vary depending on the underlying condition causing high oxalate levels. Please check with your health provider to determine the appropriate level of oxalate restriction for you.

<b>HIGH</b> Over 10mg per serving * over 50mg; ** over 100mg; *** over 200mg per serving	<b>MODERATE</b> 5 - 10mg per serving	<b>LOW</b> Less than 5 mg per serving § less than 2mg per serving
Vegetables/Legumes - ½ cup serving (unless indicated otherwise)	Vegetables/Legumes - ½ cup serving (unless indicated otherwise)	Vegetables/Legumes- ½cup serving (unless indicated otherwise)
Baked beans (⅓ cup)	Artichoke	Asparagus
Beans, green	Black Olives (8 large)	Avocado §
Beans, kidney	Carrots, cooked	Broccoli §
Beans, refried ***	Carrot juice	Brussels sprouts §
Beans, white or navy	Escarole, raw (1 cup)	Cauliflower §
Beetroot-boiled/pickled ***	Fennel, boiled	Cabbage, green §
Beet greens ***	Kale, boiled	Cabbage, red
Celery, raw	Lima Beans, cooked	Cucumber §
Carrots, raw	Parsnips, boiled	Endive §
Chicory, raw	Parsley (1 Tbsp)	Kohlrabi §
Chili peppers, raw	Peas, canned	Lettuce, all kinds §
Collards, cooked	Sauerkraut	Mushrooms §
Dandelion greens, boiled	Split peas	Onions, raw & cooked
Egg plant, boiled	Tomato juice	Peas, green (fresh /frozen) §
Leeks		Radishes §
Lentils, dried, cooked		Sweet corn
Mustard greens, raw		Turnips §
Okra **		Water chestnuts, canned §
Olives, green (10 large)		Watercress (1 cup)
Peppers, green, raw (½ cup)		
Potatoes, fried, boiled or baked		
Potato, chips (1 cup)		
Rutabagas, cooked		
Spinach, raw or cooked ***		
Tomato, fresh or canned		
Tomato, raw		

<b>HIGH</b> Over 10mg per serving * over 50mg; ** over 100mg; *** over 200mg per serving	<b>MODERATE</b> 5 – 10mg per serving	<b>LOW</b> Less than 5 mg per serving <sup>§</sup> less than 2mg per serving
Summer squash, cooked		
Sweet potatoes, cooked **		
Swiss chard, cooked ***		
Swiss chard, raw *** (1 cup)		
<b>Fruit &amp; Juices - ½ cup serving</b> (unless indicated otherwise)	<b>Fruit &amp; Juices - ½ cup serving</b> (unless indicated otherwise)	<b>Fruit &amp; Juices - ½ cup serving</b> (unless indicated otherwise)
Blackberries	Apple, Granny Smith	Aloe vera juice <sup>§</sup>
Black currants	Apple Sauce/Puree	Apples, red / juice <sup>§</sup>
Black raspberries	Apricots, fresh and canned	Cherry juice <sup>§</sup>
Blueberries	Bananas	Cherries, sour <sup>§</sup>
Currants, red	Cherries, sweet	Coconut (fresh) <sup>§</sup>
Dewberries	Cranberry juice, pure	Cranberries
Figs, dried **	Lemon, orange or lime peel (1 Tbsp)	Grapefruit, flesh and juice <sup>§</sup>
Figs, raw (1)	Lime, flesh only (1 item)	Grapes, green and red
Fruit Cocktail	Mandarin orange, fresh (1 large)	Grape juice (red and white)
Gooseberries, green or red	Orange, flesh only (1 medium ~ 5 oz)	Huckleberries, fresh
Grapes, concord	Pears, fresh or canned	Kumquat <sup>§</sup> (1 item)
Kiwi (1)	Pineapple, fresh or canned	Lemon, flesh only (1 item)
Raspberries, red	Plum juice	Lemon juice <sup>§</sup>
Rhubarb, raw, canned or stewed ***	Plums, purple (1 item)	Lime juice
Star fruit (1) ***	Prunes (1 item)	Litchi (Lychee)
Tamarillo (1)	Strawberries, fresh or canned <sup>5</sup>	Mangoes <sup>§</sup>
		Melons (all types) <sup>§</sup>
		Nectarines <sup>§</sup>
		Orange juice <sup>§</sup>
		Papaya <sup>§</sup>
		Passion fruit <sup>§</sup>
		Peaches, fresh
		Peaches, canned <sup>§</sup>
		Pineapple juice
		Plums, green or yellow <sup>§</sup>
		Raisins (¼ cup)
		Red Current Juice
<b>Nuts &amp; Seeds - note serving sizes</b>	<b>Nuts &amp; Seeds - note serving sizes</b>	<b>Nuts &amp; Seeds - note serving sizes</b>
Almonds ** (¼ cup)	Flaxseed (¼ cup)	
Hazel nuts (¼ cup)	Sunflower seeds (¼ cup)	- None -
Peanuts * (¼ cup)		
Peanut butter (1T)		<b>Fats and oils</b>
Pecans * (¼ cup)		Butter and margarine
Pistachio (¼ cup)		Cream
Sesame seeds (and Tahini) *** (1T)		Mayonnaise
Other tree nuts <sup>1</sup> . (¼ cup)		Salad dressings (all)
		Vegetable oil (all)

<b>HIGH</b> Over 10mg per serving * over 50mg; ** over 100mg; *** over 200mg per serving	<b>MODERATE</b> 5 - 10mg per serving	<b>LOW</b> Less than 5 mg per serving § less than 2mg per serving
<b>Grains - note serving sizes</b>	<b>Grains - note serving sizes</b>	<b>Grains - note serving sizes</b>
Amaranth <sup>2</sup> (3T)	Bagels, plain (~ 2 oz)	Barley, cooked (½ cup)
Breakfast cereal(bran/high fiber)* (1 cup)	Biscuit (1 oz)	Bread, white (1 oz slice)
Buckwheat, dry * (½ cup)	Bread, whole wheat (1 oz slice)	Breakfast cereals, corn/rice(1 cup) §
Grits, white corn, cooked * (¾ cup)	Brown Rice, cooked (¾ cup)	Cake, sponge (2 oz)
Oatmeal, cooked (1 cup)	English muffin, white (1 item)	Cheerios™ (1 cup)
Rye or Wheat Crispbread (4)	Pretzels (1 oz)	Corn tortilla (1 medium ~ ¾ oz)
Whole-wheat flour (½ cup)	Pasta canned in tomato sauce (1 cup)	Corn meal, yellow, dry (½ cup)
Wheat bran <sup>3</sup> (1T)	Pop tart (1 item)	Egg noodles (chow mein) (1 cup) §
Wheat germ (1T)	Fig Newton (1 item)	Flour, white (¼ cup)
Rye or Wheat Crispbread (4)		Graham crackers (3 squares)
		Pasta, boiled (½ cup)
		Popcorn, popped (1 cup)
		White rice, cooked (1 cup)
<b>Soy products - note serving sizes</b>	<b>Soy products - note serving sizes</b>	<b>Soy products - note serving sizes</b>
Soy milk ** (½ cup)		
Soy burger * (1 item ~ 67g)		
Textured veg./soy protein *** (½ cup)		
Soy Crackers * (5 crackers)		
Soy nuts *** (¼ cup)		
Soy tofu *** ( ½ cup)		
Soy yogurt ** (1 cup)		
Soy breakfast links * (1 item ~ 45g)		
Tempeh (2oz)		
Soy cheese (1oz)		
<b>Meat, Fish and Dairy</b>	<b>Meat, Fish and Dairy</b>	<b>Meat, Fish and Dairy</b>
-- NONE --	Liver (4oz)	Bacon, Pork & Ham §
	Sardines (4oz)	Beef §
		Fish (except sardines) §
		Lamb §
		Poultry and game §
		Shellfish §
		All dairy products except yogurt §
		Yogurt, plain (> 2mg per cup)

HIGH Over 10mg per serving * over 50mg; ** over 100mg; *** over 200mg per serving	MODERATE 5 - 10mg per serving	LOW Less than 5 mg per serving § less than 2mg per serving
<b>Miscellaneous</b>	<b>Miscellaneous</b>	<b>Miscellaneous</b>
Milk Chocolate Candy (~ 1.5oz)	Cinnamon, ground (1 tsp)	Basil, fresh (1 tsp) §
Plain (dark) Chocolate Candy * (~1.5oz)	Chicken noodle soup (1 cup)	Chives, raw (3 Tbsp) §
Cocoa, dry powder (1 Tbsp)	Ginger, raw (1 tsp)	Cornstarch - any amount §
Vegetable soup (1 cup)	Malt powder (1 Tbsp)	Dill, fresh (1 tsp) §
	Marmalade (1 Tbsp)	Hard candy - any amount §
	Thyme, dried (1 tsp)	Honey and Sugar - any amount §
	Tomato soup (1 cup)	Gelatin - any amount §
	Pepper, black (1 tsp)	Lemon Balm, fresh (1 tsp) §
		Mustard, all kinds (1 Tbsp) §
		Nutmeg, dry (1 tsp) §
		Oregano, dry (1 tsp) §
		Peppermint, fresh (1 tsp) §
		Sage, fresh (1 tsp) §
		Syrup, Corn or Maple - any amount §
		Tomato, ketchup 1T(15g)
		Vanilla extract, imitation -any amount §
		Vinegar - any amount §
		White Pepper (1 tsp) §
<b>Beverages</b>	<b>Beverages</b>	<b>Beverages</b>
Beer, dark, robust (12 fl oz)	Beer (12 fl oz) <sup>6</sup>	Apple cider, hard §
Coffee, instant (1 tsp)	Coffee, brewed <sup>7</sup> (1 cup)	Carbonated beverages-diet/regular §
Hot Cocoa (1 cup)	Matétea tea, green or roasted <sup>7</sup>	Herbal teas § (see full list below)
Ovaltine <sup>TM</sup> (1 tsp)	Tea, rosehip (1 cup) <sup>7</sup>	Oolong tea §
Tea, black <sup>4</sup> (1 cup)		Lemonade/ limeade §
Green Tea (1 cup) <sup>8</sup>		Wine, all kinds §
<b>Herbal Teas include:</b>		
<i>Celestial Seasoning</i> <sup>®</sup> - Sleepytime, Peppermint, Wild Forest Blackberry, Mandarin Orange Spice, Cinnamon, Apple Spice		
<i>R.C. Bigelow</i> <sup>®</sup> - Cranberry Apple, Red Raspberry, I love Lemon, Orange and Spice, Mint Medley, Sweet Dreams		
<i>Thomas J. Lipton</i> <sup>®</sup> - Gentle Orange, Lemon Soother, Chamomile Flowers.		
Fennel Tea and Stinging Nettle Tea		

<sup>1</sup> No data, but probably high, because of levels found in other tree nuts

<sup>2</sup> The oxalate content of Amaranth is unknown, but it is related to spinach and beets, and therefore possibly contains high levels of oxalate.

<sup>3</sup> No data, but probably high, because of levels found in whole wheat flour.

<sup>4</sup> Published values for black tea range from 4 - 17mg per cup. Oxalate content also varies with the strength of tea. Limit to 8 fl. oz (1 cup) daily.

<sup>5</sup> Recent oxalate analysis of strawberries shows lower values than previously thought. Until more data confirms this, ½ cup is the recommended serving size of strawberries.

<sup>6</sup> Published values for beer range from 2.8 - 13.8 mg per 12 fl oz serving, with most being less than 10mg per 12 fl oz serving.

<sup>7</sup> Oxalate content varies with the strength. Limit to 8 fl oz (1 cup) daily.

<sup>8</sup> Oxalate content varies 2 - 47mg per cup, with an average value of 15mg

## References

1. Holmes, R. Estimation of the oxalate content of foods and daily oxalate intake. *Kid Intern*, 57(4) Apr 2000, pp 1662-1667
2. Kasidas, GP and Rose, GA, Oxalate content of some common foods: determination by an enzymatic method, *J Human Nutr.* 34, 255-266, 1980
3. Zarembski, PM and Hodgkinson, A. The oxalic acid content of English diets. *Brit J Nutr*, 16, 627-634, 1962
4. Savage, GP, Nilzen V, Osterberg, K, Vanhanen, L. Soluble and insoluble oxalate content of mushrooms. *International Journal of Food Science and Nutrition.* 53(4): 293-6, July 2002
5. Massey, LK, Palmer, RG, Horner, H. Oxalate content of soybean seeds, soyfoods, and other edible legumes. *J. Agric Food Chem*, 49 (9), 4262-4266, 2001.
6. Charrier, MJS, Savage GP, Vanhanen, L. Oxalate content and calcium binding capacity of tea and herbal teas. *Asia Pacific Journal of Clinical Nutrition.* 11(4): 298-301, 2002
7. Hönow, R and Hesse, A. Comparison of extraction methods for the determination of soluble and total oxalate in foods by HPLC-enzyme-reactor. *Food chemistry* 78, 511-521, 2002
8. Libert, B; Franceschi, V. Oxalate in crop plants. *J. Agric Food Chem.* 35, 926-938, 1987