

Table 2. Calcium content in common foods

Non-milk Products	Calcium Content
Rhubarb, frozen, cooked, 1 cup	348 mg
Sardines, with bone, 3 oz.	325 mg
Spinach, frozen, cooked, 1 cup	291 mg
Salmon, canned, with bone, 3 oz.	181 mg
Soy milk, unfortified, 1 cup	61 mg
Orange, 1 medium	52 mg
Broccoli, raw, 1 cup	41 mg
Pinto beans, cooked, 1/2 cup	40 mg
Lettuce greens, 1 cup	20 mg
Tuna, white, canned, 3 oz.	12 mg
Milk and Milk Products	
Yogurt, with active and live cultures, plain, low-fat, vitamin D-fortified, 1 cup	415 mg
Milk, reduced fat, vitamin D-fortified, 1 cup	285 mg
Swiss cheese, 1 oz.	224 mg
Cottage cheese, 1/2 cup	87 mg
Ice cream, 1/2 cup	84 mg

Source: Adapted from U.S. Department of Agriculture, Agricultural Research Service, 2008. USDA National Nutrient Database for Standard Reference, Release 21.

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TABLE 14

General Physical Properties of Milk

Property	Value	Definition and Significance	Property	Value	Definition and Significance
Titrate acidity, % max	0.16	The total acidity or the amount of alkali required to neutralize the acidic constituents. Generally expressed as lactic acid. Used to determine bacterial growth in fermentations and compliance standards.	Specific heat at		The specific heat of milk products depends on their composition and the temperature. Important in processing as the amount of heat or refrigeration required may be calculated from the weight and specific heat of the different products being pasteurized or cooled.
			0° C	0.92	
			15° C	0.94	
			40° C	0.93	
pH	6.6 ± 0.2 at 25° C	Fresh milk is slightly acid (pH of drinking water is 7.0-8.5). Generally the pH is lower (pH 6.0) in colostrum and higher (up to 7.5) during mastitis than in normal milk of mid-lactation.	Coefficient of expansion at		The ratio of an increase in volume per unit increase in temperature. Milk expands when heated and contracts when cooled. Used for design of dairy equipment.
			10° C	0.9975	
			15.6° C	0.9985	
			21.1° C	1.0000	
Surface tension	50-52 dynes at 20° C	Normally, cow's milk's surface tension is about 70% of that of water. Involved in adsorption and formation and stability of emulsions. Important to creaming, functions of fat globule membranes, foaming, and emulsifier use.	Viscosity	2.0-2.1 cp at 20° C	Refers to resistance to flow measured in centipoise (cp). Used to assess aggregation of protein micelles or fat globules. Also used for design of dairy equipment.
Specific gravity	1.032 at 15° C	Ratio of the density of the product and the density of water at the same temperature. Many milk constituents have a specific gravity (sg) greater than that of water which has a sg of one. The more fat in milk, the lower the sg as fat has an sg less than one. Used to estimate solids not fat.	Electrical conductivity	45-55 × 10 ⁶ mho	In milk, fat and colloidal dispersed substances decrease conductivity. Used to detect added neutralizers, follow fermentation, and monitor demineralization of whey.
Freezing point	-0.540° C	Lower than that of pure water (0° C) due to dissolved substances in milk. Used to detect adulteration of milk with water.	Osmolality*	275 m Osm/kg	The osmolality of a solution is based on the number of particles in solution - the greater the number of particles, the higher the osmolality. Osmolality of foods is important in planning diets of low osmolality for certain patients. Since a solution of lower osmolality requires transfer of less water to the stomach and gastrointestinal tract to dilute it, it should be better tolerated than one of higher osmolality.
Boiling point	100.17° C	Greater than that of pure water (100° C) due to dissolved substances in milk. Used to detect adulteration of milk with added water.			

* Source: The Doyle Pharmaceutical Company, Minneapolis, Minn.

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TABLE 4

Recommended Dietary Allowances¹, Revised 1989
 Food and Nutrition Board, National Academy of Sciences-National Research Council
 Designed for the Maintenance of Good Nutrition of Practically All Healthy People in the U.S.A.

Age or condition (Years)	Protein (g)	Fat-Soluble Vitamins				Water-Soluble Vitamins			Minerals					
		Vitamin A (µg RE) ²	Vitamin D (µg D-TE) ³	Vitamin E (µg)	Vitamin K (µg)	Vitamin C (mg)	Iron (mg)	Zinc (mg)	Iodine (µg)	Selenium (µg)				
Infants														
0-0.5	13	375	3	5		30	6	5	40	10				
0.5-1.0	14	375	4	10		35	10	5	50	15				
Children														
1-3	16	400	6	15		40	10	10	70	20				
4-6	24	500	7	20		45	10	10	90	20				
7-10	28	700	7	30		45	10	10	120	30				
11-14	45	1,000	10	45		50	12	15	150	40				
15-18	55	1,000	10	65		60	12	15	150	50				
19-24	58	1,000	10	70		60	10	15	150	70				
25-50	63	1,000	10	80		60	10	15	150	70				
51+	63	1,000	10	80		60	10	15	150	70				
Females														
11-14	46	800	8	45		50	15	12	150	45				
15-18	44	800	8	55		60	15	12	150	50				
19-24	46	800	8	60		60	15	12	150	55				
25-50	50	800	8	65		60	15	12	150	55				
51+	50	800	8	65		60	10	12	150	55				
Pregnant														
1 st 6 mos	60	800	10	65		70	30	15	175	65				
Lactating														
1 st 6 mos	65	1,300	12	65		95	15	19	200	75				
2 nd 6 mos	62	1,300	11	65		90	15	16	200	75				

¹ The allowances, expressed as average daily intakes over time, are intended to provide for individual variations among most normal persons as they live in the United States under usual environmental stresses. Diets should be based on a variety of common foods in order to provide other nutrients for which human requirements have been less well defined.

² Retinol equivalents: 1 retinol equivalent = 1 µg retinol or 6 µg β-carotene.

³ α-Tocopherol equivalents: 1 mg d-α-tocopherol = 1 α-TE.

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TABLE 3

Food and Nutrition Board, Institute of Medicine-National Academy of Sciences
Dietary Reference Intakes: Recommended Intakes For Individuals

Life-Stage Group	Calcium (mg/d)	Phosphorus (mg/d)	Magnesium (mg/d)	Vitamin D (µg/d)	Fluoride (mg/d)	Thiamin (mg/d)	Riboflavin (mg/d)	Niacin (mg/d)	Vitamin B ₆ (mg/d)	Folate (µg/d)	Vitamin B ₁₂ (µg/d)	Pantoic Acid (mg/d)	Biotin (µg/d)	Choline (mg/d)
Infants														
0-6 months	210*	100*	30*	5*	0.01*	0.2*	0.3*	2*	0.4*	65*	0.4*	1.7*	5*	125*
7-12 months	270*	275*	75*	5*	0.5*	0.3*	0.4*	4*	0.5*	80*	0.5*	1.8*	6*	150*
Children														
1-3 years	500*	460	80	5*	0.7*	0.5	0.5	6	0.9	150	0.9	2*	8*	200*
4-8 years	800*	500	130	5*	1*	0.6	0.6	8	1.2	200	1.2	3*	12*	250*
Girls														
9-13 years	1,300*	1,250	240	5*	2*	0.9	0.9	12	1.0	300	1.8	4*	20*	375*
14-18 years	1,300*	1,250	415	5*	3*	1.2	1.3	16	1.3	400	2.4	5*	25*	550*
19-30 years	1,000*	700	400	5*	4*	1.2	1.3	16	1.3	400	2.4	5*	30*	550*
31-50 years	1,000*	700	420	5*	4*	1.2	1.3	16	1.3	400	2.4	5*	30*	550*
51-70 years	1,200*	700	420	10*	4*	1.2	1.3	16	1.7	400	2.4*	5*	30*	550*
> 70 years	1,200*	700	420	15*	4*	1.2	1.3	16	1.7	400	2.4*	5*	30*	550*
Females														
9-13 years	1,300*	1,250	240	5*	2*	0.9	0.9	12	1.0	300	1.8	4*	20*	375*
14-18 years	1,300*	1,250	360	5*	3*	1.0	1.0	14	1.2	400*	2.4	5*	25*	400*
19-30 years	1,000*	700	310	5*	3*	1.1	1.1	14	1.3	400*	2.4	5*	30*	425*
31-50 years	1,000*	700	320	5*	3*	1.1	1.1	14	1.3	400*	2.4	5*	30*	425*
51-70 years	1,200*	700	320	10*	3*	1.1	1.1	14	1.5	400	2.4*	5*	30*	425*
> 70 years	1,200*	700	320	15*	3*	1.1	1.1	14	1.5	400	2.4*	5*	30*	425*
Pregnancy														
≤ 18 years	1,300*	1,250	400	5*	3*	1.4	1.4	18	1.9	600*	2.6	6*	30*	450*
19-30 years	1,000*	700	350	5*	3*	1.4	1.4	18	1.9	600*	2.6	6*	30*	450*
31-50 years	1,000*	700	360	5*	3*	1.4	1.4	18	1.9	600*	2.6	6*	30*	450*
Lactation														
≤ 18 years	1,300*	1,250	360	5*	3*	1.5	1.6	17	2.0	500	2.8	7*	35*	550*
19-30 years	1,000*	700	310	5*	3*	1.5	1.6	17	2.0	500	2.8	7*	35*	550*
31-50 years	1,000*	700	320	5*	3*	1.5	1.6	17	2.0	500	2.8	7*	35*	550*

NOTE: This table presents Recommended Dietary Allowances (RDAs) in bold type and Adequate Intakes (AIs) in ordinary type, followed by an asterisk (*). RDAs and AIs may both be used as goals for individual intake. RDAs are set to meet the needs of a population, while AIs are set to meet the needs of an individual.

* As cholecalciferol, 1 µg cholecalciferol = 40 IU vitamin D.

^a In the absence of adequate exposure to sunlight.

^b As biotin equivalents (BE). 1 µg of niacin = 60 mg of tryptophan; 0-6 months = perinatal niacin (not NE).

^c As dietary folate equivalents (DFE). 1 DFE = 1 µg food folate = 0.6 µg of folic acid (from fortified food or supplement) consumed with food = 0.5 µg of synthetic (supplemental) folic acid taken on an empty stomach.

^d Although AIs have been set for choline, there are few data to assess whether a dietary supply of choline is needed at all stages of the life cycle, and it may be that the choline requirement can be met by endogenous synthesis at some of these stages.

^e Because 10 to 30 percent of older people may malabsorb food-bound B₁₂, it is advisable for those older than 50 years to meet their RDA mainly by consuming foods fortified with B₁₂ or a supplement containing B₁₂.

^f In view of evidence linking folate intake with neural tube defects in the fetus, it is recommended that all women capable of becoming pregnant consume 400 µg of synthetic folic acid from fortified foods and/or supplements in addition to intake of food folate from a varied diet.

^g b c e.

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NEWER KNOWLEDGE OF DAIRY FOODS

TABLE 8
SERVING GUIDELINES FOR ALL AGES

FOOD GROUP	SERVINGS					FOODS	SERVING SIZE
	CHILDREN				ADULTS		
	1-3	4-5	6-8*	9-18*	19+		
MILK GROUP	3†	3‡	3	4	3-4	<ul style="list-style-type: none"> ▲ milk ▲ yogurt ▲ cheese ▲ cottage cheese ▲ pudding ▲ ice cream, frozen yogurt 	1 cup 1 cup 1½-2 oz ½ cup ½ cup ½ cup
MEAT GROUP	2†	2	2	2	2-3	<ul style="list-style-type: none"> ▲ cooked lean meat, fish or poultry ▲ egg ▲ peanut butter ▲ cooked dried peas ▲ cooked dried beans ▲ nuts, seeds 	2-3 oz 1 2 tbsp ½ cup ½ cup ½ cup
VEGETABLE GROUP	3†	3	3	3	3-5	<ul style="list-style-type: none"> ▲ cooked vegetables ▲ chopped, raw vegetables ▲ raw, leafy vegetables ▲ vegetable juice 	½ cup ½ cup 1 cup ¾ cup
FRUIT GROUP	2†	2	2	2	2-4	<ul style="list-style-type: none"> ▲ apple, banana, orange, pear ▲ grapefruit ▲ cantaloupe ▲ raw, canned, or cooked fruit ▲ raisins, dried fruit ▲ fruit juice 	1 medium ½ ¼ ½ cup ¼ cup ¾ cup
GRAIN GROUP	6†	6‡	6	6	6-11	<ul style="list-style-type: none"> ▲ bread ▲ tortilla, roll, muffin ▲ bagel, English muffin, hamburger bun ▲ rice, pasta, cooked cereal, grits ▲ ready-to-eat cereal 	1 slice 1 ½ ½ cup 1 oz
"OTHERS" CATEGORY	Eat in moderation					<ul style="list-style-type: none"> ▲ fats, oils, and spreads ▲ candy ▲ cookies ▲ chips and other salty snacks ▲ soft drinks 	1 tsp/1 tbsp 1 oz 2 small 1 oz 12 oz

† For children 1-3, serving sizes are about 2/3 typical serving sizes.

‡ For children 4-5, serving sizes depend on the appetite of the child. If you offer smaller-sized servings, you should increase the number of servings so that children 4-5 eat the equivalent of 3 cups of milk, 4 oz. of meat, 6 slices of bread, etc., daily.

* These represent the *minimum* number of servings recommended each day for children and teens ages 6-18. Some children and teens may need more servings--depending on their size, activity level, and growth.