

Minerals

Minerals are substances like calcium, phosphorus, iron, and zinc that are found in rocks and the soil.

Why We Need Them

Minerals are needed for optimal nutrition. They work in two ways in the body:

- Many minerals support body cells and structures. For example, calcium and phosphorus help build bones, and iron is an essential part of red blood cells.
- Minerals regulate many body processes. Sodium and potassium are important to nervous system function. Chromium helps keep blood glucose levels normal. The trace mineral selenium works with vitamin E as an antioxidant, which prevents cells from being damaged by oxygen.

Sources

All the food groups contain foods rich in minerals. It is important to eat a variety of foods from each of the food groups in order to get all of the minerals in your diet.

Whole grains are rich in magnesium, selenium, and chromium. Fruits and vegetables are good sources of potassium. Red meats are particularly good sources of iron and zinc. Nuts and seeds are good sources of copper and manganese.

The body tends to better absorb certain minerals, such as iron and zinc, from animal foods than from plant foods. Fiber, phytate, and oxalate, which are found mainly in whole grains, vegetables, and legumes, reduce the absorption of some minerals. Still, plant foods are important sources of many minerals. Consuming a diet rich in a variety of plant foods can provide adequate amounts of minerals.

Since minerals are much more stable than vitamins in food, they generally remain in the food even after cooking, canning, or freezing. However, processing does affect the balance of sodium and potassium in vegetables. For example, fresh vegetables are rich in potassium and naturally low in sodium. On the other hand, canned vegetables are usually higher in sodium from added salt.

Types

Minerals are grouped as **macrominerals** and **trace minerals**. Macrominerals, such as phosphorus and calcium, are found in larger quantities in the body and are needed in larger amounts in the diet.

Trace minerals, such as iron and zinc, are found in small quantities in the body and are needed in small amounts in the diet.

Here are the 16 different minerals (seven macrominerals and nine trace minerals) that are known to be needed in our diets.

Minerals Needed in Our Diets

Macrominerals	Trace Minerals
Sodium	Iron
Potassium	Zinc
Chloride	Iodide
Calcium	Selenium
Phosphorus	Copper
Magnesium	Fluoride
Sulfur	Chromium
	Molybdenum
	Manganese

Several other minerals also may be needed in very small amounts.

Amounts Needed

We need a very small daily amount of minerals in comparison to the amount of carbohydrates, protein, and fats required for a healthy diet. Adults need about 1,000 milligrams of calcium per day, but only about 10 to 15 milligrams of iron and zinc daily.

We need less than 100 *micrograms* (μg) of chromium, molybdenum and selenium. To help you

visualize an amount this small, a teaspoon of selenium would satisfy the daily needs of over 90,000 adults!

The following table gives the daily recommended levels for individual intakes of specific macrominerals and trace minerals for adults 19 to 50 years old.

Recommended Daily Amounts of Minerals for Adults Ages 19 to 50 Years*

Nutrient	Male	Female	Pregnancy	Breastfeeding
Sodium (mg)	1,500	1,500	1,500	1,500
Chloride (mg)	2,300	2,300	2,300	2,300
Potassium (mg)	4,700	4,700	4,700	5,100
Calcium (mg)	1,000	1,000	1,000	1,000
Phosphorus (mg)	700	700	700	700
Magnesium (mg)	400-420	310-320	350-360	310-320
Iron (mg)	8	18	27	9
Zinc (mg)	11	8	11	12
Iodine (μg)	150	150	220	290
Selenium (μg)	55	55	60	70
Copper (μg)	900	900	1,000	1,300
Manganese (mg)	2.3	1.8	2.0	2.6
Fluoride (mg)	4	3	3	3
Chromium (μg)	35	25	30	45
Molybdenum (μg)	45	45	50	50

*These amounts are Recommended Dietary Allowances (RDAs) and Adequate Intake (AI) values from the 1997/1998 Dietary Reference Intakes (DRI) reports. AI values are used for nutrients when there is not enough scientific evidence to establish RDAs, or "recommended daily allowances." Recommendations for other age groups may be more than or less than these for adults ages 19-50 years.

mg = milligrams

μg = micrograms

Source: adapted from the Dietary Reference Intakes series, National Academies Press. Copyright 1997, 1998, 2000, 2001, 2002, 2004, by the National Academies of Sciences.

The Daily Value for a mineral on a food label shows you what percent of a typical healthy adult's need for that mineral is provided by the food. For example, an 8-ounce glass of fat-free milk provides 30% of the Daily Value for calcium.

Supplements

By making healthy choices from all the food groups in MyPyramid, it is possible to get all the minerals you need. For more information on the food groups, refer to [HGIC 4010, MyPyramid](#)

Here are a few specific situations where supplements may be needed:

- People who are lactose intolerant or allergic to milk may find it hard to get enough calcium.
- Women in their childbearing years may have a hard time getting all the iron they need from food.
- Pregnant women should ask their doctor or health care provider about what supplements are right for them.

Taking a mineral supplement (e.g. iron) sometimes causes an upset stomach. If this happens to you, try taking the supplement before bed, or use a slow-release supplement.

This is a typical label from a mineral supplement.

Example of a Mineral Supplement Label

Supplement Facts		
Serving Size 1 tablet		
Amount Per Serving		% Daily Value*
Calories 10		
Total Carbohydrate 2g		<1%
Sugars 2g		
Vitamin D	200 IU	50%
Calcium	600 mg	60%
Magnesium	40 mg	10%
Zinc	7.5 mg	50%
Copper	1 mg	50%
Manganese	1.8 mg	90%
Boron	250 µg	**

*Percent Daily Value is based on a 2,000 calorie diet.
 **Daily Value not established.

High Doses

When taken in large doses, many minerals can be toxic. Side effects from taking too much may range from constipation to liver and kidney damage. Consuming too much sodium (salt) and chloride may make it difficult to control blood pressure.

If you currently are taking medications, you should check with your doctor or pharmacist to see if there are any reasons that you shouldn't take a mineral supplement. You also should find out if you need to adjust the timing of your mineral supplements and other medications.

Ask your doctor or pharmacist before taking a mineral supplement. Some minerals can interfere with how well a medication works in the body. On the other hand, some medications can interfere with how well the body uses a mineral.

Excessive mineral intake usually comes from high-dose supplements. Therefore, most people should choose supplements that contain no more than 100 to 150% of the Daily Value for each mineral. The following list shows recommended *maximum* intakes that scientists have set for most minerals.

Recommended Maximum Intakes of Minerals

Calcium	2,500 mg
Phosphorus	4,000 mg
Magnesium	350 mg
Iron	45 mg
Zinc	40 mg
Boron	20 mg
Manganese	11 mg
Copper	10 mg
Fluoride	10 mg
Molybdenum	2 mg
Vanadium	1.8 mg
Iodide	1.1 mg
Nickel	1.0 mg
Selenium	0.4 mg

mg = milligrams
Warning! Do NOT consume more than these amounts from food and supplements combined!

For More Information

The Family and Consumer Sciences (FCS) agent at your county Extension office may have more written information and nutrition classes for you to attend. Also, your doctor, health care provider, or a registered dietitian (RD) can provide reliable information.

Reliable nutrition information may be found on the Internet at the following sites:

- <http://hgic.clemson.edu>
- <http://virtual.clemson.edu/groups/NIRC/>
- <http://www.eatright.org>
- <http://www.nutrition.gov>
- <http://www.nal.usda.gov/fnic>

Sources:

1. Turner, R. Elaine. University of Florida Extension. *Facts About Minerals*. FCS8809. December 2006. <http://edis.ifas.ufl.edu/publications.html>
2. National Academies of Sciences. National Academies Press. *Dietary Reference Intakes* series. 2004

This information has been reviewed and adapted for use in South Carolina by Janis G. Hunter, HGIC Nutrition Specialist, and Katherine L. Cason, Professor, State Program Leader for Food Safety and Nutrition, Clemson University. (New 08/07.)

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