



HEALTH UPDATE

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Vegetarian Diets

Vegetarian diets, like all diets, need to be planned appropriately to be nutritionally adequate. Common dietary patterns of vegetarians include:

- Lacto-ovo Vegetarian - includes grains, vegetables, fruits, legumes, seeds, nuts, dairy products, and eggs; excludes meat, fish, and poultry.
- Lacto Vegetarian - same as lacto-ovo vegetarian except also excludes eggs.
- Vegan - Same as lacto-ovo vegetarian pattern except also excludes eggs, dairy, and other animal products.

Studies indicate that vegetarians often have lower death and disease rates than do non-vegetarians from several chronic degenerative diseases including:

- obesity
- coronary artery disease
- hypertension
- diabetes mellitus
- some types of cancer

Although non-dietary factors, including physical activity and abstinence from smoking and alcohol, play a role, diet is clearly a contributing factor.

Vegetarianism Throughout the Life Cycle

Well-planned vegetarian diets are appropriate for all stages of the life cycle, from infancy to adulthood, even in special circumstances such as pregnancy, lactation, and athletics.

- Pregnancy & Lactation
 - Birth weights of infants born to well-nourished vegetarian women have been shown to be similar to birth-weight norms and to birth weights of infants of non-vegetarians.

- Diets of pregnant and lactating **vegans** should be supplemented with 2.0 micrograms and 2.6 micrograms, respectively, of **vitamin B-12** daily.
 - If sun exposure is limited, pregnant and lactating **vegans** should supplement with 10 micrograms (= 400 IU) **vitamin D** daily.
 - Supplements of **folate** are advised for **all** pregnant women.
- **Athletes**
 - Vegetarian diets can also meet the needs of competitive athletes.
 - **Protein** needs may be elevated because training increases amino acid metabolism, but vegetarian diets that meet energy needs and include good sources of protein (e.g., soyfoods, legumes) can provide adequate protein without use of special foods or supplements.

Meal Planning for Vegetarian Diets

A variety of menu-planning approaches can provide vegetarians with adequate nutrition. The Food Guide Pyramid on the last page suggests one approach. In addition, the following guidelines can help vegetarians plan healthful diets.

- Choose a **variety** of foods, including whole grains, vegetables, fruits, legumes, nuts, seeds and, if desired, dairy products and eggs.
- Choose **whole, unrefined foods** often and minimize intake of highly sweetened, fatty, and heavily refined foods.
- Choose a variety of **fruits** and **vegetables**.
- If **dairy** products are used, choose **low-fat** versions. Cheeses and other high-fat dairy foods and eggs should be limited (to approximately 1 serving per day) in the diet because of their saturated fat content and because their frequent use displaces plant foods in some vegetarian diets.
- **Vegans** should include a regular source of **vitamin B-12** (fortified cereals & soymilks, multivitamin) in their diets along with a source of **vitamin D** (fortified soymilk, supplements) if sun exposure is limited.
- Solely **breast-fed infants** should have **supplements** of **iron** after the age of 4 to 6 months and, if sun exposure is limited, a source of **vitamin D**. **Breast-fed vegan infants** should have **vitamin B-12 supplements** if the mother's diet is not fortified.
- **Do not restrict dietary fat in children younger than 2 years**. For older children, include some foods higher in unsaturated fats (e.g., nuts, seeds, nut and seed butters, avocado, and vegetable oils) to help meet nutrient and energy needs.

Nutrition Considerations for Vegetarians

Protein (DRI* = 46 grams)

- Plants provide a variety of **amino acids** (the building blocks of proteins). While only animal products provide all of the essential amino acids, choosing a variety of plant foods and eating enough to meet your energy needs ensures that you get enough **protein**.

Iron (DRI* = 18 mg)

- Iron is an essential nutrient that **helps carry oxygen** in the blood.
- Iron is found in food in two forms, heme and non-heme iron. Plant foods contain only non-heme iron, which is more sensitive than heme iron (found in animal products) to both inhibitors and enhancers of iron absorption. Although vegetarian diets are generally higher in total iron content than non-vegetarian diets, iron stores are lower in vegetarians because the **iron from plant foods** is more **poorly absorbed**.
- Including **vitamin C**-rich foods (citrus, berries, tomatoes, & bell peppers) with iron-rich foods (beans, spinach, dried fruit) helps improve iron absorption.
- **Calcium** and the **tannins** found in tea and coffee **reduce iron absorption**. Tea, coffee, and calcium supplements should be used several hours before or after an iron-rich meal.

Vitamin B-12 (DRI* = 2.4 mcg)

- Vitamin B-12 is needed for **cell division** and **blood formation**. Because vitamin B-12 requirements are small, and it is both stored and recycled in the body, **symptoms of deficiency** may be **delayed for years**.
- A vitamin B-12 **deficiency** is a very serious problem that ultimately **leads to irreversible nerve damage**.
- **Plant foods** are **not** a reliable **source of B-12** for vegetarians. Much of the vitamin B-12 present in spirulina, sea vegetables, tempeh, and miso has been shown to be inactive B-12 analog rather than the active vitamin.
- **Supplementation** or use of **fortified foods** is **advised for vegetarians** who avoid or limit animal foods.
- **Absorption** of vitamin B-12 becomes **less efficient** as the body **ages**, so **supplements** may be advised **for all older vegetarians**.

Calcium (DRI* = 1,000mg)

- Calcium is stored in bones and teeth and is used for nerve and muscle function and for blood clotting. If dietary **calcium** is too **low**, calcium is **drawn from bone** to be used for these other critical body functions.

- **Vegans** often have low calcium intakes; however, they **may have lower calcium needs** than non-vegetarians because diets low in total protein have been shown to have a calcium-sparing effect.
- Many vegetarian foods are **calcium-fortified**, such as fortified **soymilk** and **fruit juices**.
- **Tofu** can be a good source of calcium if it is processed using **calcium sulfate** rather than nigari (magnesium chloride). Look for calcium sulfate on the ingredients list on the label.
- **Calcium supplements** are advised if needs are not met through food.

Vitamin D (DRI* = 5 mcg; 1 mcg = 40 IU)

- Vitamin D is **essential for calcium absorption**.
- **Sunlight** triggers vitamin D production in the skin. Just **5 to 15 minutes** per day of sun exposure to hands, arms, and face provides sufficient amounts of vitamin D. **Apply sunscreen after** this initial exposure to obtain vitamin D and prevent sun damage. People who are older, have dark skin, or live at northern latitudes or in cloudy or smoggy areas may need increased exposure or alternative sources.
- **Fortified cow's milk or soymilk, eggs, and fortified cereals** are food sources of vitamin D.
- If sunlight exposure or food sources are inadequate, vitamin D **supplements** are recommended.

Zinc (DRI* = 8 mg)

- Zinc intake in vegetarians is comparable to or lower than that of non-vegetarians.
- Because of the low bioavailability of zinc from plant foods and because the effects of marginal zinc status are poorly understood, vegetarians should strive to meet or exceed the Recommended Dietary Allowances for zinc.

Linolenic acid (No DRI established for this nutrient; 2.2-4.4 grams/day recommended by American Dietetic Association)

- **Omega-3 fatty acids**, especially EPA (eicosapentaenoic acid) and DHA (docosahexanoic acid) have been associated with **reduced risk** of certain **cardiovascular diseases**. EPA and DHA are found in **oily fish** and **fortified eggs**. Another omega-3 fatty acid, alpha-linolenic acid, can be **converted** by the body **into DHA** in small amounts. Less is known about linolenic acid's role in cardiovascular health.
- Good sources of linolenic acid include **walnuts**, and **vegetable oils**.

* DRI = Dietary Reference Intake (nutrition recommendations established by National Academies of Science Institute of Medicine, 2004); values shown are for women ages 19 - 50.

FOOD SOURCES OF NUTRIENTS THAT ARE OFTEN OF CONCERN FOR VEGETARIANS

IRON (DRI* = 18 mg)	Milligrams per serving	CALCIUM (DRI* = 1,000 mg)	Milligrams per serving
Breads, cereals, and grains		Legumes (1/2 c cooked)	
Bagel, 1 whole	1.5	Garbanzo beans (chick peas)	40
Bread, whole wheat, 1 slice	0.9	Great northern or navy beans	60-64
Cereal, 1 c (fortified)	2.1-18	Dairy	
Oatmeal, instant, 1 packet	4.2	Cheese, 1½ oz	306
Wheat germ, 2 Tbsp	1.8	Cow's milk, 1 c	300
Vegetables (1/2 c cooked)		Yogurt, 1 c	275-400
Broccoli	0.7	Soyfoods	
Peas	1.3	Soybeans, 1 c cooked	176
Potato, baked, w/skin	2.3	Tofu, calcium set, 1/2 c	120-430
Spinach	2.0	Tempeh, 1/2 c	92
Legumes (1/2 c cooked)		Soy milk, 1 c	84
Baked beans, vegetarian	1.7	Soy milk, fortified, 1 c	250-300
Black beans	1.8	Soy nuts, 1/2 c	120
Garbanzo beans (chick peas)	2.4	Soy yogurt, fortified, 1/2 c	367
Kidney beans	2.6	Nuts and seeds	
Lentils	3.3	Almonds, ¼ c	88
Dried Fruit (1/4 c)		Almond butter, 2 Tbsp	86
Apricots	1.5	Tahini, 2 Tbsp	128
Raisins	1.1	Vegetables (1/2 c cooked)	
Soyfoods (1/2 c cooked)		Bok choy	84
Soybeans	4.4	Broccoli	34
Tempeh	2.2	Collard greens	120
Tofu	6.6	Kale	59
Soy milk, 1 c	0.8-2.0	Breads, cereals, and grains	
Veggie "meats", 1 oz	0.5-1.9	Cereal, fortified, 1 c	55-315
Nuts/seeds (1/4 c)		Fruits	
Almonds	1.5	Dried figs, 5	137
Cashews	2.1	Orange juice w/ calcium, 1 c	300
Peanut Butter, 2 Tbsp	0.6		
Pumpkin seeds	5.2		
Tahini, 2 Tbsp	2.7		
Sunflower seeds	2.3		

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ZINC (DRI* = 8 mg)	Milligrams per serving	VITAMIN D (DRI* = 5 mcg)	Micrograms per serving
Breads, grains, and cereals		Cereal, fortified, 1 c	0.5-1.0
Bread, whole wheat, 1 slice	0.5	Cow's milk, fortified, 1 c	2.4-2.6
Cereal, fortified, 1 c	0.7-15	Egg yolk	0.6
Wheat germ, 2 Tbsp	1.8	Soy milk or other nondairy milk, fortified 1 c	1.0-3.0
Legumes (1/2 c cooked)			
Baked beans	1.8		
Garbanzo beans (chickpeas)	1.3		
Kidney beans	0.9		
Lentils	1.2		
Soyfoods (1/2 c cooked)			
Soybeans	1.0		
Tempeh	0.9		
Tofu	1.0		
Veggie "meats", 1 oz	1.2-2.3		
Vegetables (1/2 c cooked)			
Corn	0.9		
Mushrooms	0.7		
Peas	1.0		
Dairy foods			
Cheddar cheese, 1 oz	0.9		
Yogurt, 1 c	1.6-2.2		
		VITAMIN B-12 (DRI* = 2.4 mcg)	Micrograms per serving
		Cereal, fortified 1 c	0.6-6.0
		Cow's milk, 1 c	0.8-1.0
		Egg	0.5
		Soy milk or other nondairy milks, fortified, 1 c	0.2-5.0
		Nutritional yeast (Red Star Vegetarian Support Formula), 1 Tbsp	1.5
		Veggie "meats", 1 oz	0.5-1.2
		LINOLENIC ACID (Rec. intake 2.2-4.4 grams)	Grams per serving
		Canola oil, 1 Tbsp	1.6
		Flax seed, ground, 1 Tbsp	1.9-2.2
		Flax seed oil, 1 tsp	2.7
		Soybean oil, 1 Tbsp	0.9
		Soybeans, 1/2 c cooked	1.0
		Tofu, 1/2 c	0.7
		Walnuts, 1 oz	2.7

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Resources & References:

Medline Plus Vegetarian Diet: www.nlm.nih.gov/medlineplus/vegetariandiet.html

The Vegetarian Resource Group: www.vrg.org

The American Dietetic Association's Position on Vegetarian Diets, 2003. www.eatright.org

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J:/health promotion/nutrition/handouts/vegetarian.doc

Food Guide for Vegetarian Meal Planning

FATS, OILS, AND SWEETS

use sparingly

candy, butter, margarine, salad dressing, cooking oil

MILK, YOGURT, AND CHEESE GROUP

0-3 servings daily*

- milk--1 cup
- yogurt--1 cup
- natural cheese--1 1/2 oz

*Vegetarians who choose not to use dairy products need to select other food sources rich in calcium.

DRY BEANS, NUTS, SEEDS, EGGS, AND MEAT SUBSTITUTES GROUP

2-3 servings daily

- soy milk--1 cup
- cooked dry beans or peas--1/2 cup
- 1 egg or 2 egg whites
- nuts or seeds--2 Tbsp
- tofu or tempeh--1/4 cup
- peanut butter--2 Tbsp

VEGETABLE GROUP

3-5 servings daily

cooked or chopped raw:

- vegetables--1/2 cup
- raw leafy vegetables--1 cup

FRUIT GROUP

2-4 servings daily

- juice--3/4 cup
- dried fruit--1/4 cup
- chopped, raw fruit--1/2 cup
- canned fruit--1/2 cup
- 1 medium-size piece of fruit, such as banana, apple, or orange

BREAD, CEREAL, RICE, AND PASTA GROUP

6-11 servings daily

- bread--1 slice
- ready-to-eat cereal--1 oz
- cooked cereal--1/2 cup
- cooked rice, pasta, or other grains--1/2 cup
- bagel--1/2