

# California Food Guide

## Vegetarian Diets

By Georgia Hodgkin, Ed.D., R.D., F.A.D.A. and  
Ella Haddad, Dr.P.H., R.D.



### What's New?

The Dietary Reference Intakes have changed the nomenclature for essential amino acids.

Recent research has shown that postmenopausal women who consume higher levels of lignans perform better on tests for cognitive function than those who consume lower levels. Good sources of lignans are oilseeds, flax, broccoli, and berries.<sup>1</sup>

Vegetable consumption has been associated with less cognitive decline in aging women. Cruciferous vegetables, followed by green leafy vegetables, were linked to a slower decline than other vegetables. Fruits did not influence decline in cognitive function.<sup>2</sup>

### Public Health Implications

Throughout the centuries, people have chosen vegetarian diets. As wealth increased, meat consumption also increased. Now more people are eating vegetarian meals because of the relationship between diet and disease. Other reasons for choosing meals without meat include those based on economics, ecology, ethics, and/or religion. The persuasions behind each will not be addressed here, but whatever prompts the decision to choose vegetarian meals, the recommendations for meal planning remain the same, as do the benefits. Research supports the health benefits of eating less meat and eating more plant-based, high-fiber foods.

### Definition

Vegetarians can be divided into several categories based on their specific dietary choices, as noted in Table 1. Meat, fish, and poultry are usually not included in a vegetarian diet. Increasing numbers within the population say they are limiting their

consumption of animal products and follow a "plant-based" diet. In this instance, the majority of the meal comes from plants and meat is a condiment.<sup>3</sup>

MyPyramid food choices for all types of vegetarian diets are similar to those for non-vegetarian diets except for the meat and beans group (protein-rich group including dry beans, eggs, and nuts). For vegetarians, the preferred source of protein is from plants rather than animals. A second difference lies within the milk group (calcium-rich group including yogurt, cheese, or other dairy products) for total vegetarians who exclude milk and its products, and eggs from the protein-rich food group.

**Table 1: Common Types of Vegetarian Diets**

|  |   |
|--|---|
| Lacto-vegetarian   | Includes milk. No eggs, meat, fish, or poultry    |
| Ovo-vegetarian   | Include eggs. No meat, fish, or poultry           |
| Lacto-ovo- vegetarian  | Includes milk and eggs. No meat, fish, or poultry |
| Pesco-vegetarian   | Includes fish. No meat or poultry                 |
| Pollo-vegetarian   | Includes chicken. No meat or fish.                |
| Total vegetarians (plant foods only-often referred to as vegans) | No milk, eggs, meat, fish, or poultry             |

### Health Benefits of Vegetarian Diets

The American Dietetic Association and Dietitians of Canada's Position Statement on Vegetarian Diets states that "appropriately planned vegetarian diets are healthful, nutritionally adequate, and provide health benefits in the prevention and treatment of certain diseases." Those diseases include: cardiovascular disease, hypertension, type 2 diabetes mellitus, prostate cancer, colorectal cancer, renal disease, dementia, diverticular disease, gallstones, and rheumatoid arthritis.<sup>4</sup>

A healthful vegetarian diet emphasizes a variety and abundance of plant foods. Vegetarian diets can be planned to be nutritionally adequate for healthy people of all ages, and for pregnant and lactating women.

Vegetarian diets can be low in saturated fat; total fat and cholesterol; and high in fiber; antioxidants; folate and vitamin C, which can reduce the risk for chronic disease.<sup>5</sup> Diets that do not provide a wide variety of plant foods may reduce phytochemical intake and alter carcinogenesis.<sup>6</sup> More information about phytochemicals may be found in the chapter on fruits and vegetables. Additional health benefits of various components of vegetarian diets are listed in Table 2.

**Table 2: Apparent Health Benefits of Components of a Vegetarian Diet\***

\*Some of the studies may be limited. This table has been compiled by the authors.

| Health Benefits                    | Diet Components  | Possible Cause of Benefit   |
|------------------------------------|--|---|
| ↓ all-cause mortality              | 15% ↓ with ↑ fruit and vegetable consumption <sup>7</sup>  | Potassium, antioxidants, folic acid <sup>7</sup>  |
| ↓ ischemic heart disease mortality | 24% ↓ in vegetarians over non-vegetarians <sup>8-10</sup>  | Whole grains and their nutrients: linolenic acid, fiber, vit. E, Se, folate. <sup>11</sup><br>Nuts, cause unknown, seems to reduce sudden cardiac death. Fruits and vegetables: flavonoid quercetin. <sup>12</sup>                            |
| ↓ CVD mortality                    | 27% ↓ with ↑ fruit and vegetable consumption <sup>7, 13</sup>  | Potassium, antioxidants, folic acid; <sup>7</sup> flavonoids: kaempferol, herperetin <sup>12</sup>  |
| ↓ stroke mortality                 | 42% ↓ with ↑ fruit and vegetable consumption <sup>7</sup>  | Same <sup>7,12</sup>  |
| ↓ risk of CHD                      | ↑ fruit and vegetable consumption, <sup>14</sup> whole grains, <sup>15</sup> and nuts: almonds, macadamia nuts, pistachios, pecans, peanuts, walnuts <sup>10</sup>                         | Fruit/vegetables: ↑ plasma levels of alpha-carotene, beta-carotene, lutein, beta-cryptoxanthin, and ascorbic acid. Nuts: monounsaturated fat; in walnuts, n-6 and n-3 PUFA, arginine, folate, fiber, tannins, and polyphenolics <sup>16</sup> |
| ↓ risk of cancer                   | ↑ fruit and vegetable consumption <sup>14</sup>  | Same <sup>16</sup>  |
| ↓ breast cancer                    | ↑ dietary fiber <sup>10</sup>  | ↑ soy products <sup>10</sup>  |
| ↓ colorectal cancer                | ↑ garlic consumption <sup>17</sup>   | Garlic (raw or cooked) <sup>17</sup>  |
| ↓ lung cancer                      | ↑ fruit and vegetable consumption <sup>12</sup>  | Flavonoid: quercetin <sup>12</sup>  |
| ↓ prostate                         | ↑ vegetable consumption, <sup>18</sup> Brassica family (broccoli, cabbage, mustard and collard greens, bok choy), tomato; ↓ dairy plus substituting olive oil for other oils <sup>19</sup> | Lutein plus zeaxanthin; <sup>19</sup> glucosinolates; <sup>20</sup> flavonoid: myricetin <sup>12</sup>  |
| ↓ stomach                          | ↑ garlic consumption <sup>17</sup>   | Garlic (raw or cooked, not supplement) <sup>17</sup>  |
| ↓ blood pressure                   | Related to ↑ fruit and vegetable consumption <sup>14</sup>   | Flavonoids <sup>21</sup>  |
| ↓ Type 2 diabetes risk factors     | ↑ intake of whole grains <sup>15</sup> and fiber <sup>22</sup><br>↑ fruit and vegetable consumption <sup>12</sup>  | Particularly soluble fiber; <sup>22</sup> flavonoids: quercetin and myricetin <sup>12</sup>   |
| ↓ BMI                              | ↑ intake of whole grains <sup>15</sup>   | Fiber <sup>15</sup>   |
| ↓ Waist-to-hip ratio               | ↑ intake of whole grains <sup>15</sup>   | Fiber <sup>15</sup>   |
| ↓ fasting insulin                  | ↑ intake of whole grains <sup>15</sup>   | Insoluble fiber and magnesium <sup>15</sup>   |
| ↓ total serum cholesterol          | ↑ whole grains <sup>15</sup><br>↑ fruits and vegetables <sup>23</sup>  | Fiber, folic acid, potassium, magnesium, carotenoids, phytosterols, flavonoids, polyphenolics <sup>15,23</sup>  |
| ↓ LDL cholesterol                  | ↑ soy and soy protein <sup>24</sup> ↑ fruits and vegetables <sup>23</sup>  | Same <sup>23,24</sup>   |
| ↑ HDL cholesterol                  | ↑ intake of soy and soy protein, <sup>24</sup> ↑ fruits and vegetables <sup>23</sup>   | Same <sup>23,24</sup>   |
| ↓ asthma                           | ↑ fruit and vegetable consumption <sup>12</sup>  | Flavonoids: quercetin and herperetin <sup>12</sup>  |
| ↓ lumbar spine bone loss           | ↑ isoflavone-rich soy protein <sup>25</sup>  | Isoflavones, not soy protein <sup>25</sup>  |
| ↓ colonic diverticula              | ↑ intake of dietary fiber <sup>10</sup>  | Fiber <sup>10</sup>   |
| ↓ gallstones                       | ↑ intake of dietary fiber <sup>10</sup>  | Fiber <sup>10</sup>   |
| ↓ macular degeneration             | ↑ intake of fruits and vegetables, Especially spinach and collard greens <sup>10</sup>   | Lutein and zeaxanthin <sup>26</sup>   |

The health benefits of vegetarian diets may stem from a number of components typical of vegetarian meal choices that are rich in whole grains, fruits, and vegetables. Those components may include: unsaturated fat, fiber, antioxidant vitamins, flavonoids, folic acid, and phytoestrogens. As science continues to identify beneficial chemicals in foods, individuals are well advised to choose whole-unrefined foods for their nutrition. Other equally or more-beneficial chemicals may be identified later that are part of the whole foods that individuals consume. In addition to food choices, those who follow a vegetarian diet often engage in positive lifestyle habits that lead to total, vibrant health, and well-being.

### **Proteins and Their Indispensable Amino Acids**

Food proteins supply the amino acids needed for growth, tissue repair, and specific metabolic functions. Nine amino acids cannot be synthesized in adequate amounts by the body: histidine, isoleucine, leucine, lysine, methionine, threonine, tryptophan, phenylalanine, valine, and possibly arginine. These are called indispensable, formerly essential amino acids because an insufficient intake will result in negative nitrogen balance, weight loss, impaired growth in infants and children, and clinical symptoms.<sup>27</sup>

All nine indispensable amino acids are found in vegetable protein as well as animal protein. In addition, the amino acid ratios of vegetable proteins are similar to those found in animal protein. Some plant protein may be somewhat lower in lysine or the sulfur containing amino acids, methionine and cystine, than those of an animal source. However, the dynamic state of protein turnover in the body creates an amino acid pool that may be called on to meet the body's demand for amino acids by cells at any given time.<sup>28</sup> The consumption of all indispensable amino acids in a defined ratio, called protein complementation, is not necessary at every meal.<sup>29</sup> The necessity of complementation of plant proteins at every meal is no longer supported by science. Vegetarian diets meet current nutrition recommendations when there is sufficient total protein throughout the day along with adequate calories and other nutrients. Vegetarians are no longer advised to consciously combine proteins at meals.

### **Nutrient Adequacy of Vegetarian Diets**

Previous Dietary Guidelines for Americans said that most vegetarians are lacto-ovo vegetarians and they "enjoy excellent health." Lacto-ovo-vegetarian diets that include dairy products and eggs are known to provide adequate protein, vitamins, and minerals. These diets also meet all of the recommended nutrient intakes for all age groups.<sup>30</sup> Later Dietary Guidelines continue to encourage the consumption of plant foods (fruits, whole grains, and vegetables), and recommend limiting sources of saturated fat and cholesterol (animal products, such as meat and full-fat dairy products).<sup>31</sup> Since meat is the usual source of protein, iron, and vitamin B<sub>12</sub> for the majority of Americans, vegetarians should ensure that their food choices include sources of these nutrients.<sup>31</sup> Those who avoid milk and its products need to choose good alternate sources of calcium, protein, and vitamins B<sub>2</sub>, B<sub>12</sub>, and D.<sup>31</sup>

In addition to the nutrients mentioned above, total vegetarian diets (plant foods only) require appropriate planning and supplements to meet certain nutrient needs (Tables 3 and 4). Animal products are the only dietary sources of naturally occurring B<sub>12</sub>. Since these diets are based entirely on plant foods, B<sub>12</sub> fortified plant foods (some cereals, some soy beverages, some meat alternates) or a daily B<sub>12</sub> supplement is required. The usual sources of calcium and vitamin D in most American's diets are dairy products, which are not consumed by total vegetarians. Thus, particular attention must be given to adequate sources of calcium and vitamin D, especially for meals for children and the elderly.<sup>4, 30</sup> Total calories may be insufficient when visible oils and fats are avoided. Some researchers are concerned about zinc and iron bioavailability due to the high fiber content of total vegetarian diets.<sup>4</sup> In their severely restricted forms, macrobiotic, Rastafarian, and fruitarian vegetarian diets are not recommended for children, due to the increased risk of iron-deficiency anemia, rickets, megaloblastic anemia, and protein-calorie malnutrition.<sup>32</sup>

**Table 3: Nutrients of Concern for Total Vegetarians (plant foods only)<sup>4, 31</sup>**

| <b>Nutrient</b>                                | <b>Rationale</b>   | <b>Healthful Recommendations for Nutrients of Concern*</b>  |
|--|--|---|
| <b>Calories</b>                                | Food volume tends to be high with few calories                             | High calorie, low volume foods, such as avocado, dried fruit, nut butters, oils, olives, salad dressings, margarines  |
| <b>Protein</b>                                 | Most plant foods are low in protein  | Cooked dry beans, vegetable and grain protein foods, tofu made with calcium sulfate, tempeh, nuts, nut butters, and seeds   |
| <b>Calcium</b>                                 | Few plant foods have substantial amounts                                   | Cooked dark green vegetables, calcium-fortified soy milk, calcium-set tofu, calcium-enriched juices   |
| <b>Iron</b>                                    | Few plant foods have substantial amounts                                   | Enriched breads and cereals, garbanzo beans, soybeans, lentils, tofu, pumpkin seeds, tomato juice, dried apricots, prune juice, and blackstrap molasses   |
| <b>Vitamin B<sub>12</sub> (cyanocobalamin)</b> | Vitamin B <sub>12</sub> does not exist in plants.                          | Enriched ready to eat cereals, B <sub>12</sub> fortified soy milk, B <sub>12</sub> fortified vegetable and grain protein food products, fortified nutritional yeast, Vitamin B <sub>12</sub> supplement |
| <b>Vitamin D</b>                               | Most vitamin D is obtained from sunlight; few foods are fortified with it. | Vitamin D-fortified soy milk, vitamin D-fortified cereal, or vitamin D supplement   |
| <b>Zinc</b>                                    | Few foods have substantial amounts.  | Enriched ready-to-eat cereals, whole grains, cooked dry beans, nuts and seeds   |

\* See Tables 5 (below) and 6 (in Appendices II) for the number of servings recommended daily and serving sizes.

**Table 4: Supplement Recommendations Across the Lifespan**<sup>4, 32</sup>

| Age Group   | Total Vegetarians*   | Lacto-ovo Vegetarians**           | Omnivores**                       |
|---|--|-----------------------------------|-----------------------------------|
| Infants, 0-6 months<br>Breastfed  | Single dose of vitamin K at birth, vitamin B <sub>12</sub> , vitamin D | Single dose of vitamin K at birth | Single dose of vitamin K at birth |
| Infants, 6-12 months<br>breastfed, plus solid foods with iron and vitamin C | B <sub>12</sub> and vitamin D  | Vitamin D                         | Vitamin D                         |
| Toddlers  | B <sub>12</sub>  |                                   |                                   |
| Preschool   | B <sub>12</sub>  |                                   |                                   |
| Adolescents   | B <sub>12</sub>  |                                   |                                   |
| Adult   | B <sub>12</sub>  |                                   |                                   |
| 50+ adult   | B <sub>12</sub>  | B <sub>12</sub>                   | B <sub>12</sub>                   |
| Pregnant/lactating  | B <sub>12</sub> , prenatal supplement                                  | Prenatal supplement               | Prenatal supplement               |

\* Read the labels on dairy substitutes to assure fortification with calcium, vitamin D, and B<sub>12</sub>.

\*\* If dairy products are limited or not part of meal planning, use substitute products containing calcium, vitamin D, and B<sub>12</sub>.

Concern has been expressed for the adequacy of vegetarian diets to provide sufficient omega-3 fatty acids, since fish is not included in most vegetarian diets and is the major source of omega-3 fatty acids for most Americans. However, flaxseed, flaxseed oil, canola oil, walnut oil, and soy oil, plus green leafy plants are excellent sources of omega-3 fatty acids- see Table 5. The nutrient recommendations from the National Academy of Sciences state an adequate intake (AI) of omega-3 fatty acids to be 1.1 grams per day for females and 1.6 grams per day for males. The AI for omega-6 fatty acids is 12 gm per day for females and 17 grams per day for males.

**Table 5: Plant Sources of Omega-3 Fatty Acids**<sup>33, 34</sup>

| Source (serving size) | Omega-3 (gm) | Omega-6 (gm) |
|-----------------------|--------------|--------------|
| <b>Oils</b>           |              |              |
| Flaxseed oil, 1 Tbsp  | 8.0          | 2.24         |
| Walnut oil, 1 Tbsp    | 1.46         | 7.41         |
| Canola oil, 1 Tbsp    | 1.30         | 2.84         |
| Soy oil               | 0.95         | 7.14         |
| <b>Nuts and seeds</b> |              |              |
| Flaxseed, 1 Tbsp      | 1.99         | .047         |
| Walnuts, 1 oz.        | 1.91         | 8.91         |
| Pecans, 1 oz.         | 0.19         | 4.48         |
| Pistachios, 1 oz.     | 0.08         | 2.15         |
| Peanut butter, 2 Tbsp | 0.02         | 4.38         |
| <b>Beans</b>          |              |              |

|                                 |                    |                    |
|---------------------------------|--------------------|--------------------|
| Soybeans, cooked, ½ cup         | 0.32               | 2.39               |
| <b>Source (serving size)</b>    | <b>Omega-3(gm)</b> | <b>Omega-6(gm)</b> |
| Kidney beans, boiled, ½ cup     | 0.15               | 0.09               |
| Lentils, boiled, ½ cup          | 0.04               | 0.14               |
| Garbanzo beans, boiled, ½ cup   | 0.04               | 0.91               |
| <b>Green leafy plants</b>       |                    |                    |
| Kale, raw, chopped, 1 cup       | 0.12               | 0.04               |
| Collards, frozen, boiled, ½ cup | 0.11               | 0.05               |
| Spinach, boiled, ½ cup          | 0.08               | 0.01               |
| Butterhead lettuce, 1 cup       | 0.05               | 0.02               |
| <b>Grains</b>                   |                    |                    |
| Rolled oats, dry, ¼ cup         | 0.02               | 0.44               |
| White flour, ¼ cup              | 0.01               | 0.12               |
| Whole wheat flour, ¼ cup        | 0.01               | 0.22               |

### Vegetarian Food Pyramid

Food pyramids provide a framework for knowing what to eat and how much to eat for a nutritionally adequate diet. The USDA MyPyramid website does not include a pyramid for vegetarians. However the My Vegetarian Food Pyramid (see Appendix I), developed by the General Conference (of Seventh-day Adventists) Nutrition Council, graphically depicts the number of servings and lists the size of the servings for balanced nutrition.<sup>31</sup> A number of vegetarian food guides are available in cookbooks, materials for the public, and scientific literature, however the USDA and USDHHS do not have extensive dietary guides for vegetarians. Loma Linda University, in conjunction with experts in the fields of vegetarian diets, have compiled daily food guide recommendations for lacto-ovo-vegetarians. Please see Appendix II and Appendix III, to review these lacto-ovo vegetarian food guides for adults and children respectively.

### Opportunities for Improvement

1. Offer a wide variety of vegetarian menu items in food programs, feeding programs, quantity food production facilities, and catering.
2. Train health care and hospitality (hotel, motel, and restaurant) professionals to support the public's choice of healthful vegetarian diets.
3. Recommend all nutrition education programs provide instruction on:
  - Plant-based foods and their possibilities for disease prevention/treatment,
  - Vegetarian meal planning, and
  - Production and manufacturing of vegetarian foods.
4. Consumers, food programs, feeding programs, restaurants, and caterers should provide the following foods daily:
  - deep green salad greens

- whole grain products
  - reduced-fat or nonfat dairy products in menu selections
5. Food industry should fortify soymilk with Vitamin B<sub>12</sub> (20% Daily Value), calcium (20-30% Daily Value), and vitamin D (25% Daily Value) and list content per serving on food labels.
  6. Government, food industry, and philanthropists should fund research on vegetarian nutrition and disease prevention/wellness promotion.
  7. Food services at conferences and conventions should provide vegetarian food choices.

### **Resources for Healthful Vegetarian Meal Planning**

#### 1. Dietary Guidelines for Americans 2005

These guidelines are intended to answer the question, "What should Americans eat to stay healthy and prevent disease?" They are meant for healthy individuals two years and older. According to the Guidelines, most calories should come from grain products, vegetables, fruits, low-fat dairy products, and lean sources of protein. Very few calories should come from fats and sweets.<sup>30, 31</sup> Updates for the Dietary Guidelines are usually published every five years. The 2005 Dietary Guidelines for Americans include recommendations for vegetarians at the MyPyramid web site.

<http://mypyramid.gov/pyramid/vegetarian.html>.

#### 2. My Vegetarian Food Pyramid

The USDA MyPyramid is a graphic depiction of the amounts of foods needed daily to meet nutritional needs for vegetarians. Foods are divided into groups based on their nutrient content. The MyPyramid lists the number of servings needed per day and serving sizes. The My Vegetarian Food Pyramid (Appendix I) is similar to the USDA MyPyramid, with the exception that protein sources are primarily from plants rather than animal sources.<sup>31</sup> Consuming the daily recommended amounts of foods or number of servings and using the appropriate serving size will assure adequate nutrition (see Appendices II and III).

#### 3. The Food Label

A third helpful tool in menu planning from the U.S. government is the food label guidance system. The food label states the serving size of the chosen food and nutrients to be provided by that food item.

Each food label gives the percent daily value (DV) for a standardized serving size. DVs are set by the U.S. government and allow consumers to compare nutrient values of similar foods. DVs replaced the U.S. Recommended Dietary Allowances (U.S. RDAs), and is an umbrella term for two sets of reference values: Daily Reference Values

(DRVs) and Reference Daily Intakes (RDIs). Current nutrition recommendations were used to set the DRVs for total fat, saturated fat, trans fat,<sup>39</sup> cholesterol, total carbohydrate, dietary fiber, sugars, sodium, potassium, and protein for adults and children 4 years and older. The RDIs are the same as the U.S. RDAs for 19 vitamins and minerals. The values for total fat, saturated fat, cholesterol, sodium, total carbohydrate, dietary fiber, protein, vitamins A and C, calcium, and iron must appear on the label; all other vitamins and minerals are optional.<sup>40</sup>

<http://www.cfsan.fda.gov/~dms/fdnewlab.html>

## **Resources/Websites**

### **Print Materials**

American Dietetic Association (ADA). *Being vegetarian*. Chicago: ADA. 1996.

Craig W. Nutrition and wellness. *A vegetarian way to better health*. Berrien springs, MI: Andrews University. 1999.

Havala, Suzanne. *Being Vegetarian for Dummies* (Wiley 2001) and *Vegetarian Cooking for Dummies* (Wiley 2001).

Hodgkin G, Maloney S (eds). *Loma Linda University Diet Manual: A handbook supporting vegetarian nutrition*. Loma Linda, CA: Loma Linda University Press. 2003.

Mellina V, Davis B, Harrison V. *Becoming Vegetarian*. The Book Publishing Co. 1996.

Messina V, Mangels R, Messina M. *The Dietitian's Guide to Vegetarian Diets: issues and applications, 2<sup>nd</sup> Edition*. Gaithersburg, MD: Aspen Pub. 2004.

Krizmanic, J. *A Teen's Guide to Going Vegetarian*. New York, NY: Viking Children's Books. 1994.

### **Websites**

#### **Accurate information, resources, and support**

Vegetarian Nutrition Dietetic Practice Group. The American Dietetic Association. 120 South Riverside Plaza, Suite 2000, Chicago IL. 60606-6995.

<http://www.eatright.org/cps/rde/xchg/SID-5303FFEA-EDABCC8D/ada> Accessed 4/14/06.

### **How to plan vegetarian diets, research, and other sites**

Department of Nutrition and Dietetics, School of Allied Health Professions, Loma Linda University, Loma Linda, CA 92350. <http://www.llu.edu/llu/nutrition/veg.html> Accessed 4/14/06.

Department of Nutrition, School of Public Health, Loma Linda University, Loma Linda, CA 92350. <http://www.llu.edu/llu/sph/nutrition/resources.html> Accessed 4/14/06.

### **Literature review and information about nutrition and vegetarian topics**

Andrews University, Nutrition Department, Michigan: <http://www.andrews.edu/nutrition/> Accessed 4/14/06.

### **Listing of soy terms, products, nutrient competition, and companies**

*U.S. Soyfoods Directory*. Indiana Soybean Development Council, 423 West South Street, Lebanon, IN 46052-2461. Published yearly. <http://www.soyfoods.com/> Accessed 4/14/06.

### **Professional resources**

Loma Linda University Diet Manual: A handbook supporting vegetarian nutrition: <http://www.llu.edu/llu/nutrition/veg.html> Accessed 4/14/06.

Seventh-Day Adventist Dietetic Association: <http://www.sdada.org/> Accessed 4/14/06.

### **Recipes, cookbooks, frequently asked questions, resources**

American Dry Bean Board: <http://www.americanbean.org/> Accessed 4/14/06.

### **Subject listing for information about vegetarianism**

Vegetarian Resource Group Box 1463, Baltimore, MD 21203. A nonprofit organization for vegetarian nutrition education. <http://www.vrg.org/> Accessed 4/14/06.

### **Vegetarian food pyramid and health-related education materials.**

The Health Connection. 55 West Oak Ridge Drive, Hagerstown, MD 21740-7390 or <http://www.healthconnection.org/> Accessed 4/14/06.

Telephone: 1-800-548-8700

FAX: 1-888-294-8405

E-mail: [sales@healthconnection.org](mailto:sales@healthconnection.org)

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# My Vegetarian Food Pyramid



|  |   |  |   |  |  |  |
|--|---|--|---|--|--|--|
| <p><b>GRAINS</b><br/>Go for Whole</p> <p>6 ounces daily*</p> | <p><b>VEGETABLES</b><br/>Vary the Veggies</p> <p>2½ cups daily*</p> | <p><b>FRUITS</b><br/>Focus on Fruit</p> <p>2 cups daily*</p> | <p><b>DAIRY/EQU</b><br/>Go Low Fat</p> <p>3 cups daily*</p> | <p><b>FATS</b><br/>Favor Healthy Fats</p> <p>1-2 ounces daily*</p> | <p><b>BEANS &amp; NUTS</b><br/>Power with Plant Proteins</p> <p>5½ ounces daily*</p> | <p><b>DESSERTS</b><br/>De-emphasize the Desserts</p> |
|--|---|--|---|--|--|--|

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\*Based on 2,000 calories per day

**Appendix II: Daily Food Guide for Lacto-ovo Vegetarian Adults** Adapted from references 35-38

| <b>Food Group</b>                             | <b>Serving Per day</b> | <b>Serving Size</b>   | <b>Daily Recommendations</b>  |
|---|------------------------|---|---|
| <b>Whole Grain Bread, Cereal, Rice, Pasta</b> | 6 or more              | 1 slice bread or 1 small roll<br>½ bun, bagel, pita<br>1 ounce (¾ cup) ready-to-eat cereal<br>½ cup cooked cereal, rice or pasta<br>4-6 small crackers<br>1 6 inch tortilla,<br>1 small pancake or waffle | Choose whole wheat or whole grain breads and cereals. Choose ready-to-eat cereals fortified with iron, zinc and vitamin B <sub>12</sub> . |
| <b>Dry Beans</b>                              | 1-3                    | ½ cup lentils, split peas, or other cooked dry beans<br>3 ounces (½ cup) tofu or tempeh<br>½ cup vegetable protein (soy) food products  | Eat to meet needs for protein, iron, zinc and other trace minerals. Eat one serving of cooked dry beans.                                  |
| <b>Eggs</b>                                   | 0-1                    | 1 egg   | Limit yolks to 3 to 4 per week. Use egg whites freely.  |
| <b>Nuts and Seeds</b>                         | 1 or more              | ¼ cup almonds, walnuts, or other nuts and seeds.<br>2 tablespoons peanut butter, almond butter, tahini  | Eat raw or dry roasted nuts and seeds or as a spread  |
| <b>Vegetables</b>                             | 5 or more              | ½ cup cooked vegetable<br>1 cup raw vegetable or salad<br>¾ cup vegetable juice   | Eat a variety of raw or lightly steamed vegetables. Select vegetables with lots of color (dark green, orange, or red beta-carotene).      |
| <b>Fruits</b>                                 | 3 or more              | 1 medium fresh fruit<br>½ cup cooked or canned fruit<br>¼ cup dried fruit<br>¾ cup 100% fruit juice   | Eat a variety of raw, frozen, canned, or dried fruits. Select fruits with lots of color (dark orange or red for beta-carotene).           |
| <b>Milk or Fortified Milk Alternatives***</b> | 2-3*                   | 1 cup reduced-fat milk or yogurt<br>1 cup calcium-fortified soymilk<br>1 ½ ounces (1/3 cup grated) cheese<br>1 cup pudding: 1 ½ cups ice milk or frozen yogurt  | Choose reduced fat and non-fat dairy products and yogurt, read labels to assure adequate fortification of milk alternatives.              |
| <b>Vegetable Fats and Oils</b>                | 3 or more              | 1 teaspoon vegetable oil or margarine<br>2 teaspoons salad dressing   | Use canola oil and olive oil (low in saturated fat and high in monounsaturated fat) and soy oil (high in omega-3 fats).                   |
| <b>Vitamin B<sub>12</sub></b>                 | 2.4 µg                 | Milk, cheese, B <sub>12</sub> fortified soymilk, eggs<br>Fortified cereals<br>Fortified vegetable and grain protein food products, fortified nutritional yeast, B <sub>12</sub> supplement                | Select a good source of B <sub>12</sub> each day.   |

\* Women who are pregnant or breast-feeding and anyone under 24 years of age needs 3 servings of milk or a milk alternative daily.

\*\*DV (Daily Value)=daily nutrient recommendations for healthy adults and children four years and older.

\*\*\* If soy or another milk alternative is preferred, choose an alternate fortified with at least 5-7 grams of protein, 20-30% DV\*\* (250-300mg) calcium, 20% (1 mcg. B<sub>12</sub>), 25% DV (100 IU or 10 mcg) vitamin D per 8 ounces, tofu made with calcium sulfate.

**Appendix III: Number of Servings\* for Lacto-ovo Vegetarian Children** Adapted from references 27, 35-37

| <b>Food Group</b>  | <b>**1-2 yr. Male<br/>1046<br/>(NAS)</b> | <b>1-2 yr. Female<br/>992 Cal</b> | <b>3-8 yr. Male<br/>1742<br/>(6 yr.)</b> | <b>3-8 yr. Female<br/>1642<br/>(6 yr.)</b> | <b>9-13 yr. Male<br/>2279<br/>(11 yr.)</b> | <b>9-13 yr. Female<br/>2071<br/>(11 yr.)</b> | <b>14-18 yr. M Male<br/>3152<br/>(16 yr.)</b> | <b>14-18 yr. Female<br/>2368<br/>(16 yr.)</b> |
|--|--|-----------------------------------|--|--|--|--|---|---|
| <b>Breads/cereals–<br/>80 Cal</b>  | 3.5                                      | 3                                 | 6  | 5.5  | 10.5                                       | 9  | 14  | 10  |
| <b>Vegetables –<br/>25 Cal</b>   | 1  | 1                                 | 3  | 2  | 3  | 3  | 5   | 4   |
| <b>Fruits –<br/>60 Cal</b>   | 2  | 2                                 | 3  | 3  | 3.5  | 3.5  | 4.5   | 4   |
| <b>Milk/dairy –<br/>Whole: 150 Cal,<br/>Low Fat: 120, 1%<br/>Non-fat: 100 Cal.</b> | 2.5<br>Whole                             | 2.5<br>Whole                      | 3<br>Low Fat                             | 3<br>Low Fat                               | 3<br>1% Non-fat                            | 3<br>1% NF                                   | 4<br>1% NF                                    | 3.5<br>1% NF                                  |
| <b>Protein foods -<br/>lean, 75 Cal</b>  | 2  | 2                                 | 5  | 5  | 6.5  | 6.5  | 8   | 6   |
| <b>Fats &amp; Oils –<br/>45 Cal</b>  | 1  | 1                                 | 4  | 3  | 5.5  | 4  | 10  | 6   |
| <b>Desserts –<br/>1 teasp. sugar, 2<br/>gm fat, 45 Cal</b>                         | 1  | 1                                 | 2  | 2  | 2  | 2  | 4   | 3   |
| <b>Total Cal</b>   | 1040                                     | 1000                              | 1740                                     | 1630                                       | 2250                                       | 2063   | 3145  | 2345  |
| <b>% Fat</b>   | 32%                                      | 33%                               | 33%                                      | 33%  | 28%***                                     | 28%***                                       | 31%***  | 29%***  |
| <b>% Protein</b>   | 16%                                      | 17%                               | 18%                                      | 18%  | 17%  | 18%  | 16%   | 16%   |

\* Bread serving = 1 slice bread, ¾ cup cold cereal, ½ cup cooked cereal, ½ cup pasta/rice, ½ bagel or English muffin, 3-4 crackers, ½ muffin

Vegetable serving = 1 cup raw leafy, ½ cup chopped raw, ½ cup cooked, 6 oz juice

Fruit serving = 1 medium piece, 1 cup berries, ¼ cup dried fruit, ½ cup canned fruit, 6 oz juice

Milk/dairy serving = 1 cup milk, 1 cup yogurt, 1 ¾ oz. cheese, 1 ½ cup cottage cheese, 1 ¾ cup ice cream

Protein foods = ½ cup cooked beans, ½ cup tofu, ¼ cup nuts or seeds, 2 tablespoons nut butter, ¼ cup meat alternative, 1 egg

Fats and Oils serving = 1 teaspoon oil, margarine, mayonnaise, nut butter; 1/8 avocado, 1 ½ teaspoon tahini

Desserts serving = 1 small cookie, 1 small piece of candy (e.g., 1/5 of 1.9 oz. Chocolate bar, 11 Gummi Savers, 1 LifeSaver lollipop, 13 M&Ms, 5 M&Ms with peanuts, small turtle), 5 animal crackers, ¼ small piece of cake, 1/3 cupcake, 1/6 small piece of pie

\*\*The headings for the row include the age range, gender, and age used for the stated calorie level.<sup>27</sup>

\*\*\*Calculations are based on lean protein choices. Children’s menus could include medium fat or high fat protein foods such as cheeses or nut butters for these age groups, thus raising the percent fat.