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# **Guide to Eating More Vegetables: Carrots**

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Carrots, the popular root vegetable known to be important for eyesight by mothers everywhere, can be grown throughout the United States and are available year-round. The carrot is a member of the parsley family, which contains other flavorful favorites such as celery, dill, fennel, and parsnip [1]. Carrots have a crunchy texture and sweet taste with ample amounts of compounds important for our health. They are delicious when eaten raw or cooked.

### **Nutrition and Health Benefits**

Calories, carbohydrate, fat, and protein: A half-cup of raw carrots (64 grams/2.3oz) contains 26 calories. Carrots contain mostly carbohydrates (6 grams). Of the carbohydrates, 2 grams are fiber, which helps lower elevated blood cholesterol levels and slows digestion. Carrots are also a low-glycemic food (see "Glycemic Index" below). Carrots contain 1 gram of protein, and no fat or cholesterol.

Glycemic index: The glycemic index (GI) is a measure of how quickly a carbohydrate-containing food causes blood glucose (blood sugar) levels to rise after consumption of foods. The GI places foods on a scale of 0 to 100. Foods with lower GI values are digested and absorbed at slower rates, causing a slower rise in

blood glucose level. Foods low on the GI include all non-starchy vegetables (examples: broccoli, carrots, celery, okra, tomatoes, etc.), most fruits, dried beans and legumes. Low-GI foods (GI values of 55 or less) may help maintain a healthy weight; these foods keep us feeling fuller for a longer period of time, which may prevent overeating. Low-GI foods have also been shown to improve insulin resistance in people with type 2 diabetes, as well as lowering their glucose, cholesterol and triglycerides levels [2]. It is important to consider that the GI value only applies when a food is consumed on an empty stomach without any other foods. The GI value will be different if both high and low-GI foods are consumed together, which balances blood glucose levels. You may use the GI as a guide to help increase the variety and nutritional contents of the foods you consume.

**Vitamins and Minerals:** Carrots contain several essential vitamins and minerals. The most abundant vitamins in carrots are vitamins A, B6, and K. Your body needs vitamin A for proper vision, immune function (to fight infections), maintaining healthy skin and bones, and regulating cell growth. Vitamin B6, part of the B-vitamin group, is involved with the conversion of food into energy, and is also important for immune function. Vitamin K is important for blood clotting, preventing excessive bleeding.

While carrots do not contain large quantities of minerals, adding carrots to your meals will contribute to your daily mineral needs. See the Nutrient Info Table below to find out the amounts of different vitamins and minerals in half a cup of chopped carrots.

**Phytochemicals:** In addition to fiber, vitamins, and minerals, carrots contain phytochemicals ('phyto' means plant). Phytochemicals are compounds produced in plants that have been shown to reduce the risk of many diseases including certain types of cancer [3]. Different varieties of carrots contain different phytochemicals. Orange carrots are best known for betacarotene, which can be converted to vitamin A in the body. Red and dark-colored carrots contain lycopene and anthocyanine, which act as antioxidants, neutralizing and removing free radicals that cause cell damage.

In summary, including carrots in your diet can help promote good health, reduce the risk of cancer and heart disease by lowering blood lipids (fats), and regulate blood glucose. The nutrients and phytochemicals in carrots can improve the health of eyes, skin, hair, and nails by helping to build new cells.

Table 1: Nutrient Info. Carrots (raw, ½ cup chopped)

	Amount
<b>Total Calories</b>	26 calories
Protein	1 g
Carbohydrate	6 g
Dietary Fiber	2 g
Total Sugars	3 g
Total Fat	0 g
Cholesterol	0 mg
Vitamins	
Vitamin A	534 micro-g RAE
Vitamin B-6	0.1 mg
Vitamin B12	0 micro-g
Vitamin C	4 mg
Vitamin D	0 micro-g
Vitamin E	0 mg
Vitamin K	8 micro-g
Folate	12 micro-g
Niacin	1 mg
Choline	6 mg
Minerals	
Calcium	21 mg
Potassium	206 mg
Sodium	44mg
Iron	0 mg
Magnesium	8 mg
Phosphorus	22 mg
Selenium	0 micro-g
Zinc	0 mg

Reference: SuperTracker, Food-A-Pedia (USDA)

# **How to Select and Store Carrots**

**Purchasing carrots:** When buying carrots, make sure they are: 1) firm, 2) smooth-skinned, 3) bright in color, and do not have thin, hair-like roots or any large, green or brown-colored areas at the tops of the carrots. Try to choose small to medium-sized carrots. Slim, small carrots are oftentimes the sweetest. If you buy carrots with their leafy green tops, make sure the tops are green and look fresh.

Buying baby carrots? They are convenient, but may not be as sweet as small, slim carrots. Most baby carrots are cut from regular-sized carrots and are then put into a machine that peels the skin, giving them the smaller form you find in the store. If you notice a thin white coating on the carrots, it means they are getting dried out. They are safe to eat [4]. Be sure to keep baby carrots in their original bag and store in your refrigerator.

**Storing fresh carrots:** Carrots can be stored in a closed plastic bag or container in a refrigerator (32°F - 50°F) for up to 2 weeks. Remove the leafy green tops, through which carrots can lose moisture, before storing. If you would like to use the green tops in a soup or stir-fry, store them separately. Wash the carrots just before you prepare them [5].

# **Home Preservation**

Fresh carrots can be stored for longer periods of time by various preservation methods that can be done at home.

**Cleaning and Preparing:** To clean fresh carrots, use a vegetable brush to remove any dirt found on the outer layer. Carrots can also be peeled with a vegetable peeler after rinsing.

**Freezing:** Freezing carrots is an easy way to preserve them for later use. The best way to freeze carrots is by first blanching: immersing the food in boiling water for a short time, and then cooling it in ice water, making the vegetables ready to be frozen. Blanching slows or stops the enzyme actions which cause loss of flavor, color, and texture.

Here are the steps: 1) Remove tops, wash, scrape or peel, dice or slice carrots into ¼ inch thick pieces, 2) Boil for 2 minutes, cool in ice water for 5 minutes, drain very well, pack, and freeze in freezer bags. (Note: If carrots are not fully drained, they will form one giant frozen lump. If you have time, try this: spread the diced or sliced carrots on a baking sheet and put in the freezer, then after they are frozen, put into a freezer bags.) Frozen carrots can be cooked from the frozen state [6].

**Canning:** Home canning is popular, but canning vegetables must be done safely in order to prevent the growth of dangerous bacteria. Carrots, like almost all vegetables, are low-acid foods. A pressure canner is needed for canning low-acid foods because it can heat the food up to 250°F; this high temperature is required to destroy certain harmful bacteria that can survive in low-acid environments, such as Clostridium botulinum, the bacteria that causes the potentially fatal food borne illness botulism.

Prior to using a pressure canner, inspect it for damage or rust and, at least once a year, have the dial gauge checked for accuracy. Many University County Extension Offices test gauges for free or for a nominal fee. Use only recipes that have been tested

and approved to reduce risk of spoilage and to safely avoid food borne illnesses. Before getting started refer to the USDA's Complete Guide to Home Canning for directions on safely using a pressure canner and tested recipes [7 - Available online. http://nchfp.uga.edu/publications/publications\_usda.html].

For more information about canning foods at home, including the correct pressure needed for different elevations, contact your local County Extension Office (Find Extension website in each state here - https://en.wikipedia.org/wiki/Cooperative\_State\_Research,\_Education,\_and\_Extension\_Service)

**Pickling:** Another option for preserving carrots is to pickle them. Pickling foods involves adding acids like vinegar to the food to help reduce the growth of harmful bacteria. A water-bath canner can be used for canning pickled foods. To ensure safety, it is important to use tested recipes for pickling and not to alter any ingredients [7 – Guide 6, Preparing and Canning Fermented Foods and Pickled Vegetables].



Figure 1 - Carrot Pickle

**Drying:** Drying the carrots removes the moisture that can spoil them and support the growth of harmful microorganisms. Dried carrots can be eaten as a healthy chip-like snack or can be reconstituted to be used in soups or other recipes.

Here are some basic tips for drying carrots:

- Use crisp, tender carrots that have been cut into 1/8 inch thick strips or slices.
- Prior to drying, the carrots need to be pretreated by blanching them for about four minutes in boiling water or a citric acid solution. This will preserve the quality of the carrots and is also an added step to ensure safety by killing any harmful microorganisms that may be present. Once carrots are pretreated and drained, it is recommended that a thermostatically controlled, electric dehydrator is used to dry them.

- If an electric dehydrator is not available, a gas or electric conventional oven can also be used, however, it is important to monitor the temperature at least every two hours with a calibrated oven thermometer to ensure that it stays between 140°F and 150°F. Place the oven thermometer directly to the oven rack or tray. (To calibrate your oven thermometer, check the following website: USDA, Kitchen Thermometers http://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/appliances-and-thermometers/kitchen-thermometers)
- Place a single layer of carrots on oven-safe trays and place in the oven with at least 3 inches of space between the trays and the top and bottom of the oven. If you have multiple trays, maintain at least 2½ inches of space between trays. This space is needed to ensure circulation of heat for even drying.
- Heat in the oven for 6-10 hours, until the carrot pieces are tough or brittle. Because carrots are a low-acid food, all the available water should be removed from them through the drying process to ensure they will be safe from harmful bacteria when storing [8].

For further information on safely freezing, canning, pickling, drying or other home preservation practices, contact your local University Extension Office.

# **Cooking Carrots**

Carrots can be cooked using many different methods, such as boiling, steaming, roasting, stir-frying, grilling, and they can be used as a side dish, main dish, or snack. Carrots can complement almost any other vegetable. The USDA's "What's Cooking?" includes more than 220 recipes with carrots. Check them out! (http://www.whatscooking.fns.usda.gov/)

Here are additional delicious recipes to try!

# Recipes

#### **Carrot Meatloaf with Tomato Sauce**

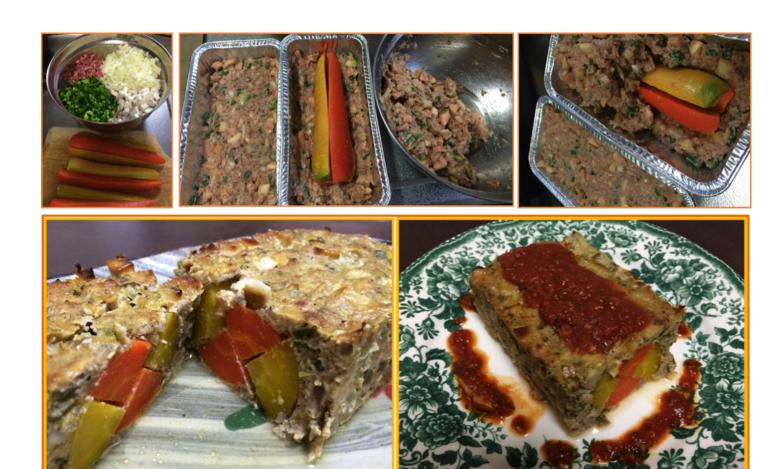
Here's a great way to add carrots and other veggies to your family's meat loaf. Eating more vegetables and less meat is heart healthy!

Estimated cost to make: ~\$10

**Ingredients:** 8 servings (two 4x8 inch loaf pans)

#### Meatloaf

1/3 cup dried bread crumbs
12 ounces carrot (any colors), (about 2 whole carrots)
12 ounces ground meat (preferably 50% beef, 50% pork)
6 ounces mushroom, chopped
6 ounces onion, chopped
6 ounces bell pepper (any color is ok), chopped
2 eggs



2 tablespoons milk

1/4 teaspoon black pepper

- 1/4 teaspoon salt
- 1/4 teaspoon nutmeg

#### Tomato Sauce

3 garlic cloves, minced (about 1 tablespoon)

- 1 tablespoon olive oil
- 1 4-5 ounces unsalted canned tomato (puree or diced)
- 1 tablespoon oyster sauce
- 2 tablespoons honey
- 2 tablespoons mustard
- 1 bay leaf

#### **Directions**

#### Meatloaf

- 1. Preheat oven to 350° F (175°C).
- 2. Soak the bread crumbs in milk.
- 3. Boil whole carrots until they soften.
- 4. In a large bowl, combine the meat, vegetables, mushrooms, eggs, and bread crumbs with milk. Season with salt, pepper, and nutmeg to taste.
- 5. Place half of the meatloaf mixture in a lightly greased 4 x

- 8 inch loaf pan.
- 6. Place the boiled carrots in the pan and cover with the rest of the meatloaf mixture.
- 7. Bake at 350° F (175°C) for 1 hour.
- 8. Remove from oven and let sit for 10 minutes.
- 9. Each meatloaf contains 4 slices.

#### Tomato Sauce (While meat loaf is baking, prepare the following)

- 1. In a medium or large pot over medium heat, cook garlic in olive oil until garlic starts to turn brownish.
- 2. Pour in pureed or diced canned tomatoes, oyster sauce, honey, and mustard.
- 3. Place bay leaf in pot.
- 4. Bring to a boil, then reduce heat to low, cover and simmer for at least 30 minutes.
- 5. Discard bay leaf, pour sauce on top of the meatloaf and serve.

#### Per Serving:

Calories, 228kcal; Carbohydrate, 23.5g; Protein, 13.3g; Total fat, 8.9g; Fiber, 5.1g; Sodium, 358mg

#### **Carrot Rice**

Tired of plain rice with your meals? Here's a delicious way to add an additional grain and heart-healthy vegetables to traditional rice.

Estimated cost to make: \$8.50 to \$10

**Ingredients:** 7-8 servings

1 cup brown rice

1 cup barley

1 pound carrots (any colors), each cut into few pieces

1.5 cup soup stock (chicken/vegetable)

5 ounces corn (canned)

1 bell pepper (any colors), minced

1 onion, minced

5 ounces mushroom, minced

1/3 cup white wine

Add chicken or canned tuna as preferred.

#### **Directions**

- 1. Set brown rice and barley aside.
- Put carrot and soup stock into a blender and blend until mixture is smooth.
- 3. Put all ingredients together in a rice cooker and start cooking.
- 4. Stir gently and serve.
  - If you do not have a rice cooker, you can substitute a saucepan. Combine all ingredients in saucepan and bring liquid to a boil over high heat. Reduce heat to low, cover with a tightened lid and simmer until all the liquid is absorbed and the rice and barley become tender, about 30-35 minutes. Turn off the heat. Cover and sit for an additional 10 minutes no peeking. Remove the lid and fluff the rice with a fork.

**Per Serving:** Calories, 314kcal; Carbohydrate, 68.6g; Protein, 6.8g; Total fat, 1.7g; Fiber, 8.5g; Sodium, 196mg



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# **Abstract:**

The Dietary Guidelines for Americans recommend 2 to 3 cups of vegetables daily for adults. The USDA reports that more than half of our vegetable intake comes from potatoes and tomatoes, whereas only 10% comes from bright, colorful vegetables, including carrots. This article focuses on many ways to enjoy carrots, introducing different types of dishes that utilize carrots and methods of preserving them for later consumption. The nutritional value and health benefits of carrots are also explained.



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