COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY • COLLEGE OF AGRICULTURE

# Vegetable Preparation for the Family

With modern transportation, we can all have year-round access to a wide variety of fresh vegetables. And in our health-conscious times, vegetables are not just used as side dishes any more. Because they are economical, we can use vegetables to prepare low-cost main dishes such as vegetable primavera, stuffed squash, or vegetable lasagna. In addition to their nutritional value, vegetables make meals more appealing in flavor, texture, and color.

Cooking changes a vegetable's texture, flavor, color, and nutrient content. High temperatures make vegetables tender and enhance flavor. In addition, cooking usually makes vegetables safer to eat by killing microbes. Overcooking, however, will cause texture, flavor, color, and nutrient content to deteriorate. Herbs and spices added to vegetables must also cook long enough to extract and diffuse their flavor throughout the vegetables but not so long that flavoring will be lost. Cooking moderates the harsh flavor of onions but strengthens the odor of vegetables in the cabbage family.

The key to cooking vegetables is to make the tissue tender without making it too soft. You can determine whether a vegetable is done by testing a piece during cooking. Most vegetables should be tender but still firm. Color can also indicate whether a vegetable is done. Green vegetables are overcooked if they turn an olive green. Delicate leafy vegetables require only a few minutes to cook, while stem and root vegetables may require more time.

## Fresh Is Best

Consider a vegetable's appearance and texture when you select fresh produce. High-quality, fresh vegetables are young, crisp, and brightly colored. As vegetables ripen, they gradually lose flavor and nutrients and become limp, losing their crispness.

Since vegetables grow close to the ground, you may need to wash them carefully. You may also need to scrape, pare, chop, or slice some vegetables before cooking. Use carefully washed vegetable odds and ends in soups or stocks.

## Storage

Store fresh vegetables for as short a time as possible to prevent loss of nutrients, flavor, and texture. Vegetables lose quality rapidly. Peas and corn begin to lose their sweetness as soon as they are picked.

Store potatoes, onions, and winter squash unwashed in a cool, dry, dark place. Refrigerate other vegetables in a covered container to prevent drying. Tightly cover vegetables that have been peeled and cut to prevent drying and discoloration.

## Nutritional Value of Vegetables

We should eat three to five servings of vegetables every day.* A serving size usually is ½ cup of cooked vegetable or 1 cup of raw vegetable. Vegetables provide important vitamins and minerals such as vitamin A, vitamin C, riboflavin, folic acid, iron, and magnesium. Most vegetables are also good sources of fiber. They are naturally cholesterol-free and low in fat. But don't turn your naturally low-fat vegetables into high-calorie selections—try to limit the amount of butter or high-fat sauces you add to your vegetables.

## Controlling Nutrient Loss

Most minerals and some vitamins dissolve in water. Soaking vegetables in water before cooking or cooking vegetables in large amounts of water causes leaching of important vitamins and minerals.

The other five factors that lead to nutrient loss are high temperatures, prolonged cooking, alkalis (such as baking soda and hard water), plant enzymes (which are destroyed by heat), and oxygen. Some nutrient loss is inevitable, but most can be avoided by understanding how these six factors affect vegetables.

** Based on the Food Guide Pyramid from the U.S. Department of Agriculture and Human Nutrition Information Service.*

# Controlling Texture Changes

You should stop cooking vegetables when they become tender. Desired tenderness varies depending on the vegetable. Winter squash, eggplant, and similar vegetables are properly cooked when they turn soft, but most vegetables are best when cooked very briefly or until they are crisp-tender. At this stage vegetables maintain their maximum flavor, color, and nutrients.

Cellulose and pectin are the fibers that give vegetables their shape and firmness. Cooking softens these fibers. The amount of fiber varies with different vegetables, with the age of vegetables, and even within the same vegetable. A longer cooking time means softer vegetables. Alkali, such as baking soda, should not be added to vegetables because it destroys vitamins and softens vegetables to the point of mush. Acids such as lemon juice, vinegar, tomato products, and sugar make vegetable fibers firmer. If you add any of these, you will need to allow more cooking time.

Starch found in vegetables also affects texture. Dry starchy foods like dried beans, peas and lentils, rice, and macaroni products must be cooked in enough water to allow the starch granules to absorb moisture and soften. Moist starchy vegetables like potatoes and yams must simply be cooked to soften the starch granules.

# Controlling Flavor Changes

The longer a vegetable is cooked, the more flavor is lost. Many flavors are lost during cooking, either by dissolving into the cooking liquid or by evaporation. You can prevent significant flavor loss by cooking vegetables as quickly as possible. Start with boiling water to reduce cooking time. Use as little water as possible to minimize leaching of vitamins and minerals. Steam vegetables when possible because less nutrients and flavor are lost during the reduced cooking time.

Strong-flavored vegetables such as onions, cabbage, brussels sprouts, cauliflower, broccoli, and turnips are much more appealing if some of their flavor is lost. Cooking strong-flavored vegetables uncovered and in larger amounts of water allows off-flavors to escape.

# Controlling Color Changes

It is important to preserve as much of a vegetable's natural color as you can during cooking. Different pigments react differently during cooking.

### *Green Vegetables*

Chlorophyll is the pigment present in all green vegetables such as asparagus, green beans, broccoli, peas, and spinach. Chlorophyll is destroyed by acids, such as lemon juice and vinegar, and by baking soda. Prolonged cooking or overcooking causes bright green vegetables to turn a drab olive green. Steaming is the most preferred method for cooking because steam cooks food rapidly, lessens the loss of nutrients and flavor, and does not break up delicate vegetables.

### *Yellow and Orange Vegetables*

Carotenoids are the yellow and orange pigments found in carrots, corn, sweet potatoes, tomatoes, and winter squash. These pigments are very stable to acids and heat, but loss of color, nutrients, and flavor occurs with overcooking.

### *Red Vegetables*

Anthocyanins are the red pigments found only in a few vegetables, such as beets and red cabbage. These red pigments react very strongly to acids and alkalis. Acids make anthocyanins brighter red, and alkalis turn them a blue or blue-green color. So a small amount of acid gives red beets and red cabbage a bright red color. This is why red cabbage is often cooked with tart apples. Because acids toughen vegetables and prolong cooking time, in recipes that call for lemon juice, tomatoes, or other acids, add only a small amount at the beginning of cooking and the remaining toward the end after the vegetables have become tender. Because anthocyanins dissolve easily in water, cook these vegetables quickly in as little water as needed.

### *White Vegetables*

Flavones are the white pigments found in potatoes, onions, cauliflower, and the white parts of celery, cucumbers, and zucchini. Cook these vegetables for a short time to avoid loss of nutrients, flavor, and color. Overcooking and hard water turn white vegetables a dull yellow or gray.

# Basic Cooking Methods

## *General Procedures:*

- Use as little water as possible, with the exception of strong-flavored vegetables.
- Cover yellow, orange, and red vegetables. Do not cover green and white vegetables.
- Cook vegetables as quickly as possible to soften fibers and retain nutrients, color, and flavor.
- Drain vegetables, but save the cooking water because it contains nutrients and flavor. Use the water in soups, sauces, and gravies.
- Season vegetables before serving. Use salt and high-fat sauces and butter sparingly.

## *Microwave Cookery*

Vegetables cook quickly and easily in the microwave oven. Only a few tablespoons of water are needed and microwaving preserves the nutrients, color, and texture of most vegetables. Always cover vegetables in the microwave.

**To microwave vegetables:**

- Place evenly cut vegetables in a ceramic dish. Add 2 tablespoons of water to fresh vegetables. Frozen vegetables usually require no extra water.
- Cover the vegetables and cook on high until fork tender. Halfway through the cooking cycle, stir the vegetables.

## *Steaming*

This method can be used for both pressurized steam cookers and range-top steamers which contain a perforated basket over a pot of boiling water. Pressurized steamers are not recommended because it is too easy to overcook the vegetables.

- If you use a pressurized steam cooker, follow the manufacturer's instructions. For range-top cooking, bring 1 to 2 inches of water to a boil in a saucepan.
- Arrange vegetables in shallow, even layers in a perforated pan or basket for cooking.
- Insert pan or basket into steamer or saucepan and cook until fork tender for most vegetables. Follow guidelines for preserving color, texture, and nutrients.

## *Baking*

Potatoes, sweet potatoes, and winter squash, as well as tomatoes, can be baked successfully. Starchy vegetables are baked because the dry heat of the oven and long baking time produce a desirable texture.

Vegetable casseroles are also baked, but precook the vegetables by simmering or steaming before they are mixed with other ingredients and baked.

## *Boiling*

Boiling is the most frequent method of cooking vegetables because it is easy and economical. Actually, simmering is the proper term. The vegetables should be simmered because the agitation and high temperature of boiling break up delicate vegetables and destroy nutrients. Simmering can be used for fresh, frozen, dried, or dehydrated vegetables.

**To boil fresh vegetables:**

- Bring water to a boil in saucepan. Leafy green vegetables require only the water that clings to the leaves. Cover other vegetables with water.
- Place vegetables in pan and return the water to a boil. Cover if appropriate.
- Reduce heat to a simmer and cook the vegetables until tender.

**To boil frozen vegetables:**

- In a saucepan, bring to a boil the amount of water suggested on the package. Frozen vegetables have been blanched or precooked so they require less water and less cooking time.
- Add frozen vegetables. Never defrost frozen vegetables before cooking. You may need to break up large blocks with a fork as the vegetables cook.
- Follow cooking instructions on package.

**To boil dehydrated or freeze-dried vegetables:**

- Follow cooking instructions on package.

**To boil canned vegetables:**

- Place vegetables and liquid in a saucepan and bring to a boil.
- Reduce to a simmer and cook until tender or as directed on the can label.
- Drain liquid before serving.

**To boil dried peas and beans:**

- Wash dried vegetables well and look for any foreign objects such as rocks.
- Allow to soak overnight in approximately 2 gallons of water for every pound of vegetable.

A quicker method is to add the dried vegetables to boiling water and boil 2 minutes. Remove from the heat and let sit for 1 hour before cooking.

- Bring the water and dried vegetables and seasonings to a boil.
- Reduce to a simmer and cook until tender, about 1½ to 2½ hours. Add more water if needed.

### *Sauteing or Pan-Frying*

The differences between sauteing and frying are in the amount of fat used and the length of cooking time. To saute is to cook quickly in a small amount of fat. Frying cooks in a larger amount of fat, usually 3 inches or more, for a longer time at a lower heat. Stir-frying is similar to sauteing and can be done in a regular pan or a stationary wok. Most vegetables are fried from 325º to 350ºF after being coated with a batter or breading. Without this coating, vegetables tend to dry out. Drain excess fat from deep-fried vegetables.

**To saute or stir-fry vegetables:**

- Heat enough fat (butter, margarine, oil) to coat the bottom of the pan. Butter burns very quickly at high heat. DO NOT leave any fat unattended.
- When fat is hot, add vegetables, being careful not to overload the pan because this will lower the fat temperature and the vegetables will simmer instead of saute.
- Stir the vegetables as often as necessary to heat evenly and coat them with fat. The heat should have time to recover between stirring. Cook until fork tender.

### *Braising*

Braising is a slow, moist-heat cooking method that uses a small amount of liquid. General procedures follow.

- Add fat to a braising pan or a saucepan and heat. Saute any additional flavoring ingredients such as a mirepoix (rough cut onions, carrots, and celery).
- Place the vegetable in the pan. It may or may not be cooked slightly in the fat before adding the liquid. Follow your recipe instructions.
- Add liquid, usually to cover the vegetable only part way. NEVER add water to hot fat as it will spatter, possibly causing burns.
- Cover the pan and cook the vegetable slowly in the oven or on the range top until fork tender.

## Seasoning List for Vegetables

Experiment with small amounts of seasonings to find what your family will accept. Start with 1 teaspoon of mild herbs or spices, such as basil, cinnamon, cumin, lemon pepper, or oregano per six servings. With strong herbs or spices, such as allspice, cloves, ginger, nutmeg, rosemary, and tarragon, start with only ¼ teaspoon per six servings. Ground herbs are stronger than dried, and dried are stronger than fresh. If a recipe calls for ¼ teaspoon of ground herbs, use almost 1 teaspoon of dried or 2 teaspoons of fresh herbs.

**Asparagus:** Garlic, fresh lemon juice, onion, vinegar.

**Beans:** Caraway, cloves, cumin, mint, onion, green bell pepper, savory, tarragon, thyme.

**Beets:** Anise, caraway, fennel, ginger, savory.

**Carrots:** Anise, cinnamon, cloves, mint, sage, tarragon.

**Corn:** Allspice, chili powder, green bell pepper, pimiento, fresh tomato.

**Cucumbers:** Chives, dill, garlic, vinegar.

**Green Beans:** Dill, fresh lemon juice, marjoram, nutmeg, pimiento.

**Greens:** Garlic, fresh lemon juice, onion, vinegar.

**Peas:** Allspice, green bell pepper, mint, fresh mushrooms, onion, fresh parsley, sage, savory.

**Potatoes:** Chives, dill, green bell pepper, onion, pimiento, saffron, sage.

**Squash:** Allspice, brown sugar, cinnamon, cloves, fennel, ginger, mace, nutmeg, onion, savory.

**Tomatoes:** Allspice, basil, garlic, marjoram, onion, oregano, sage, savory, tarragon, thyme.

**Vegetables in general:** Basil, cayenne, chervil, dill, marjoram, mint, fresh mushrooms, nutmeg, oregano, parsley, freshly ground pepper, poppy seeds, rosemary, sage, sesame seeds, tarragon, thyme, turmeric, watercress.

*Prepared by Sandra Bastin, Ph.D., R.D., L.D., Extension Food and Nutrition Specialist*

Educational programs of the Kentucky Cooperative Extension Service serve all people regardless of race, color, age, sex, religion, disability, or national origin. Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, C. Oran Little, Director of Cooperative Extension Service, University of Kentucky College of Agriculture, Lexington, and Kentucky State University, Frankfort. Copyright © 2000 for materials developed by the University of Kentucky Cooperative Extension Service. This publication may be reproduced in portions or its entirety for educational or nonprofit purposes only. Permitted users shall give credit to the author(s) and include this copyright notice. Publications are also available on the World Wide Web at: http://www.ca.uky.edu. Issued 3-94; Revised 8-2000, Last printed 8-2000, 2500 copies, 15000 copies to date.