

# Guide to Cooking at High Altitudes

If you live more than 1,000 feet above sea level, you'll need to adjust most recipes when you cook or bake. While there is no simple formula for high-altitude recipe conversions, these tips will help you get started.

## General High-Altitude Issues

Higher than 3,000 feet above sea level:

- Water boils at lower temperatures, causing moisture to evaporate more quickly. This can cause food to dry out during cooking and baking.
- Because of a lower boiling point, foods cooked in steam or boiling liquids take longer to cook.
- Lower air pressure may cause baked goods that use yeast, baking powder, baking soda, egg whites, or steam to rise excessively, then fall.

## Suggestions for Baking

- For cakes leavened by air, such as angel food, beat the egg whites only to soft peaks; otherwise, the batter may expand too much.
- For cakes made with shortening, you may want to decrease the baking powder (start by decreasing it by 1/2 teaspoon per teaspoon called for); decrease the sugar (start by decreasing by about 1 tablespoon for each cup called for); and increase the liquid (start by increasing it 1 to 2 tablespoons for each cup called for). These estimates are based on an altitude of 3,000 feet above sea level—at higher altitudes, you may need to alter these measures proportionately. You can also try increasing the baking temperature by 15°F to 25°F to help set the batter.
- When making a rich cake, reduce the shortening by 1 to 2 tablespoons per cup and add one egg (for a 2-layer cake) to prevent cake from falling.
- Cookies generally yield acceptable results, but if you're not satisfied, try slightly increasing baking temperature; slightly decreasing the baking powder or soda, fat, and/or sugar; and/or slightly increasing the liquid ingredients and flour.
- Muffinlike quick breads and biscuits generally need little adjustment, but if you find that these goods develop a bitter or alkaline flavor, decrease the baking soda or powder slightly. Because cakelike quick breads are more delicate, you may need to follow adjustment guidelines for cakes.
- Yeast breads will rise more quickly at high altitudes. Allow unshaped dough to rise only until double in size, then punch the

dough down. Repeat this rising step once more before shaping dough. Flour tends to be drier at high altitudes and sometimes absorbs more liquid. If your yeast dough seems dry, add more liquid and reduce the amount of flour the next time you make the recipe.

- Large cuts of meat may take longer to cook. Be sure to use a meat thermometer to determine proper doneness.

## Suggestions for Range-Top Cooking

- Candy-making: Rapid evaporation caused by cooking at high altitudes can cause candies to cook down more quickly. Therefore, decrease the final cooking temperature by the difference in boiling water temperature at your altitude and that of sea level (212°F). This is an approximate decrease of 2 degrees for every increase of 1,000 feet in elevation above sea level.
- Canning and freezing foods: When canning at high altitudes, adjustments in processing time or pressure are needed to guard against contamination; when freezing, an adjustment in the blanching time is needed.
- Deep-fat frying: At high altitudes, deep-fried foods can overbrown on the outside but remain underdone inside. While foods vary, a rough guideline is to lower the temperature of the fat about 3°F for every 1,000 feet in elevation above sea level.

## Cooking Above 6,000 Feet

Cooking at altitudes higher than 6,000 feet above sea level poses further challenges because the dry air found at such elevations influences cooking. Call your local United States Department of Agriculture Extension Service Office for advice.

## Further Information

For more information on cooking at high altitudes, contact your county extension office or write to Colorado State University, Department of Food Science and Human Nutrition Cooperative Extension, Fort Collins, CO 80523-1571. Please use this contact only for queries regarding high-altitude cooking.

# Guide to Food Equivalents

Take these guidelines with you to the supermarket -- they show specific measurements for fresh produce and will help you buy exactly what you need.

Food	Beginning size or amount	Yield and cut	Food	Beginning size or amount	Yield and cut
Apple	1 medium	1 cup sliced or 2/3 cup chopped	Melons		
Apricots	1 pound (8-12 whole)	2 cups sliced	Cantaloupe	1 medium (2 pounds)	6 cups cubed or 5 1/2 cups balls
Banana	1 medium	3 cup mashed or 3/4 cup sliced	Honeydew	1 medium 2 1/2 pounds	6 cups cubed or 5 1/2 cups balls
Beans, green	1 pound	3 to 3 1/2 cups 1-inch pieces	Mushrooms	8 ounces	3 cups sliced or chopped
Blueberries	1 pound	3 cups	Onion	1 medium	1/2 cup chopped
Broccoli	1 pound	4 cups florets	Onion, green	1 medium	2 tablespoons sliced
Cabbage	1 medium head (1 1/2 pounds)	7 to 10 cups shredded or 6 cups coarsely chopped	Orange	1 medium	1 tablespoon finely shredded peel. 1 1/3 cup juice or 1 1/3 cup section
Carrots	1 medium	1/2 cup sliced, chopped, julienned, or finely shredded	Papaya	1 medium	1 1/4 cups sliced
Cauliflower	1 medium head (1 1/2 pounds)	6 cups florets	Parsnip	1 medium	3/4 to 1 cup sliced or chopped
Celery	1 stalk	1/2 cup sliced or chopped	Peach	1 medium	1 cup sliced or 3/4 cup chopped
Cherries	1 pound	3 cups whole or 2 1/2 cups halved	Pear	1 medium	1 cup sliced or chopped
Chocolate chips	6 ounces	1 cup	Pepper, sweet	1 medium	1 cup strips or 3/4 cup chopped
Cranberries	1 pound	4 cups	Pineapple	1 medium (4 pounds)	4 1/2 cups peeled and cubed
Cream, whipping	1 cup unwhipped	2 cups whipped	Potatoes	1 pound	3 cups cubed (unpeeled) or 2 3/4 cups cubed (peeled)
Crumbs	1 slice	1/4 cup fine dried crumbs	Raspberries	1 pound	4 cups
Garlic	1 clove	1/2 teaspoon minced	Rhubarb	1 pound	4 cups sliced
Grapes	1 pound	2 cups	Rice, long grain	1 cup uncooked	3 cups cooked
Leek	1 medium	1/2 cup sliced	Shallot	1 medium	2 tablespoons finely chopped
Lemon	1 medium	2 teaspoons finely shredded peel. 3 tablespoons juice	Squash		
Lettuce, leaf	12 ounces (1 head)	10 cups torn	Summer (zucchini, yellow)	1 medium	1 1/4 cups sliced
Lime	1 medium	1 1/2 teaspoons finely shredded peel. 2 tablespoons juice	Winter (acorn, butternut)	2 pounds	4 cups chopped or 2 cups mashed
Mango	1 medium	1 cup sliced	Strawberries	1 pint (about 1 pound)	3 cups whole or 2 1/2 cups sliced
			Tomato	1 medium	1/2 cup peeled, seeded, and chopped

# Guide to Spices

These spices are pantry staples. Some of our substitutions offer similar flavors, while others are good flavor alternatives.

Spice	Flavor	Common Uses	Substitution
Allspice (ground)	Blend of cinnamon, nutmeg, cloves	Baked goods, jerk seasoning, stews	Ground cinnamon, nutmeg, or cloves
Anise seeds	Licoricelike flavor	Cabbage dishes, meats, fruit desserts	Fennel seeds or a few drops of anise extract
Cardamom (ground)	Spicy-sweet with peppery and gingerlike tones	Curried dishes, bean dishes, baked goods	Ground ginger
Cayenne pepper	Hot, pungent, smoky	Stews, barbecue rubs and sauces, and bean, meat, egg, and cheese dishes	Use 2 to 3 drops bottled hot pepper sauce for to teaspoon cayenne pepper
Chili powder	Hot, spicy, peppery taste and aroma	Soups, stews, marinades, meat dishes	Dash bottled hot pepper sauce plus equal measures of ground oregano and cumin
Cinnamon (ground)	Strong, spicy-sweet flavor	Meats, breads, pumpkin and fruit desserts, hot coffee, tea, chocolate	Ground nutmeg or allspice (use only of the specified amount)
Cloves (ground)	Strong, pungent, almost hot flavor	Baked beans, barbecue dishes, chili, mulled wine, fruit desserts, cakes	Ground allspice, cinnamon, or nutmeg
Cumin (ground)	Pungent, spicy, slightly -bitter flavor	Indian and Mexican cooking, meats, poultry	Chili powder
Curry powder	A fragrant, mild-to-hot blend of up to 20 ground spices	Meats, sauces, stews, root vegetables; often used in Asian and Indian cooking	Combine equal parts of ground spices common in curry (such as cumin, coriander, red and black peppers, ginger, turmeric)
Fennel seeds	Mild licoricelike flavor and aroma	Meat, sausage, poultry -dishes, baked goods, fruit desserts, coleslaw	Anise or caraway seeds
Ginger (ground)	Sweet-hot flavor, nippy aroma	Stir-fries, marinades, meats, baked goods	Ground allspice, cinnamon, mace, or nutmeg
Mustard (dry, seeds)	Dry mustard attains hot - flavor when mixed with water; seeds have hot, spicy flavor	Dry mustard—salad -dressings and egg, cheese, and meat dishes; seeds—pickling, relishes, and boiled vegetables and meats	In cooked mixtures, 1 tablespoon yellow mustard for each 1 teaspoon dry; no substitutions for mustard seeds
Nutmeg (ground)	Slightly sweet and spicy flavor and aroma	Baked goods, white sauces, custard, eggnog	Ground cinnamon, ginger, or mace
Paprika (Hungarian, Spanish)	Hungarian paprika is - generally more pungent than Spanish and can be labeled sweet (mild) or hot; Spanish paprika is slightly sweet and bitter	Vegetables, beef, fish, -chicken, salads, egg dishes	Cayenne pepper, but use sparingly because it's much hotter
Pepper, black or white	Black pepper is more - pungent than white	Savory foods, spiced -desserts	White may be substituted for black, but it's milder in flavor