



Ingredient Substitutions and Equivalents

Ann Henderson, M.S., CFCS, Susan Haws, M.S., SuzAnne Jorgensen, M.S., CFCS
(Update of Ingredient Substitution by Dr. Georgia Lauritzen, 1992)

This factsheet provides three different types of information to help answer food preparation questions. First is a list of ingredient substitutions that can be used when an ingredient called for in a recipe is not available; for example, what spices can be substituted for apple pie spice. Be aware that substitutes may alter the flavor, color, texture, or volume of the product, but will still result in an acceptable finished product. The second is a list of ingredient equivalents to help in making purchasing decisions such as how many pounds of flour should be purchased to have 12 cups called for in a recipe. The third is a list of equivalent measures to help in increasing or decreasing recipes; for example, how many teaspoons equal one-half tablespoon.

Ingredient Substitutions

Abbreviations: cup - c.; pound - lb.; teaspoon - t.; tablespoon - T.; ounce – oz.

Ingredient	Amount	Substitute
Allspice	1 teaspoon	<ul style="list-style-type: none"> • 1/2 t. cinnamon and 1/2 t. ground cloves
Apple pie spice	1 teaspoon	<ul style="list-style-type: none"> • 1/2 t. cinnamon, 1/4 t. nutmeg and 1/8 t. cardamon
Arrowroot starch	1 1/2 teaspoon	<ul style="list-style-type: none"> • 1 T. flour • 1 1/2 t. cornstarch
Baking powder	1 teaspoon	<ul style="list-style-type: none"> • 1/3 t. baking soda and 1/2 t. cream of tartar • 1/4 t. baking soda and 1/2 c. sour milk or buttermilk (decrease liquid called for in recipe by 1/2 cup) • 1/4 t. baking soda and 1/2 t. vinegar or lemon juice used with sweet milk to make 1/2 c. (decrease liquid called for in recipe by 1/2 c.)
Baking powder - double-acting	1 teaspoon	<ul style="list-style-type: none"> • 1/4 t. baking soda and 5/8 t. cream of tartar
Baking soda		<ul style="list-style-type: none"> • There is no substitute for baking soda.
Bay leaf	1 whole	<ul style="list-style-type: none"> • 1/4 t. crushed
Beau Monde	1 teaspoon	<ul style="list-style-type: none"> • 1 t. seasoning or seasoning salt • 1/2 t. salt • 1/2 t. Mei Yen seasoning

Ingredient	Amount	Substitute
Brandy	1/4 cup	<ul style="list-style-type: none"> 1 t. brandy extract plus enough water or liquid called for in recipe to make 1/4 c.
Broth, beef or chicken	1 cup	<ul style="list-style-type: none"> 1 bouillon cube dissolved in 1 c. boiling water 1 envelope powdered broth base dissolved in 1 c. boiling water 1 t. powdered broth base dissolved in 1 c. boiling water
Butter	1 cup	<ul style="list-style-type: none"> 1 c. margarine 1 c. vegetable shortening (for baking) 1 c. oil can be substituted for a similar amount of <u>melted</u> butter if the recipe specifies <u>melted</u> butter.
Buttermilk	1 cup	<ul style="list-style-type: none"> 1 T. lemon juice or vinegar plus enough regular milk to make 1 c. (allow to stand 5 minutes)
Catsup	1 cup	<ul style="list-style-type: none"> 1 c. tomato sauce, 1/4 c. brown sugar, and 2 T. vinegar (for use in cooking)
Chicken	1 1/2 pound, boned	<ul style="list-style-type: none"> 1 c. cooked, diced
Chili sauce	1 cup	<ul style="list-style-type: none"> 1 c. tomato sauce, 1/4 c. brown sugar, 2 T. vinegar, 1/4 t. cinnamon, dash of ground cloves, and dash of allspice
Chives, finely chopped	2 teaspoons	<ul style="list-style-type: none"> 2 t. green onion tops, finely chopped
Chocolate, semisweet	1 2/3 ounces	<ul style="list-style-type: none"> 1 oz. unsweetened chocolate plus 4 t. sugar
Chocolate, unsweetened	1 oz. or 1 square	<ul style="list-style-type: none"> 3 T. cocoa and 1 T. butter, regular margarine or vegetable oil 3 T. carob powder plus 2 T. water
Chocolate chips, semisweet, melted	6 ounce package (2/3 cup)	2 squares (2 oz.) unsweetened chocolate plus 2 T. shortening and 1/2 c. sugar
Cocoa	1/4 cup or 4 tablespoons	<ul style="list-style-type: none"> 1 oz. (square) unsweetened chocolate (decrease fat called for in recipe by 1/2 T.)
Cornmeal, self rising	1 cup	<ul style="list-style-type: none"> 7/8 c. cornmeal, 1 1/2 T. baking powder, and 1/2 t. salt
Corn syrup	1 cup	<ul style="list-style-type: none"> 7/8 c. sugar and 2 T. water 7/8 cup honey (baked goods will brown more)
Cornstarch	1 tablespoon	<ul style="list-style-type: none"> 2 T. all-purpose flour 2 T. granular tapioca 1 T. arrowroot
Cream, half & half (12-16% fat)	1 cup	<ul style="list-style-type: none"> 7/8 c. milk and 3 T. butter or margarine (for use in cooking and baking) 1 c. evaporated milk, undiluted
Cream, light (18-20% fat)	1 cup	<ul style="list-style-type: none"> 7/8 c. milk and T. butter or margarine (for use in cooking and baking) 1 c. evaporated milk, undiluted
Cream, heavy (36% to 40% fat)	1 cup	<ul style="list-style-type: none"> 3/4 c. milk and 1/3 c. butter or margarine (for use in cooking or baking)

Cream, sour	1 cup	<ul style="list-style-type: none"> • 7/8 c. buttermilk or sour milk • 1 c. yogurt • 1 1/8 c. powdered nonfat dry milk, 1/2 c. warm water, and 1 T. vinegar (mixture will thicken in refrigerator in a few hours) • 1 c. evaporated milk plus 1 T. vinegar (allow to stand 5 minutes before using) • 1/3 cup buttermilk, 1 T. lemon juice, and 1 c. smooth cottage cheese blended together • 7/8 c. milk, 1 T. lemon juice, and 2 T. butter or margarine
Cream, Whipping	1 cup, not whipped	<ul style="list-style-type: none"> • If you wish to use a commercial pre-whipped whipped cream or whipped cream substitute rather than whip your own cream, use the guideline that 1 c. whipping cream expands to 2 c. when whipped. For example, if your recipe called for 1 c. of cream to make whipped cream, you could substitute 2 c. of an already whipped product. • 1 c. chilled evaporated milk plus 1/2 t. lemon juice, whipped until stiff
Dill plant, fresh or dried	3 heads	<ul style="list-style-type: none"> • 1 T. dill seed
Eggs, whole, uncooked	1 large 1 cup	<ul style="list-style-type: none"> • 1/4 c. egg substitute (examples include: Egg Beaters, Second Nature, Scramblers) • 3 T. and 1 t. thawed frozen egg • 2 1/2 T. sifted, dry whole egg powder and 2 1/2 T. lukewarm water • 2 yolks and 1 T. water (for cookies) • 2 yolks (in custards, cream fillings, and similar mixtures) • 2 whites as a thickening agent • 5 large eggs or 6 medium eggs
Egg white	1 large (2 tablespoons) 1 cup	<ul style="list-style-type: none"> • 2 T. thawed frozen egg white • 2 t. sifted, dry egg white powder, and 2 T. lukewarm water • 8 large egg whites
Egg yolk	1 yolk (1 1/2 tablespoons)	<ul style="list-style-type: none"> • 3 1/2 t. thawed frozen egg yolk • 2 t. sifted, dry egg yolk and 2 t. water
Flour, all-purpose (for thickening)	1 tablespoon	<ul style="list-style-type: none"> • 1 1/2 t. cornstarch, arrowroot starch, potato starch, or rice starch • 1 T. quick cooking tapioca • 1 T. waxy rice flour • 2 T. browned flour • 1 1/2 T. whole wheat flour • 1/2 T. whole wheat flour and 1/2 T. all-purpose flour
Flour, cake	1 pound 1 cup sifted	<ul style="list-style-type: none"> • 4 3/4 c. • 1 c. minus 2 T. sifted all-purpose flour (7/8 c.)

Flour, self rising	1 cup	<ul style="list-style-type: none"> 1 c. minus 2 t. all-purpose flour, 1 1/2 t. baking powder, and 1/2 t. salt
Flour, all-purpose	1 cup	<ul style="list-style-type: none"> 3/4 cup all purpose flour + 1/4 cup whole wheat flour, in cakes 3/4 cup all purpose flour + 1/4 cup whole wheat flour 1/2 cup all purpose flour + 1/2 cup whole wheat flour <p>Note: Substitutes for white flour in most baked goods will result in reduced volume and a heavier product.</p>
Garlic	1 clove, small	<ul style="list-style-type: none"> 1/8 t. garlic powder
Garlic salt	1 teaspoon	<ul style="list-style-type: none"> 1/8 garlic powder + 7/8 t. salt
Gelatin, flavored	3-ounce	<ul style="list-style-type: none"> 1 T. plain gelatin and 2 c. fruit juice
Ginger	1/8 teaspoon	<ul style="list-style-type: none"> 1 T. candied ginger rinsed in water to remove sugar; then finely cut 1 T. raw ginger
Herbs, fresh	1 tablespoon, chopped	<ul style="list-style-type: none"> 1/2 t. dried, crushed herbs
Honey	1 cup	<ul style="list-style-type: none"> 1 1/4 c. sugar and 1/4 c. water
Lemon	1 medium	<ul style="list-style-type: none"> 1 to 3 T. juice 1 to 2 t. grated peel
Lemon juice	1 teaspoon juice	<ul style="list-style-type: none"> 1/2 t. vinegar
Lime	1 medium	<ul style="list-style-type: none"> 1 1/2 to 2 T. juice
Marshmallows, miniature	1 cup	<ul style="list-style-type: none"> 10 large
Mayonnaise (for use in salads and salad dressings)	1 cup	<ul style="list-style-type: none"> 1/2 c. yogurt and 1/2 c. mayonnaise 1 c. sour cream 1 c. cottage cheese pureed in a blender
Milk, skim	1 cup	<ul style="list-style-type: none"> 4 to 5 T. non-fat dry milk powder and enough water to make 1 c. or follow manufacturer's directions. 1/2 cup evaporated milk and 1/2 cup water
Milk, whole	1 cup	<ul style="list-style-type: none"> 1 c. reconstituted non-fat dry milk (add 2 t. butter or margarine, if desired) 1/2 c. evaporated milk and 1/2 c. water 4 T. whole dry milk and 1 c. water (or follow manufacturer's directions) 1 c. fruit juice or 1 c. potato water (for use in baking)
Mustard, dry	1 teaspoon	<ul style="list-style-type: none"> 1 T. prepared mustard
Onion, fresh	1 small	<ul style="list-style-type: none"> 1/4 c. chopped, fresh onion 1 1/3 t. onion salt 1 t. onion powder 1 T. instant minced onions, rehydrated
Onion powder	1 tablespoon	<ul style="list-style-type: none"> 1 medium onion, chopped 4 T. fresh chopped onion
Orange peel, dried	1 tablespoon 2 teaspoon	<ul style="list-style-type: none"> 2 to 3 T. grated fresh orange peel (grated peel of 1 medium orange) 1 t. orange extract
Parsley fresh	1 T. chopped	<ul style="list-style-type: none"> 1 t. dried leafy parsley

Pimiento	2 T. dried	<ul style="list-style-type: none"> • 1 T. dried red bell pepper, rehydrated • 3 T. fresh red bell pepper, chopped
Pumpkin pie spice	1 teaspoon	<ul style="list-style-type: none"> • 1/2 t. cinnamon, 1/4 t. ginger, 1/8 t. allspice, and 1/8 t. nutmeg
Shortening, melted	1 cup	<ul style="list-style-type: none"> • 1 c. cooking oil (only for recipes that call for melted shortening)
Shortening, solid	1 cup	<ul style="list-style-type: none"> • 1 1/8 c. unsalted butter • 1/4 cup shortening + 3/4 cup applesauce, pureed prunes (add with liquid ingredients) ** • 1/4 cup shortening + 3/4 cup ricotta cheese (in yeast breads) ** <p>**Reducing fat will give baked goods a denser texture; to correct for this, try increasing the sugar in the recipe and/or beating the egg whites and folding them into the batter. Also try using a softer flour, like pastry or cake flour.</p>
Sour cream	1 cup	<ul style="list-style-type: none"> • 3/4 c. sour milk or buttermilk and 1/3 c. butter or margarine blend until smooth • 1/3 c. buttermilk, 1 T. lemon juice and 1 c. cottage cheese • 1 c. plain yogurt • 3/4 c. milk, 3/4 t. lemon juice and 1/3 c. butter or margarine
Sugar, brown	1 cup, firmly packed	<ul style="list-style-type: none"> • 1 c. granulated sugar • 1 c. granulated sugar plus 4 T. molasses, and decrease liquid in the recipe by 3 T.
Sugar, granulated	1 cup	<ul style="list-style-type: none"> • 1 1/2 c. corn syrup (decrease liquid by 1/4 c.) • 1 1/3 c. molasses (decrease liquid by 1/3 c.) • 1 c. powdered sugar • 1 c. brown sugar, firmly packed • 3/4 c. honey (decrease liquid by 1/4 c. in baked goods add 1/2 t. soda)
Tapioca, granular	1 teaspoon	<ul style="list-style-type: none"> • 2 T. pearl tapioca
Tomato juice	1 cup	<ul style="list-style-type: none"> • 1/2 c. tomato sauce plus 1/2 c. water
Tomato sauce	2 cups	<ul style="list-style-type: none"> • 3/4 c. tomato paste plus 1 cup water
Tomato soup	10 3/4 ounce can	<ul style="list-style-type: none"> • 1 c. tomato sauce plus 1/4 c. water
Wine, red		<ul style="list-style-type: none"> • Same amount of grape juice or cranberry juice
Wine, white		<ul style="list-style-type: none"> • Same amount of apple juice or white grape juice
Worcestershire sauce	1 teaspoon	<ul style="list-style-type: none"> • 1 t. bottled steak sauce
Yeast, active dry (1/4 oz.)	1 package	<ul style="list-style-type: none"> • 2 1/2 t. dry yeast • 1 compressed yeast cake.
Yogurt, plain	1 cup	<ul style="list-style-type: none"> • 1 c. buttermilk • 1 c. cottage cheese blended until smooth • 1 c. sour cream

Ingredient Equivalents

Ingredient	Amount	Equivalent
Almonds, blanched	1 pound	3 c.
Apples	1 pound	3-4 medium
Apricots, dried	1 pound	3 c.
Apricots, fresh	1 pound	5-8 apricots
Asparagus	1 pound	16-20 spears
Bacon, raw	1 pound	15-25 slices
Bananas	1 pound	3 medium
Barley, pearl	1 pound	2 c.
Beans, kidney	1 pound	2 2/3 c., 6-7 c. cooked
Beans, lima	1 pound	2 1/2 c., 6 c. cooked
Beans, navy	1 pound	2 1/3 c., 5 1/2 - 6 c. cooked
Beans, green, snap	1 pound	3 1/2 c. cooked
Beets	1 pound	3-4 beets, 2 c. sliced and cooked
Blackberries, fresh	1 pound	2-2 1/2 c.
Blueberries	1 pound	2 c.
Bread	1 slice dry	1/3 c. dry breadcrumbs
Bread	1 slice soft	3/4 c. soft breadcrumbs
Broccoli	1 pound	2 c.
Brussels sprouts	1 pound	4 c.
Cabbage	1 pound, shredded	4 c. lightly packed
Cabbage	1 pound, cooked	2 c.
Carrots	1 pound	4-5, 3 c. cooked
Carrots, shredded	1 pound	2 1/2 c.
Cauliflower	1 pound	1 1/2 c.
Celery	1 pound	1-2 bunches, 4 c. diced
Cheese	1 pound	4-5 c. grated
Cherries	1 pound	2 1/4 c.
Chicken, cooked and cubed	1 pound	3 c. cooked, diced
Cocoa	1 pound	4 c.
Coconut	1 pound	6-7 c. prepared and shredded
Coffee, ground coarse	1 pound	5 -5 1/2 c.
Cornmeal, coarse	1 pound	3 c.
Cornstarch	1 pound	3 1/2 c.
Crackers, graham	1 pound	58-66 crackers
Cracker crumbs, medium fine	1 pound	5-6 c.
Cranberries, raw	1 pound	4 c.
Cream, heavy (36%-40% fat)	1 cup	2-2 1/2 c. whipped
Dates	1 pound	2 1/2 c. pitted
Eggplant, diced, cooked	1 pound	2 1/2 c.
Flour, all-purpose	1 pound	4 c.
Flour, whole wheat	1 pound	3 3/4 c.
Grapes	1 pound	2 c. seeded, 2 1/2 c. seedless

Ingredient	Amount	Equivalent
Greens, cooked	1 pound	4 to 6 c.
Lettuce, head	1 pound	6 1/4 c.
Lettuce, leaf	1 pound	6 1/4 c.
Lettuce, Romaine	1 pound	6 c.
Lettuce, Endive	1 pound	4 1/4 c.
Macaroni	1 pound	4 c. uncooked, 9 c. cooked
Margarine	1 pound	2 c.
Mushrooms, fresh	1 pound	2-3 c. whole, 3 oz. dried 5 c. sliced, 1 10 oz. can
Noodles	1 pound	6 c., 9 c. cooked
Nutmeats	1 pound	3 1/2 c.
Oats, rolled, quick	1 pound	6 c., 16 c. cooked
Oil, vegetable	1 pound	2-2 1/8 c.
Okra	1 pound	2 1/4 c. cooked
Onions	1 pound	4-5 medium onions, 2-2 1/2 c. chopped
Orange	1 medium	1/3 c. juice, 2-3 T. grated peel
Parsnips	1 pound	4 medium, 2 c. cooked
Peaches	1 pound	4 medium, 2 c. sliced
Peanut butter	1 pound	1 3/4 c.
Peppers, green	1 pound	7-9, 3 c. chopped
Pears	1 pound	4 medium, 2 1/2 c. diced
Peas, green, in pod	1 pound	1 c. shelled, 1 c. cooked
Pineapple, fresh	2 pounds	1 pineapple, 2-3 c.
Plums	1 pound	8-20 whole, 2 c. halves
Potatoes, white	1 pound	3 medium, 4 c. cooked
Prunes, dried	1 pound	2 1/2 c. pitted
Pumpkin	1 pound	2 1/2 c. cooked
Raisins	1 pound	3 c.
Raspberries	1 pound	3 3/8 c.
Rhubarb, fresh	1 pound	4-8 pieces, 2 1/2 c. cooked
Rice	1 pound	2 c. uncooked, 6 c. cooked
Rutabaga	1 pound	3 1/3 c. cubed, 2 c. cooked
Shortening	1 pound	2 1/4 c.
Spaghetti	1 pound	9 c. cooked
Spinach	1 pound	4 c. fresh, 1 1/2 c. cooked
Squash, summer	1 pound	2 c. cooked
Squash, winter	1 pound	1 c. cooked and mashed
Strawberries	1 pound	2 2/3 c. sliced strawberries.
Sugar, brown	1 pound	2 1/4 c. firmly packed
Sugar, granulated	1 pound	2 1/4 c.
Sugar, powdered	1 pound	2 3/4 c.
Sweet potato	1 pound	3 medium
Tomatoes, fresh	1 pound	3-4 small, 2 1/2 c. diced fresh
Turnips	1 pound	3 medium, 2 c. cooked

Equivalent Measures

This Much	Equals This Much
1 gallon	4 quarts
1 quart	2 pints
1 pint	2 cups
1 bushel	4 pecks
1 peck	8 quarts
1 cup	16 tablespoons
7/8 cup	14 tablespoons OR 1 cup minus 2 tablespoons
3/4 cup	12 tablespoons
2/3 cup	10 tablespoons plus 2 teaspoons
5/8 cup	10 tablespoons
1/2 cup	8 tablespoons
3/8 cup	6 tablespoons
1/3 cup	5 tablespoons plus 1 teaspoon
1/4 cup	4 tablespoons
1/8 cup	2 tablespoons
1/16 cup	1 tablespoon
1 tablespoon	3 teaspoons
3/4 teaspoon	2 1/3 teaspoons
2/3 tablespoon	2 teaspoons
1/2 tablespoon	1 1/2 teaspoons
1/3 tablespoon	1 teaspoon
1/4 tablespoon	3/4 teaspoon
Pinch or Dash	1/16 teaspoon

References

Fats. Retrieved on December 15, 2010, from The Cooks Thesaurus website
<http://sonic.net/~alden/Fatsoils.html>.

Fowler, S. F., West, B. B., Shugart, G. S. (1971). *Food for 50*. John Wiley & Sons, Inc., New York, New York.

Henneman, A. (2008). *Ingredient Substitutions*. Retrieved on March 26, 2010, from University of Nebraska - Lincoln Extension website,
<http://lancaster.unl.edu/food/ciqsubs.shtml>.

Hunter, J. G., & Carson, K. L. (2005). *Using & Storing Strawberries* (HGIC 4255). Retrieved on October 13, 2010, from Clemson University Cooperative Extension website, http://www.clemson.edu/extension/hgic/food/nutrition/food_shop_prep/food_prep/hgic4255.html

Kendall, P. (2008). *Ingredient Substitutions* (no.9.329). Retrieved on March 26, 2010, from Colorado State University Extension website, <http://www.ext.colostate.edu/pubs/foodnut/09329.html>.

Handbook of Food Preparation, Ninth Edition. (1993). American Home Economics Association. Dubuque, IA: Kendall/Hunt Publishing Company.

Nutrition Calendar. (2007). Iowa State University Extension.

Preparation. Retrieved on October 10, 2010 from USA Rice Federation, http://www.usarice.com/index.php?option=com_content&view=article&id=68&Itemid=71.

Struempfer, B. *Ingredient Substitution and Equivalent Chart.* (2006). Retrieved on March 26, 2010 from Alabama Cooperative Extension System website, <http://www.aces.edu/pubs/docs/H/HE-0585//>.

Using sugar, brown, sugar, honey, maple syrup interchangeably. Retrieved on February 1, 2011, from the OChef website, <http://ochef.com/91.htm>.

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