

# Consumer and Family Sciences



Department of Foods and Nutrition

## Substitutions and Equivalents in Food Ingredients

In a recipe, each ingredient has a specific function or functions. Ingredients may be substituted, but substitution may result in changes in the flavor, texture, and/or other characteristics of the finished product. Equivalents are ingredients which are very similar or identical. No changes in product characteristics are expected when equivalents are interchanged.

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If you run out of certain ingredients or want to change a recipe slightly, you may find the following guide helpful in choosing an appropriate substitution or equivalent.

NOTE: The following abbreviations are taken from *Handbook of Food Preparation* published by The American Home Economics Association, 7th edition, 1975, a more complete reference.

\*For more information on this subject, contact Bill Evers, Extension Specialist, Department of Foods and Nutrition, Purdue University.

- c = cup
- tsp = teaspoon
- Tbsp = tablespoon
- lb = pound
- oz = ounce
- pt = pint
- qt = quart
- D = drops

### Substitutions

To replace	Use
<b>BOUILLON CUBE:</b>	
1 bouillon cube	1 Tbsp brewer's yeast and 1 Tbsp soy sauce
<b>BREAD CRUMBS:</b>	
Bread crumbs, dry (1/4 c)	1/4 c cracker crumbs or cornmeal OR 1 c soft bread crumbs

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**To replace**

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**Use**

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**CHOCOLATE:**

1 square (1 oz) unsweetened chocolate

3 Tbsp cocoa plus 1 Tbsp shortening

1 square (1/2 oz) baking chocolate

3 Tbsp carob powder plus 2 Tbsp water

Unsweetened cocoa

Equal amount of carob powder

1 can chocolate syrup

Add 3/4 c sugar, 1/4 c cocoa and dash of salt to 1/2 c water. Cook 5-7 minutes. Remove from heat, add 1 tsp vanilla

**DAIRY PRODUCTS:****• Cottage cheese**

Cottage cheese or milk

Equal volume of tofu

**• Cream**

1 c light cream (18 to 20% butterfat)

7/8 c milk plus 3 Tbsp butter (for cooking)

1 c heavy cream (36 to 40% butterfat)

3/4 c milk plus 1/3 c butter (for cooking, not for whipping)

1/2 c whipped cream or whipped topping

1/2 c instant skim milk powder whipped with 1/2 c ice water and 1 Tbsp orange juice

**• Milk**

1 c whole milk

1/2 c evaporated milk plus 1/2 c water  
OR1 c reconstituted instant skim milk powder plus 2 tsp fat  
OR1 c skim milk plus 2 tsp fat  
OR1 c goat's milk  
OR5 to 6 Tbsp instant skim milk powder plus 1 c water plus 2 tsp fat  
OR1/2 c sweetened condensed milk plus 1/2 c water (reduce sugar in recipe by 6 Tbsp)  
OR5-6 Tbsp instant whole milk powder plus 1 c water  
OR

1 c sour milk or buttermilk plus 1/2 tsp soda (decrease baking powder by 2 tsp)

To replace	Use
1 c skim milk	1/3 c instant skim milk powder plus 7/8 c water, follow directions on the package
1 c buttermilk or sour milk	1 Tbsp vinegar or lemon juice plus sweet milk to make 1 c, let stand 5 minutes before using OR 1 c yogurt (plain)
Sweetened condensed milk	1 c plus 2 Tbsp instant dry milk, 1/2 c warm water and 3/4 c sugar (Add dry milk to warm water; mix well; add sugar; may set bowl in pan of hot water to dissolve sugar.)

**• Non-dairy creamer**

Coffee lightener and non-dairy creamers      1 Tbsp instant dry skim milk powder dissolved in 1 Tbsp water

**• Sour Cream**

1 c commercial sour cream      1 Tbsp lemon juice plus evaporated milk to equal 1 c (Allow to stand until it clabbers.)  
OR  
3 Tbsp butter plus 7/8 c sour milk

**• Yogurt**

1 c plain yogurt      1 c buttermilk or sour milk

**EGGS:**

1 whole egg      2 egg yolks  
OR  
3 Tbsp plus 1 tsp thawed frozen egg

**FATS: \***

1 c butter      7/8 c lard or other rendered fat plus 1/2 tsp salt  
OR  
1 c hydrogenated fat plus 1/2 tsp salt  
OR  
1 c margarine

1 c butter, margarine or vegetable shortening in baking      7/8 c nut or vegetable oil, preferably peanut, corn or sesame

1 Tbsp solid fat in cooking      1 Tbsp oil

1 c butter or margarine for spreading      1/2 c butter softened and whipped with 1/2 c oil

1/3 c butter      1 c chopped nut meats (in cookie recipes)

\*Do not use oil in place of solid fat to grease cake pans.

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**To replace****Use**

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**FLOUR:****• Baking**

1 c all purpose flour

1 c minus 2 Tbsp stirred whole wheat flour (reduce oil by 1 Tbsp per c of flour and increase liquid by 1 to 2 Tbsp per c of flour)

OR

1 1/2 c bread crumbs

OR

7/8 c corn meal

OR

1 1/4 c rye flour

1 c cake flour

1 c minus 2 Tbsp sifted all-purpose flour

OR

1 c minus 1 Tbsp all-purpose flour plus 1 Tbsp cornstarch sifted together

1 c self-rising flour

1 c all-purpose flour plus 1 1/2 tsp baking powder and 1/2 tsp salt

2 Tbsp flour from each cup (when baking or breading)

2 Tbsp wheat germ

OR

2 Tbsp soy flour

OR

2 Tbsp ground nuts or sunflower seeds

**• Thickening**

1 Tbsp flour

1/2 Tbsp cornstarch, arrowroot, or potato starch

OR

2 tsp granular tapioca

OR

1 whole egg

OR

2 egg whites

OR

2 egg yolks

OR

2 Tbsp granular cereal

OR

1/4 c dry bread crumbs

OR

1/2 Tbsp potato flour

OR

1/2 Tbsp rice flour

## Whole Wheat

Whole or cracked wheat can be a nutritious and tasty addition to meals. The whole wheat kernel may be cooked and used as a cereal or in casseroles and other baked dishes. One cup of cooked wheat kernels may be substituted in a recipe for 1 cup cooked rice or 4 ounces of uncooked noodles, spaghetti or macaroni. Also, wheat kernels can be ground in a blender for use in baking. Process about 1 cup at a time at a medium-high setting until the texture resembles coarse corn meal.

Cracked wheat also can be used in soup in place of rice or barley. For yeast bread, substitute 1/4 of the flour with cracked wheat. Still another idea is to make cooked, cracked wheat cereal. For this, you need 1 cup of cracked wheat, 1 teaspoon salt and 4 cups of water. Heat water and salt to boiling. Add cereal slowly to boiling, salted water, stirring constantly. Cook for 10 minutes over direct heat, then in double boiler for 25 minutes. For a final touch, add dates or raisins.

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To replace	Use
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### GARLIC:

1 clove fresh garlic	1 tsp garlic salt or garlic powder
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### HERBS:

1 Tbsp fresh herbs	1 tsp crumbled dry herbs
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### LEAVENING:

#### • Baking powder

1 tsp baking powder	1/3 tsp baking soda plus 1/2 tsp cream of tartar
	OR
	1/4 tsp baking soda plus 1/2 c fully soured milk, buttermilk, or yogurt (decrease liquid in recipe by 1/2 c)
	OR
	1/4 tsp baking soda plus 1/2 Tbsp vinegar or lemon juice in 1/2 c sweet milk
OR	
	1/4 tsp baking soda plus 1/4 to 1/2 c molasses

1 tsp sulfate-phosphate baking powder (double-acting)	1/4 tsp baking soda plus 1/2 tsp tartrate baking powder
	OR
	1 1/2 tsp phosphate baking powder

#### • Eggs

1 whole egg has leavening power of 1/2 tsp baking powder
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NOTE: Cream of tartar is an acid which may be added to baked products in order to react with an alkaline substance (baking soda) to produce carbon dioxide. Other acid ingredients which may be used include sour milk, molasses and fruit juices.

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**To replace**

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**Use**

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**• Yeast**

1 Tbsp active dry yeast

1 package active dry yeast  
OR  
1 compressed yeast cake**MAYONNAISE:**

Mayonnaise in salads and salad dressings

Equal amounts yogurt and mayonnaise

**MUSHROOMS:**

1 lb fresh mushrooms

6 oz canned mushrooms

**MUSTARD:**

1 tsp dry mustard

1 Tbsp prepared mustard

**PARSLEY:**

1/4 c chopped fresh parsley

1 Tbsp dehydrated parsley

**SALT:**

1 tsp salt

1 tsp powdered kelp or gomasio (sesame salt)

**SUGAR:****• Baking**

1 c granulated sugar

3/4 c honey (reduce liquid by 1/4 c for each 3/4 c honey. If there is no liquid in recipe add 1/4 c flour per 3/4 c honey)  
OR  
1 1/3 c molasses or sorghum plus 2/3 tsp baking soda; omit baking powder, reduce liquid by 1/4 c**• Cooking**

1 Tbsp granulated sugar

1/2 to 3/4 Tbsp honey, molasses or pure maple sugar

To replace	Use
<b>• Sweetness</b>	
1 c granulated white sugar	1 3/4 c powdered sugar (not for baking) OR 2 c corn syrup OR 1 c honey OR 1 to 1 1/3 c maple sugar OR 1 c maple syrup OR 1 1/2 c sorghum syrup OR 1 1/2 c cane syrup OR 1 c brown sugar, firmly packed

Effect on flavor: Of the sweetenings, light corn syrup has the mildest flavor. Honey and some of the other sweetenings may vary from mild to quite strong flavors.

Effect on color: Light corn syrup affects the color of the finished product slightly. Other sweetenings give a golden brown or grayish-brown color according to the one used.

Effect on texture in baking products: Breads and muffins require so little sweetening that any sweetener available may be substituted for sugar without other changes. In cakes the substitution of more than one-half of the sugar for one of the syrups or liquid sweetenings produces a change in the texture, giving a product that is more compact. In cookies all or part of the sugar may be substituted.

Corn syrup cannot be substituted for sugar in most recipes without making other changes in the recipe.

To replace	Use
<b>TOMATOES:</b>	
1 c canned tomatoes	1 1/3 c cut up fresh tomatoes, simmered 10 minutes
1 can (1 lb 3 oz) tomatoes	2 c chopped fresh tomatoes
1 c tomato juice	1/2 c tomato sauce plus 1/2 c water
1 c catsup	1 c tomato sauce plus 1/2 c sugar and 2 Tbsp vinegar (for use in cooking)

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**To replace**

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**Use**

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**WHITE RICE:**

White rice

An equal amount of brown rice. Increase cooking time by 20 minutes when cooked alone; 30 minutes when combined with other foods

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**Equivalents**

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**Amount**

**Equivalent**

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**BACON:**

8 slices

1/2 c crumbled

**BEANS:**

Dry beans

1 cup

3 c cooked

Dried or cooked

1 can (1 lb)

3/4 c dried or 2 c cooked beans

**BREAD:**

Bread

1 lb loaf

14 to 20 slices

Bread crumbs

1 slice bread dry or soft

1/3 c crumbs, 3/4 c cubes

**CHOCOLATE:**

Chocolate morsels

6 oz pkg

1 c

Cocoa

1 lb

4 c

Chocolate, unsweetened

1/2 lb

8 1-oz squares

**COFFEE-TEA:**

Coffee, ground

1 lb

80 Tbsp

1 lb

40 to 50 servings

Tea

1 lb

6 to 8 c leaves; 300 servings

**CORN MEAL:**

1 lb

3 c



	Amount	Equivalent
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**CRACKERS:**

Graham	10 crackers	1 c fine crumbs
	16 to 18 crackers	1 1/3 c crumbs
	50 to 80 crackers	1 lb
Saltines, 2" x 2"	108 crackers	1 lb
	OR	
	6 1/2 c fine crumbs	

**DAIRY PRODUCTS:**

**• Cheese**

American	1 lb	4 to 5 c shredded
Cottage	1 lb	2 c
Cream	3 oz pkg	6 Tbsp or 1/3 c
Cheddar	1/4 lb	1 c shredded

**• Cream**

Heavy (36 to 40% butterfat)	1 c	2 c whipped approx. butterfat)
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**• Milk**

Sweetened condensed	14 oz	1 1/4 c
Evaporated	14 1/2 oz can	1 2/3 c
	6 oz	2/3 c
	1 c	3 c whipped
Dry (whole)	1 lb	3 1/2 c instant dry whole milk 3 1/2 to 4 1/2 qt liquid
Dry (skim)	1 lb powder	4 c dry 4 to 5 qt liquid

**EGGS:**

Whole, unbeaten	5 large	about 1 c
	1 medium	3 Tbsp
White, unbeaten	8 large	about 1 c
	1 medium	2 Tbsp
Yolk, unbeaten	12 large	1 c
	1 medium	1 Tbsp
Large	1 dozen	24 oz
Medium	1 dozen	21 oz
Small	1 dozen	18 oz

	Amount	Equivalent
Whole, dried, sifted eggs	1 lb	5 c powdered
	1 dozen	2 c sifted powdered plus equal amount of lukewarm water

### FATS:

Butter or margarine	1 lb (4 sticks)	2 c
	1/4 lb (1 stick)	1/2 c or 8 Tbsp
	Size of an egg	About 1/4 c
Fat	2 Tbsp	1 oz
	1 c	1/2 lb
Hydrogenated fats, solid	1 lb	2 1/2 c
Suet, chopped medium fine	1/2 lb	3 3/4 c
Lard, solid	1 lb	2 c
Liquid fats, oils	1 lb	2 c

### FLOUR:

All-purpose	1 c sifted	1 c unsifted all-purpose flour minus 2 Tbsp
Cake, sifted	1 lb	4 3/4 c
Rye	1 lb	4 1/2 to 5 c
Self-rising, sifted	1 lb	4 c
Wheat flour, sifted:	hard wheat	3 1/2 to 4 1/2 c
	soft wheat	4 to 4 3/4 c
	average	4 c
Whole wheat	1 lb	2 1/4 c unsifted
		3 3/4 c stirred

### FRUIT:

Apples	1 lb (3 medium)	3 c sliced
Bananas	1 lb (3 medium)	2 1/2 c sliced or 2 c mashed
Berries	1 pt	1 3/4 c

	Amount	Equivalent
Candied fruit or peels	1/2 lb	1 1/4 c cut-up
Coconut, flaked or shredded	1 lb	5 c
<b>Dates:</b>		
whole	1 lb	2 1/4 c or 2 to 3 c chopped
pitted	1 lb	2 c
	7 1/4 oz	1 1/4 c chopped
cut-up	1 lb	1 3/4 c
finely cut	1 lb	1 1/2 c
<b>Figs:</b>		
whole	1 lb	2 3/4 c
cut-up	1 lb	2 2/3 c
finely cut	1 lb	2 1/2 c
<b>Lemon, medium-sized:</b>		
juice	1	2 to 3 Tbsp
rind, lightly grated	1	1 1/2 to 3 tsp
<b>Orange:</b>		
juice	1 medium	1/3 to 1/2 c juice
rind, grated	1 medium	4 tsp
	1 c juice	3 to 4 medium oranges
	1 c bite-size pieces	2 medium oranges
	10 orange sections	1 orange
<b>Prunes:</b>		
whole	1 lb	2 1/3 c
pitted	1 lb	4 c (cooked)
cut-up	1 lb	3 c (cooked)
finely cut	1 lb	2 7/8 c (cooked)
<b>Raisins:</b>		
whole	15 oz pkg	3 c
cut-up	15 oz pkg	2 3/4 c
finely cut	15 oz pkg	2 1/2 c
seedless	1 lb	3 c

#### MARSHMALLOWS:

Standard size	1/4 lb	16 large
	1 lb	4 c
Miniature	1/3 lb	4 1/2 c
	10	1 large
Marshmallow cream	1 c	16 large

	Amount	Equivalent
<b>NUTS:</b>		
Almonds:		
in shell	1 lb	1/4 lb or 1 to 1 3/4 c nut meats
shelled	1 lb	3 c blanched whole
English Walnuts:		
in shell	1 lb	1/2 lb or 1 2/3 c nut meats
shelled	1 lb	4 1/2 c halves or 3 2/3 c chopped
cut-up	1 lb	2 2/3 c
Filberts:		
in shell	1 lb	1/3 lb nut meats
shelled	1 lb	3 1/4 c nut meats
Peanuts:		
in shell	1 lb	2/3 lb or 2 to 2 1/4 c nut meats
shelled	1 lb	3 1/4 c nut meats
Pecans:		
in shell	1 lb	1/2 lb or 2 1/4 c nut meats
shelled	1 lb	4 to 4 1/2 c halves or 3 3/4 c chopped
<b>OATS:</b>		
rolled:	1 c	1 3/4 c cooked
<b>ONION:</b>		
	1 small	1/4 c chopped
	1 medium	1/2 c chopped
	1 large	1 c chopped
<b>PASTA:</b>		
Macaroni	4 oz (1 c)	2 1/4 c, cooked
Macaroni, uncooked 1-inch pieces	1 lb	4 c uncooked or 9 c cooked
Noodles, uncooked 1-inch pieces	1 lb 1 c	6 c uncooked or 9 c cooked (approx.) 1 3/4 c cooked
Spaghetti, uncooked 2-inch pieces	1 lb	4 3/4 c uncooked or 10 c cooked (approx.)
Spaghetti	7 oz	about 4 c cooked

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	Amount	Equivalent
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**POPCORN:**

	1/4 c kernels	2 qt popcorn
	1/3 c kernels	3 qt popcorn

**POTATOES:**

White	1 lb	3 medium 1 1/2 to 2 1/3 c sliced 2 c mashed
Sweet	1 lb	3 medium 2 1/2 to 3 c sliced

**RICE:**

	1 c	3 to 4 c cooked (approx.)
	1 lb	2 1/8 c uncooked or 7 to 8 c cooked
Rice, pre-packaged, pre-cooked	1 c	2 c cooked

**SUGAR:**

Brown sugar	1 lb	2 1/4 c firmly packed or 3 c lightly packed
Confectioners sugar	1 lb	3 1/2 c, sifted
Corn syrup	1 lb	1 1/3 c
Granulated sugar	1 lb 5 lb	2 1/4 c 11 1/4 c
Honey	1 lb	1 1/2 c
Maple syrup, light or dark	12 oz	2 c
Molasses	1 lb	1 1/3 c

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## Sugar Substitutes – Equivalence to Sugar

The sweetness equivalence of a sugar substitute varies depending on the chemical and the form in which the sweetener is packed. Check the product label to determine the equivalent number of teaspoons, cups or drops of a particular substitute.

NOTE:

- Not all sugar substitutes are 0 calorie and some contain carbohydrate. If you are diabetic, read the label carefully.
- Not all sugar substitutes can be used in baking, so read the label carefully.

The current major sugar substitutes are:

Equal/NutraSweet - aspartame

Sweet 'n Low - saccharin

Splenda - sucralose

Sunett - acesulfame potassium

	Amount	Equivalent
<b>TAPIOCA:</b>		
granular	1 Tbsp quick-cooking	2 Tbsp pearl tapioca, soaked
<b>TOMATOES:</b>		
	1 lb	3 medium

## Equivalent Measure

Use standard cups (both dry and liquid measure) and measuring spoons when measuring ingredients. All measurements given below are level.

Measure	Equivalent
1 teaspoon (dry)	1/6 ounce (dry)
3 teaspoons	1 tablespoon
1 tablespoon (dry)	1/2 ounce (dry)
2 tablespoons (liquid)	1 ounce
4 tablespoons	1/4 cup
5 1/3 tablespoons	1/3 cup
8 tablespoons	1/2 cup
16 tablespoons	1 cup
1 cup	8 fluid ounces
2 cups	1 pint (16 fluid ounces)

Measure	Equivalent
4 cups	1 quart
4 quarts	1 gallon
few grains (or dash) OR pinch	less than 1/8 teaspoon OR as much as can be taken between tip of finger and thumb
1 peck (pk)	8 quarts (2 gallons)
1 bushel (bu)	4 pecks
1 pound	16 ounces (oz)
1 pound	453.6 grams
1 ounce	28.35 grams (gm)
3 1/2 ounce	100 grams

#### SALT (Measure)

- 1 tsp to 1 quart sauce
- 1 tsp to 4 cups flour for dough
- 1 tsp to 2 cups water for cereal
- 1 tsp to 1 lb meat
- 1/2 tsp to 1 quart water for vegetables

#### FILLINGS FOR PIES

- 2 1/2 cups for an 8-inch pie
- 3 1/4 cups for a 9-inch pie
- 4 cups for a 10-inch pie
- Fat for flour for pie crust: 1/3 cup fat to 1 cup flour
- 1 tablespoon unflavored gelatin thickens 2 cups of liquid

CAN SIZES	CONTENTS	APPROX. CUPS
5 oz	5 oz	5/8
8 oz	8 oz	1
Picnic	10 1/2-12 oz	1 1/4
12 oz vacuum	14-16 oz	1 1/2
No. 300	14-16 oz	1 3/4
No. 303	16-17 oz	2
No. 2	1 lb 4 oz or 1 pt 2 fl oz	2 1/2
No. 2 1/2	1 lb 13 oz	3 1/2
No. 3	46 oz	5 3/4
Baby foods	3 1/2-8 oz	

## SAUCES

Type	Flour	Liquid	Fat	Salt	Sugar
• White					
Very thin (pureed potato soup, navy and lima bean soup, etc.)	1 1/2 tsp	1 c	1 Tbsp	1/2 tsp	
Thin (soups)	1 Tbsp	1 c	1 Tbsp	1/4 tsp	
Medium (creamed dishes, gravies)	2 Tbsp	1 c	2 Tbsp	1/4 tsp	
Thick (souffles)	3 Tbsp	1 c	3 Tbsp	1/4 tsp	
Very Thick (croquettes)	4 Tbsp	1 c	3 to 4 Tbsp	1/4 tsp	
• Fruit					
Fruit sauce (fruit, if desired)	3/4 to 1 Tbsp cornstarch	1 c fruit juice			2 to 4 Tbsp

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