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HIGH ALTITUDE Cakes



Circular 224

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HIGH ALTITUDE

Cakes

By Lucinda E. Hughes

Home Demonstration Agent

Success in baking has often been considered a measure of one's ability as a cook. A newcomer to Northern Arizona may discover to her dismay that her favorite recipe does not produce the fine cake to which she has been accustomed.

She may find that her cake rose too high and flowed over the top of the pan, or rose and then fell. Perhaps she noted a more porous and crumbly product than she had baked before.

Since failures often can be ex-

plained by differences in altitude, the purpose of this circular is to present selected and tested recipes for high altitudes.

Recipe Corrections

As the altitude increases, the air pressure becomes less, and changes in recipes must be made to compensate for the difference. In general, the following corrections made in your favorite recipes will produce a desirable cake.

Guide to Cake Recipe Adjustments for High Altitudes

1. With Conventional-Method Recipes

	2500 to 4000 ft.	4000 to 6000 ft.	Over 6000 ft.
Reduce baking powder For each teaspoon, use	$\frac{7}{8}$ teaspoon	$\frac{3}{4}$ teaspoon	$\frac{1}{2}$ teaspoon
Reduce sugar For each cup, use	(no change)	$\frac{7}{8}$ cup	$\frac{3}{4}$ cup
Increase liquid For each cup add	(no change)	1 to 2* tablespoons	2 to 4 tablespoons
Increase baking temperature to	(no change)	375° F.	375° F.

*Try the smaller amount; then if cake seems dry, add the larger amount the next time you make the cake.

2. With New "Speedy" Method Recipes

	3000 to 4000 ft.	4000 to 5500 ft.	Over 5500 ft.
Reduce baking powder For each teaspoon, use	$\frac{3}{4}$ teaspoon	$\frac{3}{4}$ teaspoon	$\frac{3}{4}$ teaspoon
Reduce sugar For each cup, use	(no change)	$\frac{3}{4}$ cup	$\frac{2}{3}$ cup
For each cup and one-half, use	(no change)	1 $\frac{1}{4}$ cups	1 cup plus 3 tablespoons
Increase baking temperature to	(no change)	375° F.	375° F.

Ingredients

Use cake flour in all the cakes unless otherwise stated. Cake flour is manufactured particularly to produce light and tender cakes.

All-purpose flour will not yield as fine or light a product. If it must be used, 2 tablespoons of flour should be removed from each cup and 2 tablespoons of cornstarch added.

Double-acting baking powder has been used in developing these recipes, but other types may be used. One and one-half times as much single-action baking powder as a given amount of double-action baking powder should be used to produce the same amount of leavening action.

Eggs should be relatively fresh, and stored in the refrigerator or other cool place until almost ready

to use. They should be allowed to warm to room temperature before beating. Eggs handled in this manner produce a better sponge-type cake than is obtained from eggs which have been stored at warm room temperatures.

The emulsified types of shortening are to be preferred for quick-mix cakes or "speedy-method" cakes. Other shortening such as butter and margarine may be used in cakemaking, but the volume is apt to be less. Best results will be obtained by using $\frac{1}{2}$ emulsified shortening and $\frac{1}{2}$ butter or margarine. Never use liquid shortening unless the recipe so specifies.

Mixing Directions

At increased altitudes, recipes have been found to be more sensitive to slight changes. Therefore, it is important to follow carefully the directions given for each recipe. Be sure that measurements are exact. Note especially the adding or subtracting of amounts by tablespoons from cups of flour, sugar, or liquid. Always use measuring spoons or cups when definite amounts of ingredients are specified.

When measuring flour and baking powder, do not pack, but spoon lightly and level off. Always sift flour before measuring. Brown sugar and fat should be packed in cup or spoon to give accurate measurements. All ingredients should be at room temperature for best results.

Cakes are easier to remove from pans if waxed paper, cut to fit the bottom of pans, is used. The pan should be greased, then fitted with waxed paper and the paper greased. Do not grease the sides of the pan.

After the batter has been poured

into the pan it is well to cut through it several times with a knife to release the large pockets of air which may be trapped in it. Otherwise, the air pockets may cause large holes to appear in the cake.

When the cake is removed from the pan, lift off the waxed paper immediately.

A pan of definite size has been suggested for each recipe, although other sizes of pans may be used if the total area of each is the same.

Mixing Methods

Be sure to follow the directions for mixing. Ingredients vary with the different methods of mixing.

Baking Times and Temperatures

Baking times for recipes may vary, depending upon the accuracy of the oven. Remove the cake when it appears to be done whether or not the exact time specified in the recipe has expired.

To test for doneness, press the surface of the cake lightly. If it springs back, the cake may be removed from the oven. Another indication that a cake is done is that it pulls away from the sides of the pan.

Remove the cake from the pan after it has cooled several minutes and immediately pull off the waxed paper. Let it cool on a rack before frosting or storing it.

Recipes

The following recipes have been tested under high-altitude conditions in Arizona.

ANGEL FOOD CAKE

(Conventional)

5,000 to 7,000 feet

Sift together three times

1 cup sifted cake flour

$\frac{1}{2}$ cup sugar

Beat until foamy

$1\frac{1}{2}$ cups egg whites (10 to 12 large eggs)

Add to foamy egg whites

$1\frac{1}{2}$ teaspoons cream of tartar

$\frac{1}{2}$ teaspoon salt

Continue beating until egg whites are glossy and fine grained and form peaks which just barely fall over.

Fold in a little at a time

1 cup sifted sugar

Fold in by fourths, using 15 strokes per addition, the flour, and sugar mixture. Use 10 additional strokes after all additions.

Last fold in

$\frac{1}{2}$ teaspoon vanilla

$\frac{1}{2}$ teaspoon almond extract

Pour into ungreased 10-inch tube pan. Cut through batter with a knife to release air bubbles. Bake at 350°F. for 45 to 50 minutes. Allow to cool in the pan inverted.

Alterations to recipe for elevations other than those given:

3,500 to 5,000 feet

Add 2 tablespoons sugar

Over 7,000 feet

Decrease sugar 2 tablespoons

QUICK ANGEL FOOD CAKE

5,000 to 7,000 feet

Note: This recipe will apparently violate every rule that you've ever learned regarding egg cookery. But try it exactly as it's written. It will "melt in your mouth."

- 1½ cups egg whites
- ¼ teaspoon salt
- 1 teaspoon cream of tartar
- 2 cups (minus 2 tablespoons) sifted granulated sugar
- 1 cup powdered sugar
- 1 cup sifted cake flour (sift 3 times before measuring)
- 1 teaspoon vanilla

Put tube pan into 425°F. oven to pre-heat.

Beat egg whites with salt and cream of tartar until stiff but not dry.

Fold in granulated sugar 2 tablespoons at a time. (Use low speed on the mixer)

Sift flour and powdered sugar together five times.

Fold flour mixture into egg white mixture two tablespoons at a time. Raise spoon high when folding thus incorporating the maximum amount of air.

Add vanilla, and blend into mixture.

Pour batter into hot ungreased tube pan.

Bake 23 minutes at 425°F.

(Cake may crack on the top but the flavor and texture are delicious.)

Alterations to recipe for elevations other than those given.

Over 7,000 feet

Decrease granulated sugar 2 tablespoons

Under 5,000 feet

Increase granulated sugar 2 tablespoons

EGG-YOLK SPONGE CAKE

5,000 to 7,000 feet

8 egg yolks

$\frac{1}{4}$ teaspoon salt

$\frac{1}{2}$ teaspoon cream of tartar

$\frac{1}{2}$ teaspoon vanilla

Beat with rotary beater or electric mixer until blended.

$\frac{1}{2}$ cup minus 2 tablespoons water

Add gradually

$\frac{2}{3}$ cup sugar

Add slowly and continue beating until **thick** and **lemon colored**

1 teaspoon grated lemon rind

2 tablespoons lemon juice, mix thoroughly

1 cup plus 1 tablespoon sifted cake flour

Add $\frac{1}{4}$ flour at a time (sift over egg-yoke mixture). Fold in flour with about 15 folding strokes after each addition of flour. Use 10 additional folding strokes after the last addition.

Bake in 8-inch tube pan 340°F. for 40 to 50 minutes.

Alterations to recipe for elevations other than those given.

3,500 to 5,000 feet

Subtract 2 tablespoons sifted cake flour

Bake 325°F.

Over 7,000 feet

Add $\frac{1}{4}$ cup sifted cake flour

Bake 350°F.

CHIFFON CAKE

(Courtesy Betty Crocker)

5,000 to 7,000 feet

Sift together into mixing bowl
2¼ cups sifted cake flour
1½ cups sugar
1½ teaspoons baking powder
1 teaspoon salt

“Make a well” and add
½ cup salad or cooking oil
5 egg yolks unbeaten
¾ cup cold water
2 teaspoons grated lemon rind
2 teaspoons vanilla

Beat until smooth—2 minutes with mixer

Then measure into a bowl
1 cup egg whites (7 or 8)
½ teaspoon cream of tartar
Beat until egg whites stand in very stiff peaks.
Gradually pour egg yolk mixture over stiffly
beaten whites. Fold gently until all ingredients
are blended.

Pour into ungreased 10-inch tube pan.

Bake 50 to 55 minutes at 350°F. then
10 to 15 minutes at 375°F.

Invert pan and let hang until thoroughly cold.

Alterations to recipe for elevations other than those given.

3,500 to 5,000 feet

Increase baking powder 1½ teaspoons

Above 7,000 feet

Decrease baking powder ½ teaspoon

Decrease sugar 3 tablespoons

WHITE CAKE

(Streamlined Method)

5,000 to 7,000 feet

½ cup shortening, soften

2 cups sifted cake flour

2 teaspoons baking powder

1 teaspoon salt

1 cup sugar

Sift together twice then add to the shortening

1 teaspoon vanilla

¾ cup milk

Add to shortening and flour and mix 300 strokes
(2 minutes in the mixer)

4 egg whites

¼ cup sugar

Beat egg whites until foamy. Gradually add
sugar and continue beating until meringue is
stiff and stands in peaks.

2 tablespoons milk

Add meringue and milk to batter and beat 150
strokes (1 minute in the beater)

Bake in two 8-inch cake pans which have been greased and
lined with greased wax paper. Cut through batter three or four
times in each direction to release large air pockets. Bake at
375°F. for 30 to 35 minutes.

Alterations to recipe for elevations other than those given.

3,500 to 5,000 feet

Add: ½ teaspoon baking powder

Bake: 350°F.

Over 7,000 feet

Decrease ½ teaspoon baking powder

GOLDEN LAYER CAKE

(Speedy Method)

4,000 to 5,500 feet

Sift together into a bowl
2 $\frac{1}{4}$ cups sifted cake flour
1 $\frac{1}{4}$ cups sugar
2 $\frac{1}{4}$ teaspoons baking powder
1 teaspoon salt

Add
 $\frac{1}{2}$ cup shortening
1 teaspoon vanilla
 $\frac{2}{3}$ cup milk

Blend then beat for 2 minutes (300 strokes)

Add
 $\frac{1}{3}$ cup milk
2 eggs

Blend then beat for 2 minutes (300 strokes)

Pour batter into two 8-inch layer pans which have been greased and lined with greased wax paper. Bake 25 to 30 minutes at 375°F. Alterations to recipe for elevations other than those given.

3,000 to 4,000 feet

Increase sugar by $\frac{1}{4}$ cup
Decrease oven temperature to 350°F.

5,500 to 7,000 feet

Decrease sugar 1 tablespoon
Decrease baking powder $\frac{1}{4}$ teaspoon

TWO-EGG CAKE

(Conventional Method)

5,000 to 7,000 feet

2 cups sifted cake flour
1½ teaspoons double-acting baking powder
1 teaspoon salt
Sift together three times

½ cup shortening
Cream until fluffy (1 minute in mixer)

1 cup sugar
1 teaspoon vanilla
Add gradually to shortening and cream until light and fluffy (5 minutes in mixer)

2 Eggs
Beat, add to creamed mixture and mix thoroughly. (1 minute in mixer)

¾ cup plus 1 tablespoon milk
Add alternately by thirds, flour mixture, and milk.

Beat 25 strokes after each addition of flour and 50 strokes after each addition of liquid. For best results **do not** use the mixer for this final step.

Bake in two 8-inch layer pans which have been greased and lined with greased wax paper. Cut through batter 3 or 4 times in each direction to release large air pockets. Bake 375°F. for 25 to 30 minutes.

Alterations to recipe for elevations other than those given.

3,500 to 5,000 feet

Add: ¼ teaspoon baking powder
Decrease: 1 tablespoon milk
Bake: 350°F.

Over 7,000 feet

Decrease: ¼ teaspoon baking powder
Add: 2 tablespoons milk

BURNT SUGAR CAKE

(Streamlined Method)

5,000 to 7,000 feet

- 1/2 cup shortening, soften
- 2 1/2 cups sifted cake flour
- 1 7/8 teaspoons baking powder
- 1/2 teaspoon salt
- 1 1/4 cups sugar

Sift together twice then add to the fat.

- 2 egg yolks
- 1 teaspoon vanilla
- 3/4 cup cold water
- *3 tablespoons burnt sugar syrup

Add to the flour and fat mixture and beat 300 strokes (2 minutes with electric mixer)

- 2 egg whites
- Beat until foamy

1/4 cup sugar

Add gradually to egg whites and beat until stiff

1/4 cup water

Add egg whites and water to batter and beat 150 strokes (1 minute with electric mixer)

Bake in two 9-inch layer pans which have been greased and lined with greased wax paper. Cut through batter three or four times to release any large airpockets. Bake at 375°F. for 25 to 30 minutes.

***Burnt sugar syrup:** Stir and melt slowly in a heavy skillet 1/2 cup sugar. Allow to brown slightly. Add 1/2 cup boiling water and cook until smooth. Cool before using. Left over syrup may be used in frosting or stored in a covered container in the refrigerator.

Alterations to recipe for elevations other than those given.

3,500 to 5,000 feet

Add: 1/4 teaspoon baking powder

Bake 350°F.

Over 7,000 feet

Decrease baking powder 1/2 teaspoon

OLD FASHIONED POUND CAKE

(Courtesy of Charleston Receipts)

5,000 to 7,000 feet

2 cups minus 2 tablespoons granulated sugar
2 cups butter or margarine
10 eggs
1 teaspoon baking powder
4 cups sifted flour
 $\frac{1}{2}$ teaspoon mace
 $\frac{1}{2}$ teaspoon vanilla
 $\frac{1}{2}$ teaspoon lemon extract
 $\frac{1}{4}$ teaspoon almond extract

Cream butter and sugar

Add well beaten egg yolks and continue beating until thick and lemon colored.

Add sifted flour and baking powder gradually to the mixture

Add mace and extracts

Fold in stiffly beaten egg whites.

(Be sure that batter is thoroughly mixed)

Pour into well greased tube pan or loaf pan which has been greased and lined with two thicknesses of greased wax paper. Bake 250°F. (slow oven) $1\frac{1}{2}$ hours.

Alterations to recipe for elevations other than those given.

3,000 to 5,000 feet

Add 2 tablespoons sugar

Over 7,000 feet

Decrease sugar 2 tablespoons

COCOA FUDGE CAKE

5,000 to 7,000 feet

1 $\frac{3}{4}$ cups sifted cake flour
1 $\frac{1}{3}$ cups sugar
1 teaspoon soda
6 tablespoons cocoa

$\frac{1}{2}$ cup shortening
1 cup plus 2 tablespoons buttermilk
1 teaspoon vanilla
2 large eggs ($\frac{1}{2}$ to $\frac{2}{3}$ cup)

Sift dry ingredients together into bowl. Add shortening, buttermilk, and vanilla. Beat 2 minutes on medium speed with mixer or 300 handstrokes. Add eggs and beat 2 minutes more (300 strokes).

Bake in two 8-inch layer pans which have been greased and lined with greased wax paper 30 to 35 minutes at 375°F. Alterations to recipe for elevations other than those given.

3,500 to 5,000 feet

Decrease buttermilk by 2 tablespoons
Bake 350°F.

Above 7,000 feet

Decrease sugar by 2 tablespoons