

# Chapter 45

## Pies and Tarts

### Thickening Agents

**Directions:** Read the following selection. Then answer the questions under *Thinking Critically*, and complete the activities as directed by your teacher.

What can turn vegetable broth into a hearty soup, meat drippings into a rich gravy, or fruit filling into a juicy, rather than a runny, pie filling? The answer is thickening agents, ingredients that cause foods to thicken.

One way to add thickness to foods is by adding starches, such as flour, cornstarch, and tapioca. When heated in a liquid, starch granules act like sponges, absorbing water and swelling. This process, which is called *gelatinization* (juh-LA-tun-uh-ZAY-shun), is what you observe happening as a mixture thickens.

All-purpose flour is the most popular starch for thickening foods. It does a fine job in preparing soups, sauces, gravies, and pie fillings. *Browned flour*, a so-called “fat-free roux,” is made by toasting flour over medium heat while stirring constantly. Browned flour is used primarily for gravy, where it enhances the flavor and color. However, dark flours retain less ability to thicken than light-colored flours.

Fine and silky, cornstarch is filtered from corn kernel fragments that have been soaked in order to remove the germ. It has twice the thickening power of flour. Unlike flour, which produces an opaque (solid-looking) mixture, cornstarch creates a translucent (semitransparent) mixture. Thus, it’s favored for its glazing effect in cooked pie fillings, fruit sauces, and Asian cuisine.

Although you are probably familiar with tapioca pudding, tapioca itself is a starch extracted from the ground, dried root of the cassava plant, which grows in the tropics. The pudding is made with pearl tapioca, which must be softened by soaking for a few hours before cooking. A second variety, quick-cooking tapioca,

is granulated and doesn’t require soaking. Both types are translucent when cooked, making them good choices for fruit fillings. They’re occasionally used for soups and sauces as well. Unlike flour and cornstarch mixtures, those made with tapioca don’t break down and become watery when reheated after freezing.

Eggs can also be used as thickeners. They are used to thicken custard or cream pies. The thickening power of eggs comes from the coagulation of protein as the egg cooks.

When eggs are used as thickeners, the mixture must be cooked slowly, over low heat. A double boiler is often recommended for this purpose.

Avoid adding eggs directly to an acid mixture; they may curdle. Likewise, eggs may cook if added straight to a hot mixture, giving the finished product a distinctly egg-like taste. Instead, lightly beat a small amount of the acid mixture into the eggs first. Then gradually stir the egg mixture into the remaining acid mixture.

#### Starch Substitutions

Because starches differ in thickening ability, you may need to change the amount to substitute one for another. All of the starches in the list below are equal to one tablespoon of all-purpose flour.

- ◆ 1½ tsp. cornstarch, arrowroot, potato starch, or rice flour
- ◆ 1 Tbsp. quick-cooking tapioca or waxy rice flour
- ◆ 1½ Tbsp. whole-wheat flour
- ◆ 2 Tbsp. browned flour

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## Thinking Critically

1. In many fruit-pie recipes, the uncooked filling is first tossed with flour and sugar. It is then placed in the crust, dotted with butter, and baked. What is the reason for this procedure?

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2. Because pie is one of America's most popular desserts, what suggestions do you have for a weight-conscious America regarding how to prepare pie that is more healthful?

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3. In your own words, summarize tips for making a perfectly thickened cooked pie filling with fruits, such as cherries, blueberries, or strawberries.

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## For Further Study

- ◆ Suppose that you decide you want to make a fruit pie thickened with starch. Your recipe calls for three tablespoons of cornstarch, but you are out of it. You decide to substitute flour for the cornstarch. How much flour will you need to use to equal three tablespoons of cornstarch? How might using flour instead of cornstarch affect the flavor, texture, and clarity of the fruit filling for your pie? Write a summary about your findings and conclusions and submit it to your teacher.
- ◆ Use Internet or print resources to locate a recipe for starch-thickened pudding to use in a cream-style pie. What type of starch is used to thicken the pudding? What process is used to prepare the pudding? Write a summary of your findings to share with the class. If possible, prepare the cream-style pudding pie to share with your classmates.
- ◆ Investigate the history and preparation technique for making *Crème Brûlée* (broo-LAY)—a rich custard dessert that is thickened with eggs. If possible, demonstrate how to prepare this dessert for your class. Have the class taste-test the resulting product and critique your demonstration. (Note: The custard will need to be baked and chilled before serving.)