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– Chapter 3 –

Dough Ingredients

One of the most complex aspects of pizza is dough. It offers many ways for something to go wrong. However, with knowledge and proper procedure, mistakes can be minimized and consistent top quality crust can be produced. This chapter provides an understanding of the ingredients used in making dough.

Lengths, weights, temperatures, and volume measurements are given in inches, pounds and ounces, degrees Fahrenheit, and quarts and cups (U.S. version). The following abbreviations are used: **lb** = pounds, **oz** = ounces, **F** = Fahrenheit, and **qt** = quarts. For conversion to other measurement systems, refer to the chapter on Measurements and Conversions.

The Ready-to-Use Option

An alternative to scaling individual ingredients is the prepared mix, also called pre-mix and pre-blend. There are two kinds: a *complete* mix, which contains all the dry ingredients for dough, including flour (however, some exclude yeast), and a *partial* mix, which contains all dry ingredients except for flour (some also exclude yeast).

Many companies sell generic mixes. In addition they will blend to specification for large buyers. Finally, it's possible for a pizzeria to make its own mix. Once a week, scale the salt, sugar, etc. needed for a week's worth of dough. Mix it uniformly. Put it into a plastic bag, seal it tight, and store it in a cool store room or a walk-in cooler. The process can save labor and reduce the chance of scaling error during dough-mixing.

Using a Partial mix

Some partial mixes include yeast, others don't. Instant, regular active dry, and protected active dry yeast can be used. Instant dry yeast can be mixed without rehydration. However, regular and protected active dry (ADY and PADY) yeast must be rehydrated before mixing. To do that the entire mix is put into water, which results in the yeast being rehydrated in salty water. If it's a high concentration of salt it can inhibit fermentation. For this reason it's important to use plenty of water, or at least ten times the weight of mix. To avoid this potential problem some people exclude yeast from the mix and, instead, add it separately.

PADY is sometimes preferred over ADY or instant yeast because it's protected from oxygen and moisture. With ADY and instant, the mix must be properly packaged and/or stored cold to prevent deterioration of the yeast.

Advantages and Drawbacks

The main advantage of a mix is that it provides consistency by reducing the chance of scaling error. Also, for a company wanting to keep its recipe secret, a custom-blended mix offers a way to do that.

The main drawback of a mix is increased food cost. Of the two, complete mixes are the most expensive. A partial mix is less so. For more discussion see the chapter on the Ready-to-use Option (pg. 25).

Baker's Percents

For convenience, bakers refer to ingredient amounts in a dough formula as a *percentage of total flour weight*. That means, regardless of how much flour a recipe calls for, the flour amount is always considered to be 100 percent and every other ingredient is referred to as a percentage thereof. For example, if a formula calls for 25 lb flour and 15 lb water, they would say that the formula consisted of 60 percent water ($15 \div 25 = .60$ or 60 percent). They call this a *baker's percent*. To further illustrate, if a baker said "lower water by 5 percent," this would mean that the water portion should be reduced 5 percent of the weight of the flour portion called for by the recipe.

Throughout this chapter and other chapters on dough, whenever we mention percentages we're referring to baker's percents. So keep in mind that these percents relate to a percent of the *total flour weight* in the dough formula, not to a percent of total dough weight.

Types of Ingredients

Typical pizza crust is made from yeast dough. In its basic form a yeast dough consists of flour, water, yeast, and salt — the basic four ingredients of bread. A fine pizza crust can be created with only those ingredients. However, to impart special qualities to dough and crust some recipes also contain chemical leavening, sugar, shortening (oil), egg, milk, flavoring, and/or dough additives. So, in creating a pizza dough we have ten categories of ingredients to consider.

- Flour
- Water
- Yeast & Other Leaveners
- Salt
- Sugar
- Shortening or Oil
- Non-fat Dry Milk
- Egg
- Flavoring & Coloring
- Dough Additive

Flour

Generally defined, *flour* is finely ground, starchy material produced from milling the seeds or fruit of various plants, most notably cereals. There are many types of flour, including wheat, corn, oat, rice, rye, buckwheat, barley, and triticale flour. There's also soybean, almond, tapioca, peanut, cottonseed, and potato flour.

By far, the main flour used in baking comes from wheat. In fact it's so common that the federal government says the word "flour," when used by itself, refers to the material produced from grinding and sifting wheat.

During the milling process the brownish-colored bran and the germ portion of the grain are separated from the white, starchy inner portion, called endosperm. It's the finely ground endosperm that we know as *flour*. Other terms for it are *wheat flour* and *white flour*. So when we speak of flour we're referring to that product that is the finely ground endosperm of wheat.

Terminology Note

The term “wheat flour” should not be confused with “whole wheat flour.” *Wheat flour* is white flour. It contains only the white endosperm portion of the kernel, and does not contain significant amounts of germ and bran. *Whole wheat flour*, on the other hand, contains the entire kernel, including the germ and bran. So, when a label lists “wheat flour” it’s actually referring to white flour, not whole wheat flour. This is something that many consumers don’t realize.

Role in Baking

Flour and water are the indispensable ingredients in baked goods. When combined, the flour absorbs the water, making dough (or batter). Without flour, baking and pizza-making as we know it wouldn’t exist.

The flour-water combination binds or holds other dough ingredients. In addition, flour contributes special flavor and nutrients. Finally, because of its unique protein, flour allows dough to rise during fermentation and to retain its shape and volume after baking.

Wheat

For a full understanding of pizza flour, how it works and why it can vary, it helps to have a basic knowledge of wheat. This section describes those aspects of wheat and wheat production that might be of interest to a buyer, quality assurance director, or manager.

Species and Varieties

Worldwide, there are fourteen species of wheat, all beginning with the name *Triticum*. However, over 90 percent of wheat production comes from three species: *Triticum aestivum* (also called *Triticum vulgare*), or common wheat; *Triticum durum*, or durum wheat; and *Triticum compactum*, or club wheat.

Common wheat is by far the most important, comprising over 90 percent of wheat production in the United States. Common wheat is used mainly in baking. Durum wheat, sometimes called macaroni wheat, is used for making pasta. And club wheat, which yields a very soft flour — low in protein content — is used for items needing a crumbly texture, such as crackers. Pizza flour comes from common wheat, so the rest of this discussion focuses on that.

To achieve better wheat, scientists are constantly making hybrid varieties. Through hybrids they create wheat with special characteristics such as greater yield, disease and insect resistance, shorter growing season, different color, kernel hardness, better milling and baking qualities, and shorter stem to resist flattening by wind. In the U.S. alone there are over 100 varieties of common wheat. Different wheats produce markedly different flours. Other factors affecting wheat and flour characteristics are weather conditions and the milling process.

Wheat Classification

To promote product consistency, the USDA (U.S. Department of Agriculture) groups the varieties of wheat into classes, or strains. The classes are based on three factors: (1) The texture of the ripened kernel (hard or soft), (2) the color of the kernel (red, amber, or white), and (3) the season when the wheat begins growing (winter or spring). As such, common wheats are grouped into the following five classes:

- Hard red winter wheats (HRW)
- Soft red winter wheats (SRW)
- Hard red spring wheats (HRS)
- Hard white wheats (winter and spring)
- Soft white wheats (winter and spring)

Two other wheat classes are durum and red durum. Durum, which is amber colored, is used for making pasta; red durum is used for livestock feed. In each of the above classes there are two to four sub-classes. When two or more classes are blended together during milling it's called a "mixed wheat." Approximately 45 percent of wheat is HRW, 21 percent is SRW, 18 percent is HRS, 11 percent is hard and soft white wheat, and 5 percent is durum.

Winter wheats are planted in the fall in regions with mild, dry winters, most notably in those states across the middle of the U.S. In fall the wheat takes root and leaves and shoots emerge. During winter it enters a dormant or vegetative stage. In spring it resumes growing and, finally, is harvested in June or July. Hard red winter wheats mainly come from Kansas, Nebraska, Oklahoma, Texas, and Colorado. Soft red winter varieties are mainly grown in Ohio, Indiana, Missouri, Illinois, and Pennsylvania.

Spring wheats are planted in early spring in regions with harsh winters that would kill a winter wheat. They are harvested in late summer. Minnesota, North