BAKER'S PERCENTAGE

When writing a formula, the easiest method is to do so using what is known as baker's percentage, or baker's math. In using baker's percentage, each ingredient in a formula is expressed as a percentage of the flour weight, and the flour weight is always expressed as 100%. Most American bakers who have been baking professionally for a couple of decades or more will remember when the only scale in most shops was a balance beam scale, and when liquids were almost always measured in gallon pitchers, not weighed. Although balance beam scales are still widely used, more and more bakers are turning to electronic scales for weigh outs, and gallon pitchers are giving way to liquids that are weighed along with the dry ingredients.

There are good reasons for using baker's percent for our formulas. First, since each ingredient is weighed, it enables us to work with precision using only one unit of measure. Second, it is quite easy to scale a formula up or down when we are working with baker's percent. And last, it allows bakers to share a common language. This common language enables the baker to not only communicate with other bakers, but also makes it possible to quickly assess a formula simply by seeing the percentages used. In this discussion, we will talk about converting a simple bread formula into percentages; transferring from percentages to pounds; and how to compute the Formula Conversion Factor for use in scaling a recipe up or down.

COMPUTING PERCENTAGES OF A FORMULA

We will begin with a straightforward recipe for white bread:

FLOUR	50#
WATER	33#
SALT	1#
YEAST	.6#

As mentioned above, when using baker's percentage, the flour is represented as 100%, and all the other ingredients are expressed as a percentage of the flour's weight. We can begin to express the formula as follows:

FLOUR	50#	100%
WATER	33#	?
SALT	1#	?
YEAST	.6#	?

To determine the percentage of the other ingredients, we divide each one by the weight of the flour, and then multiply the result (which is in decimal form) by 100 to convert it to a percent. For example, to calculate the percentage of water, we divide it by the flour and multiply by 100: 33/50 = .66 X 100 = 66%. When we follow the same method, we arrive at the following values for the salt and yeast:

FLOUR	50#	100%
WATER	33#	66%
SALT	1#	2%
YEAST	.6#	1.2%

It is worth noting that by simply looking at the percentages we can ascertain important things about this bread. For one thing, we know at a glance that the bread has a 66% hydration (hydration is defined as the percentage of liquid in a dough, again based on the flour weight). If we had used gallon pitchers to measure the water, we would have the rather cumbersome formula, much more difficult to assess.

COMPUTING POUNDS FROM PERCENTAGES

For our second example, let's assume that a baker colleague has given you his or her formula for ciabatta:

FLOUR	100%
WATER	73%
SALT	1.8%
YEAST	1.1%

You decide to make this dough using 50# of flour:

FLOUR	100%	50#
WATER	73%	?
SALT	1.8%	?
YEAST	1.1%	?

To obtain the weights of the remaining ingredients, first we divide the percentage by 100 to obtain a decimal, then multiply the resulting decimal by the weight of the flour. For example, the water is calculated as 73/100 = .73. Then we multiply this by the flour weight to obtain the weight of the water: .73 X 50 = 36.5#. The entire formula would look like this:

FLOUR	100%	50#
WATER	73%	36.5#
SALT	1.8%	.9# (1.8/100=.018 X 50=.9#)
YEAST	1.1%	.55# (1.1/100=.011 X 50=.55#)

RESIZING A FORMULA USING THE FORMULA CONVERSION FACTOR

There are times when we may need to recalculate the size of a formula in order to make either more or less bread. By employing baker's percent, this is quick, accurate, and easily learned by the baker. Let's assume that another colleague has given you his formula for French bread:

FLOUR	120#	100%
WATER	78#	65%
SALT	2.4#	2%
YEAST	1.5#	1.25%
TOTAL	201.9#	168.25%

Although you like the bread very much, in your situation you only need to make 150# of dough. How can you recalculate the formula to obtain 150# and retain the percentages of the ingredients? The first step is to determine the Formula Conversion Factor. We establish this by adding the percentages of the formula, which in this case total 168.25. Then divide our new desired dough weight by the sum of the percentages:

150/168.25 = .8915. It is preferable to round this figure up, because it is better to have a little extra bread rather than not enough, so we round up to .9. The next step is to multiply the percentages of each ingredient by .9:

FLOUR	(.9 X 100 = 90) 90#
WATER	(.9 X 65 = 58.5) 58.5#
SALT	(.9 X 2 = 1.8) 1.8#
YEAST	(.9 X 1.25 = 1.13) 1.13#
TOTAL	151.43#

BAKER'S PERCENT AND PREFERMENTS

There are two different considerations relating to baker's percent when making bread with preferments. The first is relatively simple: the preferment is treated as any other ingredient. The second, figuring overall baker's percent, is slightly more complicated.

Here is a formula for French bread using a poolish:

FLOUR	**40.12#**	**100%**
WATER	**19.32#**	**48%**
SALT	**1.19#**	**3%**
YEAST	**.72#**	**1.8%**
POOLISH	**38.66#**	**96%**

Although there is accuracy to the percentages as they are expressed, there is also confusion. Three percent salt seems excessive, 48% water seems far too little. Of course, it is the presence of the poolish, comprised of equal weights flour and water, which makes the formula appear bewildering. It can therefore be a good idea, when using preferments, to also express the formula in terms of Overall Baker's Percent; in other words, computing the sum of all the flour, all the water, etcetera, and basing our percentages on the total sum. In the above instance, we would break the poolish up into its component parts, and add them in to the proper places.

POOLISH FLOUR	**19.32#**	**100%**
POOLISH WATER	**19.32#**	**48%**
POOLISH YEAST	**.02#**	**.1%**

Adding these figures in with the rest of the dough, we get the following:

FLOUR (40.12#+19.32#)	**59.44#**	**100%**
WATER(19.32#+19.32#)	**38.64#**	**65%**
SALT	**1.19#**	**2%**
YEAST(.72#+.02#)	**.74#**	**1.25%**