

**Understanding Baking:
The Art and
Science of Baking**

THIRD EDITION

*Joseph Amendola
Nicole Rees*

John Wiley & Sons, Inc.

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SCIENCE OF BAKING

JOSEPH AMENDOLA
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Many people have endured my obsessive baking habit over the past decade. During my tenure at *Woman's World* and *First for Women* magazines, colleagues helpfully served as critics for my efforts. Michelle Davis had the presence of mind to end the reign of chocolate cake terror. Sean Smith, friend and one-time husband, supported seemingly pointless baking experiment after baking experiment and explained tedious chemistry principles with great patience.

This revision of this book, and the *Baker's Manual*, would not have been possible without the help of Lisa Bell. Lisa was my pastry mentor and now she is my business partner. She helped research, develop, fine-tune, and edit these books, generously donating recipes and expertise. The chapters on flour and breadmaking were her gift to this project, and reflect up-to-date and comprehensive research. This project rejuvenated our enthusiasm for pastry, shifting our interests from publishing to having our own bakery. Working with someone as talented as she is has been the highlight of my baking career.

Many food companies and professionals have been generous with information—King Arthur Flour, Guittard Chocolates, Knox Gelatin, Red Star Yeast, and General Mills are among them. Tim Healea of Pearl Bakery in Portland, Oregon, provided valuable information regarding pre-ferments and wild yeast starters. The American Baking Institute proved to be an indispensable resource. I have also drawn information from articles I wrote for *Pastry Art & Design* magazine.

—Nicole Rees

P R E F A C E

When first published, *Understanding Baking* was one of the few resources available to the common professional baker that seriously attempted to address the science behind the bakery recipe, be it chemistry, physics, or biology. This edition has been thoroughly revised, maintaining that original intent, but with several new goals in mind.

The first, obviously, was to update and expand the scientific material. Newer ingredients such as osmotolerant instant active dry yeast are clearly defined, while discussions of staple ingredients such as chocolate are expanded to reflect changes in manufacturing and usage.

Second, products and production methods have been updated to reflect current trends. When *Understanding Baking* first emerged, a primary concern of the baking industry and hence, the young baker, was the mastery of large-scale production. Automated equipment, mixes, and time-saving methods were regarded with enthusiasm as the way of the future, liberating the baker from round-the-clock toil. And, today, in a bit of mixed blessing, most of the baked goods consumed in America do indeed come from large, state-of-the-art industrial plants. However, certain very popular movements in modern pastry and breadmaking seem to be heading, not forward into some brave new world of baking, but backward toward craft, quality ingredients, and uncompromised flavor. The artisanal bread movement that currently has the entire nation enthralled is a key example of this trend. Even large supermarket chains are rushing to produce their own specialty breads to cash in on the cachet of “artisan.” The old ways are back by popular demand—upscale coffeehouses, specialty bakeries, and restaurants boasting quality local ingredients have crept into almost every town.

Our final goal, in this era of television celebrity chefs and vast numbers of magazines devoted to food and fine living, is to make *Understanding Baking* accessible to a wider audience. Today’s culinary students anticipate working in restaurants, bakeries, or even as self-employed caterers or personal chefs. This edition of *Understanding Baking* is meant to be a handbook for all those rookie bakers, as well as a reference for enthusiasts. Whether your lemon meringue pie begins to weep or you need to review the list of foods that prevent gelatin from setting up, *Understanding Baking* is an easy-to-use reference for the pastry kitchen. Talented and curious amateurs with a desire to under-

stand the hows and whys can come away (after study and practice, of course!) with good technical skills and the wherewithal to modify recipes for specific ends. Understanding how ingredients interact in the processes of mixing and baking, and why certain proportions and ratios are successful in recipes, means you won't ever be limited to recipes found in books.

In the spirit of the original edition, the text has been kept short and, we hope, succinct. Like the previous edition, this book relies heavily on E. J. Pyler's two-volume tome, *Baking Science & Technology*. Though Pyler's work addresses the complex chemistry of large-scale industrial baking, it summarizes many studies of specific ingredients and processes, providing detailed explanations of the chemistry behind baking.



WHEAT AND GRAIN FLOURS