



Baking for **Special Diets**

• Richard J. Coppedge, Jr. CMB •

THE CULINARY INSTITUTE OF AMERICA

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Richard J. Coppedge, Jr. CMB

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PREFACE



When people go out to a food service establishment, in particular a sit-down-style establishment, the kitchen staff can have a big influence on their experience. Why? Because we contribute to the first and last courses of almost any meal. When a customer cannot have bread to break with others, due to celiac disease or a wheat intolerance, or they pass on dessert because of their concerns for their glucose level spiking right afterward, they are having a diminished dining experience. Hopefully we can assist them by producing items that will allow their meal to be as fully enjoyable as it is for the others at the table.

As more people are being diagnosed with a wide variety of diseases, allergies, or dietary restrictions, we need to be prepared to help. You already have a level of knowledge and experience based on your training and past and current employment. So, take those experiences and adapt them with the suggested materials in this text. The goal here is not to make you a new baker or pastry chef, but rather one who is more versatile and, most importantly, more adaptable for situations requiring ingredient modifications.

The customer has to be the one to ask for these items which you should be willing and able to produce. Many of the formulae in this text were produced and tested by past students throughout my years of teaching a nutritional-experimental-type baking course. I too had to find my own way, and I'm still learning with each new day and situation I face.

Regards,
Chef Richard J. Coppedge, JR., CMB



Bakers, pastry cooks, and pastry chefs have developed a long-standing discipline of techniques, methods, formulations, and most of all creativity to produce a myriad of products. Baked goods are commonly the first and last

products of almost any meal. We really get things going with scrumptious breads and conclude any meal with a fantastic dessert.

The traditions in baking and pastry are truly that: traditions. So, how can one reformulate or modify the time-honored techniques so that we can produce products for diners with dietary restrictions and allergies?

Baking for Special Diets is designed to help. It provides basic nutritional information as a review or as an introduction to that field of study. Understanding the many different dietary situations affecting many customers is discussed: food allergies, customer consumption preferences (whether it be for personal, medical, or religious beliefs), diabetes management, and overall caloric management of the baked goods we love to eat.

For the professional baker, pastry cook, or chef, these new adaptations to the products we are so used to making may seem daunting; that's where this book comes into play. You already know how to bake, but need the guidance to take the steps forward so that you can continue to produce bakery products accessible to many more customers.

Organization and Approach

Baking for Special Diets is designed to take your baking knowledge to the next dietary level by articulating the theories of basic nutrition, dietary or food allergy restrictions, ingredients functions, and how all of these affect the baked goods we make every day. Understanding the need for alternative baked goods can seem difficult, especially if you have no personal experience with it.

The book is organized into seven chapters, beginning with the nutrition and dietary learning and health-related issues, that can establish the need to produce specialized products. Next is the introduction of ingredients; function, form, and suggestions for replacement. Numerous dietary- or allergy-based topics follow that give specifics of converting recipes for each of the subjects covered.

CHAPTER 1: Current Health Problems and Dietary Needs: An Abundance of Foods and Health Problems

Understanding the current health problems many of our customers face is the first step before you go about making specialized baked goods. Putting yourself in the role of the customer who is dealing with one or many health issues can allow you a better feeling of what they require. Why use a sugar substitute if you can't relate to the need for it? These health problems seem to be increasing, with more consumers being diagnosed and others choosing to change their diets, perhaps because of trends or curiosity. This is not a medical book, but rather a guide to set the baking professional in the right direction.

CHAPTER 2: What Is Nutritional Baking?

Bakery products are full of flavor, goodness, and wonderful texture, but they are also high in kilocalories (in particular fat and sugars). Understanding basic nutrition is an essential subject, necessary so that you can knowingly comprehend what ingredients contribute to the products' total nutrient level, before you determine how to change the nutrient levels when restrictions are necessary.

CHAPTER 3: Ingredients for Nutritious Baking

We use so many different types of ingredients. So, how can you decide which new ingredient works best for a dietary adjustment to a bakery product? Any adjustment in regards to ingredients can trigger a response to the method of mixing, baking, texture, specific gravity, etc., so, with a base knowledge from this chapter, you will have more confidence to make adjustments.

CHAPTER 4: Reduced- and Low-Fat Baking

"Fat is fat, and that's that." So, when fat-based ingredients in a formula need to be removed, reduced, or replaced, what can happen to the product? This chapter introduces many readily available substances (that you may already stock in your bakeshop) needed to mimic the action and

reaction of fat-based ingredients, without the use of as much fat. Relocating the fat in a formula or knowing when/where it is best to use is discussed.

CHAPTER 5: Baking with Less Sugar

Almost all of us know someone battling with some form of diabetes or who needs less caloric intake from sugar. In baking, sugar is many times the number-one ingredient amount in a formula, especially in cakes, cookies, and pastries. This chapter introduces different options to lower the sugar content in some of the ingredients. The key is how or why have the properties of a formula differ with the reduction of sugar-based sweeteners; and how alternative non-sugar-based sweeteners will react in the formula in place of sugar.

CHAPTER 6: Gluten-Free Baking

Whether it is gluten intolerance, gluten sensitivity, celiac disease, or another dietary restriction (involving the removal of one of our most-used forms of baking proteins), gluten-free demands have taken off. This chapter will guide you through the somewhat complicated process, by simplifying it from a baker's perspective. Besides considering which gluten-free alternative ingredients to use, there is more to the process if you want to produce safe, gluten-free products. Because even simple, overlooked concepts can make a customer's dining experience a miserable one, in a matter of minutes or hours afterward.

CHAPTER 7: Nondairy and Vegan Products

In this chapter, we look at the ever-growing percentage of customers who cannot consume or tolerate dairy-based ingredients, or who have more severe restrictions to all animal ingredients. Many of the world's inhabitants do not consume dairy or animal-based ingredients. This chapter introduces the ingredient concerns, followed by suggested replacement options, and the unique changes in mixing and baking procedures.

ACKNOWLEDGMENTS

Ten-plus years ago, I was very happy, teaching students the art of quality baking craftsmanship. When a curriculum change was initiated, a new calling fell in my lap. Thinking back, I'm very happy with the change. This change led me to developing a decent knowledge base in the alteration of core formulae and techniques established by bakers and pastry chefs for decades (maybe even for over a century?).

First I acknowledge The Culinary Institute of America, in particular Dr. L. Timothy Ryan, CMC, the college president, and Provost Mark Erickson, CMC.

Everyone at John Wiley and Sons, for giving me this opportunity to promote change in our industry. The staff in the publishing department; in particular, Nathalie Fischer, in charge of intellectual property. Lisa Lahey, my direct link to getting this book completed. Photographer extraordinaire, Ben Fink.

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Cathy Charles, my silent voice, who puts my lectures, demos, and thoughts into words that make me sound smarter than I think I am! Thank you again with book number two.

Many weekends and other periods were spent testing, retesting, and thinking. Without the music of my friends The Robert Cray band, The Kenny Wayne Shepherd Band, and Joe Bonamassa I might not have finished.

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My wife of thirty years, Julie Keef: thanks for putting up with me throughout this project and everything else! Our four-legged housemates, for your devotion, no matter what time I arrived home. All my friends and family, thanks for being there.

DEDICATION

This book is dedicated to two groups of people. First, to all of my students, past, current, and future; this book will assist you in your endeavors, and will most of all assist you in helping out my second group folks to whom I dedicate this book.

Second, to anyone and everyone who cannot enjoy a slice of bread or savor a dessert because of food sensitivity,

allergy, or dietary restriction. You shouldn't have to go without. So, let those bakers and pastry chefs have their way in baking items that you can enjoy without worry.

All the best. Peace!

For Bill Charles



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RICHARD COPPEDGE, Jr. is a professor of baking and pastry arts at The Culinary Institute of America (CIA). Chef Coppedge currently teaches Advanced Baking Principles to students pursuing their bachelor's and associate degrees from the CIA. During his tenure at the CIA, he has taught various bread baking courses. He also helped develop and provide content for the CIA's bread baking instructional video series.

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CHAPTER ONE



Current Health Problems and Dietary Needs: An Abundance of Foods and Health Problems

Chances are you greet each day wondering “What should I eat?” rather than “What is there to eat?” Many of us take the abundance of food in the developed world for granted and we may need to remind ourselves that for millennia, people struggled to survive. Obtaining food was always the primary focus and, in the earliest times, not much separated humans from animals, other than our ability to use abstract thinking. Hunting, foraging, gathering, and eventually animal husbandry and agriculture turned the tide. The ancient Egyptians were the first to bake leavened bread and it quickly became the “staff of life.”

The nineteenth and twentieth centuries brought us mechanized farming, fertilizers, pesticides, and bioengineering. Now there are vast monocultures in the United States, and food companies have invented new ways to use these commodities. Food additives and sweeteners pump up the calories and fat in convenience foods and extend their shelf life. Our stores are lined with foodstuffs meant to make our lives easier, and more often than not, these products appeal to palates accustomed to heavy combinations of fat, salt, and sugar. It’s easy to grab a doughnut or a fast meal at a drive-through, and when dining out for special occasions, it’s more about pleasure and experience than about sustenance.

We do pay a high price for all of this.

In the United States alone:

- Heart disease is the number one killer, among both men and women.
- About 1 in 3 adults has high blood pressure and 1 in 6 has high total cholesterol—both major risk factors for heart disease.
- Obesity affects close to one-third of the adult population, and childhood and adolescent obesity has nearly tripled since 1980.
- Diabetes is on the rise: As of 2008, 24 million people, or close to 8 percent of the U.S. population, were diagnosed with it. Another estimated 57 million people had pre-diabetes, a condition putting them at risk for developing the disease.
- The ascension of processed foods also corresponds to higher reporting of other food-related health problems in the United States:
 - More than 12 million Americans have food allergies.
 - More than 2 million people have celiac disease and must avoid gluten.¹

Treatment of these diseases and disorders often includes drugs, but diet and exercise also play important roles. In the case of people with allergies and celiac disease, carefully avoiding certain foods is the only way to go.

A lot of other people are careful about their diets for more general health reasons, and may even adhere to ways of eating because of philosophy or religion. Veganism and keeping kosher are examples of those.

¹ www.cdc.gov; www.jama.ama-assn.org.

All of these health conditions and their attendant diets require altering the traditional ingredients and/or methods you use in baking. When you get an order, it is up to you to deliver what you say you will, not to make a judgment about the client's diet.

In the following pages, you will learn more about these health issues and dietary needs, starting with the one that requires the biggest change in how you bake: celiac disease and the gluten-free diet.

Celiac Disease



People often refer to **celiac disease** as an allergy to **gluten**, but it's actually an inherited autoimmune disease that can be managed with a gluten-free diet. When a person with celiac disease ingests the proteins in wheat, barley, and rye (commonly referred to as gluten), the intestinal villi become damaged or destroyed and can no longer absorb nutrients. The disease can be hard to diagnose because the symptoms are varied and some doctors may not think to test for it. Some people, especially children, have classic digestive symptoms, including abdominal pain, bloating, chronic diarrhea or constipation, vomiting, and weight loss. Others have secondary symptoms, such as unexplained fatigue or anemia, depression or anxiety, bone or joint pain, infertility, canker sores, or tingling or numbness in the extremities. Still others have no symptoms at all. Since celiac disease runs in families, a person might get tested for the disease after a relative is diagnosed, and be surprised to discover that he or she has it, too. Testing involves checking the blood for certain antibodies, then confirming a positive blood test result with an **endoscopy** in which biopsies are taken of the intestinal villi.

Some patients may have a positive blood test for celiac disease antibodies and/or a positive genetic test, but a biopsy of the intestinal villi will come back negative. Doctors sometimes refer to this as "**gluten sensitivity**." People who do not have positive blood test or biopsy results, but whose symptoms are relieved by the gluten-free diet, may be termed "gluten intolerant." Interestingly, people with a confirmed diagnosis of celiac disease are both gluten sensitive and gluten intolerant, but it is not the other way around.

Sometimes a patient may undergo an endoscopy for a seemingly unrelated condition, such as **GERD (gastro-esophageal reflux disease)**, and learn from the doctor that his or her intestine is damaged. Celiac disease was once thought of as a rare disease, but that perception is starting to change due to higher public awareness.

Many people decide to stop eating gluten without consulting a doctor or without knowing for sure that they have celiac disease to see if it makes them feel better. Doctors who specialize in celiac disease caution people not to do this. Why? Unless a person has been eating a regular, gluten-containing diet for several months (i.e., consuming the equivalent of at least two to four slices of bread a day), the blood test may come back as a false negative. Undiagnosed celiac disease can cause serious, long-term complications. For now there is no cure for celiac disease, and avoiding gluten for life is the only way to keep it in remission. Additionally, the diet is more than a matter of just avoiding bread products. Gluten can be hidden in places you might not suspect: Malt vinegar, barley malt, soy sauce, beer, and prepared seasoning mixes are just a few examples. People must also be very careful about cross contamination, because even trace amounts of gluten can cause damage. This makes eating out difficult.

OTHER CONDITIONS REQUIRING A GLUTEN-FREE DIET

There is an itchy and painful skin rash form of celiac disease called **dermatitis herpetiformis (DH)**. It is diagnosed with a biopsy of the skin adjacent to the affected area. Often a person with dermatitis herpetiformis may have no intestinal damage, but the condition is serious and requires adhering