chapter, like every other one in the book, presents an opportunity to write more specifically about texture, color, flavor, and aroma. Information gleaned earlier in the book about how starches, proteins, and oil-and-water mixtures behave is imperative, but cross-referencing reminds us that whatever we have forgotten we can easily find again.

Over the past two decades there have been numerous innovations in saucing techniques, notably the innovations of molecular gastronomers who produce ethereal foams and surprising suspensions that bend the very concept of a sauce. McGee is not afraid to voice an opinion about the latest trends: “Chefs are experimenting with unusual tools and materials...to make new forms of suspensions, emulsions, foams, and jellies. The softness and delicacy described by I Yin and Francois Marin are not especially prominent among contemporary sauces” (p.590).

A revision of the sort undertaken by McGee creates and reinforces the framework for understanding food and cooking. Readers unfamiliar with food science or who have been away from a college classroom for a while will benefit from starting at the beginning. This is an academic work, one that relies upon readers to absorb and integrate information. Copious cross-referencing, noticeably more than in the first edition, is reassuring and illuminating. Returning to a discussion of terpenes and phenolic compounds after encountering a real-world example of those abstract concepts reminds the reader once more that the author has taken on the task of providing more than just a jumble of facts. He has taken up a mission to give cooks, chefs, and scientists a common language that will advance the field of gastronomy.

—Mary Donovan, Culinary Institute of America

Chemistry and Safety of Acrylamide in Food Advances in Experimental Medicine and Biology, vol. 561
Edited by Mendel Friedman and Don Motttram
New York: Springer Science + Business Media, 2005 xi + 476 pp. Formulas, tables, and graphs. $169.00 (cloth)

Acrylamide is an industrial chemical utilized in the preparation of polyacrylamide for use as a soil conditioner and in the cosmetic, paper, and textile industries. Extensive animal and human tests have demonstrated neurotoxicity, reproductive toxicity, genotoxicity, and carcinogenicity to be potential human health risks from exposure to this chemical. The discovery in Sweden in 2002 that acrylamide was found in carbohydrate-rich foods such as potatoes and grains as a result of processing resulted in increased global interest in the chemistry and safety of acrylamide in food. A symposium on the subject was held at an American Chemical Society meeting in 2004, and the contributions of the thirty-four speakers from eight countries are presented in this volume, which includes a wide variety of topics relating to the formation of acrylamide in food, distribution of acrylamide and its precursors in food, toxicology, epidemiology, risk assessment, acrylamide reduction, and formation in different foods. Although experimental animal studies have implicated carcinogenicity and reproductive toxicity as possible consequences of exposure to acrylamide, neurotoxicity is the only outcome identified by epidemiological studies of occupationally exposed human populations.

Food contains many bioactive compounds. Some are naturally present as a result of formation by the plant or due to uptake from the soil. Others are introduced during cultivation or processing and food preparation. Their significance depends on toxicity, dosage, and bioavailability. The intake of dietary acrylamide is influenced not only by its level in a food but by how much of that food is consumed. For example, breads, bakery products, and cereals have lower levels than those of french fries or potato chips, but the former have much higher daily food intakes and thus provide greater acrylamide exposure.

Heat induces the formation of acrylamide in food under conditions that also induce the formation of browning products. Controlled browning is often used to develop desirable flavor, odor, and color properties in foods, including coffee, bread, and soy sauce. As a beneficial side effect, these browning reactions often lead to the formation of naturally occurring antioxidants. Advanced-stage browning products are stronger antioxidants than those formed in earlier stages of the reaction. These products are often antimutagenic, induce liver-detoxifying enzymes, and have antibiotic properties. Thus, predictions of the safety of acrylamide in foods based on studies with pure acrylamide may not be justified. Based on the biological and antitoxological effects cited above, the browning products coproduced with acrylamide may modulate possible adverse effects of acrylamide.

Acrylamide formation has been attributed to the reaction of the free amino acid asparagine with glucose or fructose. Varying concentrations of these reactants in the food being processed will lead to different acrylamide contents. In model systems acrylamide begins to form at temperatures greater than 120°C. Most of the acrylamide (>90 percent) present in cereals is formed in the toasting step. When biscuits are toasted to the lowest degree, acrylamide concentration is increased by 15 to 45 percent. When toasted to a nearly burnt state, the concentration is decreased by 40 to 50 per-
cent. Similar results have been observed during flash-frying of potatoes. Model systems spiked with asparagine generate more acrylamide than do controls. Although not as efficient a process, acrylamide has also been produced by heating asparagine with various fats and oils. At 180°C sardine oil yielded 0.42 µg acrylamide/g asparagine; soybean oil, 136; canola oil, 71; and lard, 56.

As with commercially processed foods, acrylamide levels in home-prepared foods tend to increase with cooking time and temperature. The levels depend greatly on the cooking conditions and the degree of “doneness,” as measured by the level of surface browning. Soaking raw potato slices in water before frying proved effective in reducing acrylamide levels in french fries.

What message might the ordinary consumer of baked, toasted, and fried carbohydrate-rich foods take away from reading this collection of papers by specialists? My personal reaction is as follows:

There is no question that a potentially damaging chemical is produced during food preparation processes that predate recorded history, and probably go back to the first utilization of fire. Despite positive animal studies, there is doubt that acrylamide is carcinogenic in humans. People have lived with these processes for millennia. They are a normal part of the human condition and are integral to our standard actuarial statistics. Since acrylamide formation is directly linked to the desired browning reaction that generates important flavor and aroma compounds, consumer acceptance of potential changes to the taste of our diet is questionable.

—Irving S. Goldstein, North Carolina State University

**Marketing Nutrition: Soy, Functional Foods, Biotechnology, and Obesity**  
Brian Wansink  
Champaign: University of Illinois Press, 2004  
206 pp. $34.95 (cloth)

How can we get people to eat better? Lots of us, particularly nutritionists, would pay good money to find out. Brian Wansink, professor of applied economics and nutritional science at Cornell University and director of the Cornell Food and Brand Lab, has some answers. Wansink studies why consumers choose one brand of food over another, which is exactly what food companies spend millions doing. It is likely that eating better is generally not a primary goal of either the companies or the potential customers. After all, Oreos are an easier sell than kiwis. The companies’ marketing methods are obviously effective: their corporate earnings have grown even faster than the waistlines of their customers. What do they know that we nutritionists don’t?

Wansink’s short answer is to look at how a mother gets a child to eat carrots. Make them easy to eat (shred them) and then disguise them in a food the child likes, such as orange Jell-O. His long answer, and the subject of this book, is to borrow tools and insights from marketing successes and failures. Wansink, helped by enterprising graduate students, used laboratory and field research methods to test the results reported in food and marketing journals, from *Food Quality and Preference* and *Appetite* to *Journal of Targeting*, *Measurement and Analysis for Marketing* and *American Behavioral Scientist*.

The book’s topics range from revealing marketing secrets to managing information that affects the nutritional health of nations; the volume ends with examples of food labeling and promotions that actually work. Wansink employs a marketing secret that he calls “laddering”: linking the reader’s reason for doing something (reading the book) with desirable consequences (improving one’s health). Readers also learn why knowing the qualities of a product (product attributes knowledge) does not change long-term behavior. For example, a woman in her thirties says she likes cranberries because they “add a kick to things and are healthy for me.” This is not quite enough, says Wansink. The trick, he explains, is to “ladder to the value behind the cranberry purchase. Find out why ‘adding a kick’ is important” (p.64).

The woman says that cranberries make her feel satiated without feeling as if she is sacrificing taste for nutrition. For this interviewee “not sacrificing” is an important value. Dozens of such values gleaned from interviews that may last thirty or forty minutes are used to devise marketing strategies. But that is only the beginning of a process that goes beyond attributes (kick) to consequences (acceptance, feeling energetic) until it reaches a result that matches the consumer’s values (achievement, gaining health without sacrifice).

Since this method works for food companies, why can’t it be used to get people to eat more fruits and vegetables? Wansink’s chapter-by-chapter lessons use examples from his research on the promotion of soy products and functional foods (foods that provide a health benefit beyond basic nutrition, such as fermented yogurt drinks). In this research he determined the characteristics of those cooks most predisposed to buy and prepare especially nutritious foods. It turns out that personality is the most predictive characteristic. Someone apt to cook and eat soy-based foods is not just a healthy or an athletic cook but a giving and a “stimulation-seeking” cook.