

Preface



Cheese blocks are prepared for sensory assessment by graders at an American Cheese Society Cheese Competition

The Sensory Evaluation of Dairy Products is intended for all persons who seek a book entirely devoted to the sensory evaluation of dairy products and modern applications of the science. The previous edition of *The Sensory Evaluation of Dairy Products*, published in 1988, has served as the primary reference on the topic until now. The first three editions of this book were published in 1934, 1948 and 1965, under the title *Judging Dairy Products*. We are pleased to present this newest edition to be (1) a reference text for all persons interested in the history, art and science behind the sensory evaluation of dairy products; (2) a guide to assist in tracing the origins of identifiable sensory defects in dairy products with hints or strategies for their correction; (3) a practical guide to the preparation of samples for sensory evaluation; and (4) as a training tool for personnel in the evaluation of dairy products.

Three different methods are available for tracing causes of sensory defects in dairy foods: (1) chemical procedures; (2) microbiological tests; and (3) sensory evaluation. The simplest, most rapid and direct approach is sensory evaluation.

A food technologist trained and experienced in flavor evaluation of dairy products has an “edge” over someone who is competent only in performing chemical and/or microbiological methods of product analysis. Correct diagnosis of the type and cause(s) of sensory defects is a prerequisite to application of remedial measures in production, processing and distribution stages. For dairy processors, the most important requirement of a comprehensive quality assurance program is careful and competent flavor evaluation of all dairy ingredients. Based upon sensory judgments, occasionally some milk, cream or other dairy ingredients may merit rejection. An important premise of the dairy industry is *dairy products quality can be only as good as the raw materials from which they are made.*



Technical and esthetic judges evaluate a variety of cheeses at a recent American Cheese Society Cheese Competition

In this book, the authors have attempted to present a reasonably complete overview of the sensory evaluation of most of the major commercial dairy products in the United States and Canada. Furthermore, the authors have de-emphasized the terms “judging”, “scoring” and “organoleptic analysis” in favor of the more contemporary terms “flavor” or “sensory evaluation.” The latter terminology is more reflective of the marked progress made in relating flavor perception to the areas of sensory panel methodology, statistics, human behavior, psychology and the psychophysics of human sensory perception. In addition to traditional practices, this book devotes several chapters to modern sensory evaluation methodology, since this science has profoundly advanced since 1988.

The early chapters of this edition review the history, physiology and psychology of human sensory perception, with emphasis on dairy products

evaluation. Chapter 4 includes an overview of some of the different state, regional and national dairy products competitions held annually in the United States. Chapters 5 through 10 focus on dairy products evaluated in the annual Collegiate Dairy Products Evaluation Competition, including descriptions of various sensory defects, their causes and remedial steps to minimize or eliminate their occurrence in fluid milk, butter, cottage cheese, yogurt, Cheddar cheese and ice cream. Chapters 11 through 16 cover the sensory evaluation of several dairy products not included in the collegiate contest, but that are most assuredly evaluated in plants and may be judged at other various dairy products competitions. Additionally, each of these chapters is intended to serve as a guide to dairy foods manufacturers who seek to optimize the quality of their products. The other products covered include concentrated and dry milk and whey, pasteurized process cheese and related products, sour cream and related products, Swiss cheese and related cheeses, Mozzarella and Hispanic cheeses. Chapter 17 is devoted to modern sensory evaluation practices, including an overview of modern affective and analytical sensory tests, as well as the application of sensory languages (such as the Cheddar cheese lexicon) to scientific and market research. An appendix section guides coaches or instructors through the preparation of samples and provides an overview of sensory panel methods.

In preparing this edition of *The Sensory Evaluation of Dairy Products*, authors from industry and academia have applied their philosophy and instructional techniques to convey their expertise at describing sensory shortcomings of dairy foods. This edition of the book brings together a historical perspective of the sensory evaluation of dairy products, the stages of advancement of this field of applied science, personnel development, improvements in sensory assessment techniques and methodologies, as well as the role of statistical validation and other modern and progressive approaches. Simultaneously, many of the chapter contributors to this edition have relied on the sound discussion and guidance of earlier authors of the four earlier editions of *Judging Dairy Products* and *The Sensory Evaluation of Dairy Products*. The current chapter authors retained many of the pertinent details and clearly stated descriptions of the so-called “ideal products” and the scope of various sensory defects pertaining to flavor, body and texture, color and appearance, as so adequately delineated by the forerunner sets of authors. Hence, the chapters dealing with given dairy product categories (e.g. Fluid Milk and Cream; Butter; Cheese; etc.) are in many cases extensively reliant on the discussions and perspective from earlier authors of the first four variations of this book. The current authors have inserted focus and discussion on updating the science of sensory assessment of the respective dairy products in line with ingredient changes, technological progress and the availability and application of modern sensory techniques.

The reader should recognize that a clear distinction exists between the concepts of “quality,” “flavor profile,” “preference” and “acceptability.” The primary aim of this book is to describe the subject of sensory quality, which is not directly associated with flavor profiles and not always directly associated

with consumer acceptability. Product quality and consumer acceptability of products vary throughout the United States and Canada. For instance, cottage cheese curds that may be evaluated as “firm/rubbery” are familiar and desirable to consumers on the U.S. West coast, while relatively “weak/soft” curds are more commonly preferred by consumers on the East coast. Additionally, it is generally presumed that vanilla ice cream consumers on the U.S. East coast prefer higher intensities of the “vanilla note” than customers from the West and/or Mid-West. Consumer acceptability of a particular product of one coastal region may differ from preferences in the Mid-West or on the opposite coast. Ideally, definitions of attributes should not deviate from one coast to another. Furthermore, as previously emphasized, quality, and the presence of specific sensory attributes – designated either historically or by industry professionals as product defects – are not necessarily related to consumer acceptance.



Quality in the eyes of official judges does not necessarily guarantee success in the marketplace

Many dairy products are defined in the U.S. Code of Federal Regulations (CFR). If product quality is perceived as the absence of sensory defects, the consequences of compositional changes of a given dairy food (as introduced or changed by CFR specifications) need not be reflected in quality changes. However, certain product characteristics may change as the result of formula alterations. For instance, reduction of the milkfat content of ice cream from 12 to 10% certainly could affect the given product’s sensory and hedonic characteristics without affecting quality. In defining various dairy products, reference has been made to the CFR throughout the book. The reader is cautioned that since changes in the CFRs may occur at any time, only the latest edition of this official document should be consulted for purposes of legal compliance.

Technological progress has eliminated some sensory defects of dairy products reviewed in previous editions of this text, but has also introduced some sensory attributes of dairy products not reviewed in previous editions. Some flavor descriptors or terms have continued in use over the years more by habit

than due to logic. In this edition, an effort has been made to bridge the traditional terminology with more advanced knowledge of the defects. By necessity, this transition process must be gradual, to preserve our ability to accurately communicate the sensory properties of dairy products.



Modern sensory analysis commonly relies on private sensory evaluation booths and computer software

The editors gratefully acknowledge the technical and creditable contributions by our chapter authors. Without their outstanding efforts and dedication to the field of the sensory evaluation of dairy foods, this book would not be complete. We also recognize the following individuals for their outstanding efforts and assistance in preparing this book by reviewing certain chapters: Rosyleen Aquino, Susan Duncan, Charlsia Fortner, Lisbeth Goddik, Jonathan Hopkinson, Luis A. Jimenez-Maroto, Robert T. Marshall, Tonya Schoenfuss and Bruce Tharp.

Although two of the authors of earlier editions of this book have passed away, we honor the pioneering work and original contributions of Dr. John A. Nelson (1890–1971; Montana State University) and Dr. G. Malcolm Trout (1896–1990; Michigan State University). We also recognize the 1988 volume, *The Sensory Evaluation of Dairy Products*, by Floyd W. Bodyfelt (1937–present; Emeritus Professor, Oregon State University), Dr. Joseph Tobias (1921–present; University of Illinois) and Dr. G.M. Trout, which has well-served many needs of dairy sensory scientists for two decades. May our newest volume serve you well as you contribute to the field of dairy sensory science.

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