

electrophoresis, Western blots, and confocal microscopy. Computer-aided techniques for quantitative structure-activity relationship (QSAR or SAR) of peptides and food proteins are discussed in Chapter 4.

Chapter 5 reviews the forces involved in emulsion formation and relates these to the forces that govern protein-lipid interactions. The mechanism of emulsion destabilisation and the interactions involved are also well discussed. The following chapter (6) covers foam structure, foam stability and relates these to the forces that govern protein-gas phase interactions. Protein interaction in gels is discussed in chapter 7. This gives a rather detailed account of protein gelation as a series of biochemical events and focuses on some of the biochemical mechanisms involved in the heat-induced gelation of thermally irreversible gels.

Chapter 8 is devoted to protein-polysaccharide interactions and discusses the different types of interactions in detail. An excellent review is given on the use of these interactions in food systems.

In chapter 9, four methods are discussed in detail on chemical and enzymatic modification of proteins with emphasis on changes in their functional properties. The methods covered include, (i) enzymatic hydrolysis of proteins to produce controlled-size peptides, (ii) deamidation of protein-bound asparagine and glutamine residues, (iii) the effect of charge on proteins before and after deglycosylation and dephosphorylation of proteins, and (iv) recombinant DNA-derived proteins.

Chapter 10 briefly reviews the various types of soy protein ingredients and products available commercially, methods for their preparation, their physicochemical and functional properties, and the current and possible functional applications of these ingredients. There is also an interesting chapter (11) on whey protein functionality. This chapter outlines the types of whey products currently available in the market. The factors affecting composition or characteristics of whey products are examined as well as the functionality of such products. The correlations between composition and functionality are discussed, followed by the uses of whey protein products in various foods.

Chapter 12 gives an interesting overview on colour as a functional property of proteins. Sections include light-scattering effects, role of proteins in browning and enzymatic reactions, followed by a short description of myoglobin, flavoproteins and cytochromes. Protein gel ultrastructure and functionality is dealt with in chapter 13. This chapter covers meat and dairy proteins, and the use of proteins as a wall material for microencapsulation. This review is designed to highlight some of the relationships between protein gel structure and functionality and to demonstrate some techniques used in studying these relationships.

The following chapter (14) is devoted to the use of protein-based fat mimetics instead of fat in various foods. The sections cover approaches to fat replacement in food products, requirements for a fat-replacement system, and compares protein-based fat-replacement ingredients such as Simplese<sup>®</sup>, Dairy-Lo<sup>™</sup>, LITA<sup>®</sup> and Trail-

blazer. The final chapter (15) reviews the development of edible films, permeability measurements, and type of edible protein coating and film.

Overall, there is a good selection of references associated with each chapter, which provides further reading in the subject areas. The index, design and layout of the chapters is good. The book is well produced, provides fundamental information and is a sound basis for understanding the basic principles involved in food protein functionality.

Vanda B. Galazka

**Biochemistry of Milk Products.** Edited by A. T. Andrews & J. Varley. Royal Society of Chemistry, Cambridge, 1994. pp. viii + 182. ISBN 0 85186 702 2. £39.50.

This book is the Proceedings of a one day Symposium organized by the Food Chemistry Group of the RSC Industrial Division, and held on 14 December 1993 at Reading University. It comprises set piece papers delivered by invited speakers during what must have been a very full day, and others deriving from poster presentations.

The former are, for the most part, well referenced reviews and the latter, mainly from the University of Reading, present new work. Altogether, the authors are representative of centres of dairy research in the UK, Ireland, the Netherlands, and Finland. The emphasis is heavily on starter cultures, enzymes, and the associated proteolysis, but the other active research area, the functional behaviour of milk proteins is by no means neglected.

Of the reviews, possibly the most detailed is that from Cork on the proteolysis of cheese during ripening. Only three of the 159 references, pre-date the mid-1970s, and just over half are to work published in the past 5 years. It is an up to the minute account of the current situation. This is followed by a shorter, but no less detailed (78 references), discussion by workers at Groningen of the manipulation of proteolysis in *Lactococcus lactis*, an example of what now may be accomplished with the enzymes in dairy fermentations.

A short, but succinct, review from Reading of new starter cultures for cheese ripening precedes three reviews on aspects of lactococcal proteolysis. The first, from NIZO, discusses the genetic engineering of pivotal proteins. It describes engineering studies on 'the cell envelope-located proteinases that initiate casein degradation, and the intracellular amino-peptidase N that has debittering capacity'. The second, from Birkbeck College and V.T.T., Finland, 'describes progress round the protein engineering cycle using chymosin as an example'. There is considerable experimental detail, but it points the way to the future. The third, from Reading, deals with peptidases from lactococci and the secondary proteolysis of milk products. Though only nine pages long, this covers more than fifty references to, mostly, recent literature.

The final two reviews are concerned with the func-

tionality of milk proteins. The first, from Cork, is a general review of functional milk protein products, the second is more specific. Authors from Edinburgh and Cornell combine 'to review some of the site-directed mutagenesis work which has been performed to investigate the basic properties of  $\beta$ -lactoglobulin, the putative function and finally the processing behaviour of this small milk-whey protein'. Both are up to date well referenced statements.

The shorter, more focused, chapters discuss aspects of specific products and processes. They include the functional properties of the products of chhana whey (chhana is a traditional Indian product used in confectionery), the investigation of the effect of fluid shear on the aggregation of whey protein concentrates, the debittering of  $\alpha$ -casein hydrolysates with an enzyme from *Aspergillus oryzae*, the effect of mild heat treatment on the denaturation of  $\gamma$ -glutamyltranspeptidase (an indicator for assessing heat treatments) in milk and some milk products, the keeping quality of pasteurized (72° for 15 sec) and high pasteurized (115° for 2 sec) milk, fouling in UHT processing, and the UF of sweet cream buttermilk.

The book itself is a mixture of typesetting and reprographics. The figures are clear and easy to follow, and there is an adequate index. Altogether, this is an essential, and relatively inexpensive, book for all those working, or interested, in the biochemistry of milk products. It is highly recommended.

K. T. H. Farrer

**Carbohydrate Polyesters as Fat Substitutes.** Edited by Casimir C. Akoh and Barry G. Swanson, Marcel Dekker Inc., New York, 1994. pp. viii + 269. ISBN 0-8247-9062-6. US\$ 125.

Reduction of fat content by the use of fat substitutes or fat replacers has become an important commercial area in recent years as food manufacturers seek to offer a range of palatable foods that appeal to consumers as products that aid their efforts to reduce their fat intake in line with nutritional advice.

This book is a detailed and wide-ranging account of carbohydrate polyesters as fat substitutes. The thirteen chapters cover a wide range of topics relevant to this area. The reviews of chemical and enzymatic synthesis, patent literature, emulsification and anti-microbial properties of sugar esters, potential markets and consumer demand, and regulations and applications of these products provide a very useful and detailed insight into the science, technology and economics of carbohydrate polyesters as fat substitutes. Chapters on other fat substitutes, nutritional aspects and supercritical fluid extraction and chromatography are also included.

Despite small amounts of overlap between some chapters, and the occasional typographical error, this book is generally well-edited. Although the references at the end of each chapter are very useful, some of the recent developments since early 1992 are not included, although some chapters include a few references from 1993. Sol-

ventless enzymatic synthesis of carbohydrate polyesters is one area that has developed to a significant extent since the appropriate chapter in this book was written.

The authors are clearly strongly committed to sucrose fatty acid polyesters, and they do not seem to dwell on any negative aspects. Thus, the index includes anal leakage of trialkoxytricarballylate, but not of sucrose polyesters. Loose stools caused by high intakes of sucrose polyesters are mentioned as causing difficulties with stool collection, but there is no detailed discussion of this aspect. The authors may feel by including the levels of Olestra in the petition to the Food and Drug Administration, they do not need to consider negative effects of the product at higher intakes, but it would have been useful in a text of this type to indicate how these proposed limits were arrived at.

Despite these reservations, the book will be an essential read for scientist and technologists interested in the area of fat substitutes, and the coverage of this subject is sufficiently broad and detailed to justify the purchase of this book.

M. H. Gordon

**Food Labelling Data for Manufacturers.** Based on McCance & Widdowson's *The Composition of Foods*. Published by the Royal Society of Chemistry and the Ministry of Agriculture, Fisheries & Food, Anon (1992). ISBN 0-85186-992-9.

This book has been published to help food manufacturers in their nutritional labelling of products. Key nutrients have been selected from the list of 42 in the 5th edition McCance and Widdowson's *The Composition of Foods* (a joint production by the Royal Society of Chemistry and the Ministry of Agriculture, Fisheries & Food), to include those laid down by the EC Directive 90/496/EEC on Nutrition Labelling for Foodstuffs which became law in October 1993.

There are about 1200 fresh, prepared and manufactured foods included in the book. The data have been recalculated from the original tables, in the form required by the EC Directive. Directive 'Group 1' nutrients are those listed first, and are energy (in kJ followed by kcal), protein, carbohydrate and fat. These are followed by 'Group 2' nutrients: total sugars, saturated fatty acids (saturates), fibre and sodium. Recalculated values for starch are also included as are the amounts of alcohol in alcoholic drinks in the format required by law. According to the Directive, nutrition information on food product labels may be derived from (a) analysis or (b) on calculation from the composition of the ingredients or (c) using generally established and accepted data. Data in the book will provide information for (b) and (c).

The book is an invaluable resource for manufacturers and the approach is especially useful for small manufacturers, with a wide range of products, who have no access to analytical facilities.

Ann F. Walker