



## Book Reviews

**Chemistry and Analysis of Hop and Beer Bitter Acids.** Edited by M. Verzele and D. Keukeleire. Elsevier Applied Science Publishers, Amsterdam, 1991. xx + 418 pp. ISBN 0-444-88165-4. Price: US\$146.00.

This book is undoubtedly a valuable contribution to the understanding of hops chemistry and beer bitter acids. Beginning with an overall review on hops, the authors proceed to unfold their theme in 17 further chapters on various aspects of the chemistry of the most important components in hop soft resins: the alpha- and beta-acids.

Individual chapters are devoted to the transformation products and reduced- and oxidized- derivatives of the alpha- and beta-acids, respectively. For example, the iso-alpha acids (represented by the isohumulones), which are produced by isomerization of the alpha-acids, are the main hop derivatives and contributors to the beer bitter taste. They represent more than 80% of all hop components occurring in beer. Reduced-derivatives of the isohumulones are studied in connection with off taste and odour development in beer, while formation of stale and cardboard flavour, ascribed to the presence of alkenals and alkadienals containing 6 to 8 carbon atoms is also discussed.

A chapter is devoted to the transformation and degradation products of the anti-isohumulones. These compounds show a bitterness level twice that of the isohumulones and could attract future interest in the beer industry. A number of procedures used to oxidize the labile beta-acids, with oxygen are described. The resulting bitter-tasting oil compounds (e.g. hulupones) are also important, since they have an effect on the surface tension of beer and therefore influence foam formation.

Characterisation studies and chemical structures are systematically presented for the relevant compounds, as well as suggested pathways for their formation mechanisms. The methodology for their isolation and analysis is also included, as well as protocols for their synthetic preparation, in a number of cases.

Various chromatographic methods for the analysis of bitter acids and hops are discussed, although overall, the method of choice appears to be gas chromatography and high resolution liquid chromatography. The authors are themselves pioneers in some of the techniques reported, and the book presents a thoroughly consistent and comprehensive account of the complex chemistry of the bitter acids, supported throughout by numerous references.

The closing pages highlight problems specific to each of the chapters and are abundant in thought-provoking suggestions for future research. The authors must be congratulated on the high quality and style of their book.

M. Naish

**Protein Interactions.** Edited by H. Visser. VCH, Weinheim, 1992. 386 pp. ISBN 3-527-28499-0. Price: £56.00.

This book consists of 19 chapters contributed by an impressive list of food protein chemists, and related scientists. The contributions are derived from the 201st Annual Meeting of the American Chemical Society, Atlanta, April 1991.

The first 3 chapters present general information on the forces involved in protein interactions. Ten chapters give detailed descriptions of aspects of milk protein chemistry. This includes a fascinating presentation of a novel model of casein micelle structure by the editors, which challenges the classical submicelle theories. The proposed theory accounts for some anomalies of the sub-micellar model—such as the behaviour of  $\beta$ -casein during cold storage of milk—and explains iso-electric gelation of casein. The remaining chapters describe studies carried out in other food protein systems including plant seeds, oat globulin, gelatin and yeast proteins.

The book should be essential reading for dairy protein chemists, and should also be useful to researchers in more general food and other protein systems. However, the work is too specialised for use in the teaching of food science and technology.

Generally, the book is quite well presented, with plenty of diagrams, and data in graphs and tables. However, the quality varies considerably between chapters.

Overall, the book is fair value for money.

A. S. Grandison

**Data Sourcebook for Food Scientists and Technologists.** Edited by Y. H. Hui. VCH, Weinheim, 1991. 976 pp. 438 tables. ISBN 1-56081-0092. Price: £85.00.

This handbook is a reference resource for food scientists and technologists worldwide. It covers the three main categories of information (Parts A–C).

Part A is *Chemical and Biological Data* and deals with 'Functional and economic food chemicals', 'Biotechnology' and 'Foodborne diseases and associated terminology'. Part B deals with *Product Categories Data*