

# Dairy Chemistry and Biochemistry

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## Preface

Milk has been the subject of scientific study for about 150 years and, consequently, is probably the best characterized, in chemical terms, of our major foods. It is probably also the most complicated and serves as the raw material for a very large and diverse family of food products. Dairy science has existed as a university discipline for more than 100 years; it is the oldest sector of food science (and technology), with the exception of brewery science. Since dairy chemistry is a major facet of dairy science, it might be expected to have been the subject of numerous books. This is, in fact, not so. During the past 40 years, as far as we are aware, only six books or series on dairy chemistry have been published in English, i.e. *Principles of Dairy Chemistry* (Jenness and Paton, 1959), *Dairy Chemistry and Physics* (Walstra and Jenness, 1984), *Fundamentals of Dairy Chemistry* (Webb and Johnson, 1964; Webb, Johnson and Alford, 1974; Wong *et al.*, 1988), *Developments in Dairy Chemistry* (Fox, four volumes, 1982, 1983, 1985, 1989), *Advanced Dairy Chemistry* (Fox, three volumes, 1992, 1995, 1997) and *Handbook of Milk Composition* (Jensen, 1995). Of these, *Principles of Dairy Chemistry* and *Dairy Chemistry and Physics* were written essentially for senior undergraduate students. The other four books/series were focused principally on lecturers, researchers, senior postgraduate students and senior production management. Thus, at present there is a lack of books written at senior undergraduate/junior postgraduate level specializing in dairy chemistry/science. This book is intended to fill that gap and should be as useful to graduates working in the dairy industry as it is to those still studying.

The book assumes a knowledge of chemistry and biochemistry but not of dairy chemistry. As the title suggests, the book has a stronger biochemical orientation than either *Principles of Dairy Chemistry* or *Dairy Chemistry and Physics*. In addition to a fairly in-depth treatment of the chemistry of the principal constituents of milk, i.e. water, lactose, lipids, proteins (including enzymes), salts and vitamins, various more applied aspects are also covered, e.g. heat-induced changes, cheese, protein-rich products and the applications of enzymes in dairy technology. The principal physical properties are also described.

To facilitate the reader, the structure of various molecules mentioned frequently in the text are given in appendices but we emphasize that a good general knowledge of chemistry and biochemistry is assumed. The chemical composition of the principal dairy products is also included.

The book does not cover the technology of the various dairy products, although brief manufacturing protocols for some products are included to facilitate discussion; however, a number of textbooks on various aspects of dairy technology are referenced. Neither are the chemical analyses, microbiology and nutritional aspects of dairy products covered, except in a very incidental manner. The effects of dairy husbandry on the composition and properties of milk are discussed briefly, as is the biosynthesis of milk constituents; in both cases, some major textbooks are referenced.

We hope that the book will answer some of your questions on the chemistry and biochemistry of milk and milk products and encourage you to undertake more extensive study of these topics.

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