

ionisation (FI) and field desorption, which are focused upon in Chapter 8. Chapter 9 is concerned with ion sources, formations and applications of fast atom bombardment (FAB) and liquid secondary ion mass spectrometry (LSIMS). The ion sources, sample preparation and the application of matrix-assisted laser desorption/ionisation (MALDI), are covered in Chapter 10. The penultimate chapter discusses another important soft ionisation technique, namely electrospray ionisation (ESI). Hyphenated techniques, such as chromatography-mass spectrometry coupling, tandem mass spectrometry and ultrahigh-resolution mass spectrometry, are covered in the final chapter.

This volume provides detailed information on many aspects of mass spectrometry, and is a useful textbook for students in chemistry and the life sciences who will encounter such techniques as powerful analytical tools during their studies. It is also recommended to novices to mass spectrometry from other research fields.

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S. Doonan, Nucleic Acids, The Royal Society of Chemistry, Cambridge, UK, 2004 (vi + 185 pp., £14.95, ISBN 0-85404-4817).

Nucleic acids are responsible for the continuation of all forms of life on earth, and are essentially informational macromolecules—and stretching a point they are a ‘form’ of carbohydrate polymer. DNA and RNA are two types of nucleic acids: DNA encodes the instructions that are passed on from parents to progeny as the carrier of genetic information; RNA is the related molecule of DNA, which serves the same function in some viruses, such as HIV. This volume provides general information about the structures and biological roles of nucleic acids, and their structure–function relationships, and is comprised of five sections.

The first section covers the biological roles of the nucleic acids, beginning with the discovery of DNA, followed by DNA function as the carrier of genetic information, and finally introduces general information regarding molecular biology. The second section deals with the covalent structures of nucleic acids, firstly comparing the building blocks of DNA and RNA, then describing nucleosides, nucleotides and inter-nucleotide linkages. Information

about shorthand notations, oligonucleotides and the size of nucleic acid is included in this section. The three-dimensional structure of DNA and its implications for replication is discussed in the third section. This starts with a general description of the complete structure of DNA molecules, followed by detailed information about the DNA double helix structure, and finishing with discussion of nucleosomes and chromosomes, and the processes of DNA replication and repair.

The fourth section focuses on the processes of transcription (DNA to messenger RNA) and translation (messenger RNA to protein) of the genetic message. Some information about ribosomal and transfer RNA is also included. The final section introduces advanced methodologies in DNA analysis, such as gel electrophoresis, restriction enzymes, DNA sequencing, and the polymerase chain reaction (PCR), which is one of the most widely used tools in molecular biology. Finally, computer applications in DNA chemistry and chemical synthesis of oligonucleotides are discussed.

This volume is part of the RSC *Tutorial Chemistry Texts* series and provides a clearly and concise overview of nucleic acid chemistry, which is highly recommended for undergraduate students in chemistry and related fields and all individuals requiring informed background information on this interesting topic.

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S. Roller (Ed.), Natural Antimicrobials for the Minimal Processing of Foods, Woodhead Publishing Ltd, Cambridge, UK, 2003 (xii + 306 pp., £115.00, ISBN 1-85573-669-1).

A reduction in the risk of food intoxication is possible by addition of antimicrobial agents to food products. Such antimicrobial agents are aimed at decreasing the growth of microorganisms naturally present in food, thus increasing safety, quality and shelf life of food products. Commonly used antimicrobial agents are synthetic (e.g. nitrite and sodium benzoate), some of which exhibit potential toxic effects by either triggering allergenic reactions in sensitive individuals or via the generation of carcinogenic by-products. To overcome these problems, natural antimicrobial products such as nisin, natamycin and organic acids are

increasingly used in foods and beverages. However, although a wide range of such natural antimicrobials show activity in vitro, only a few are efficient and therefore used in the food industry. This volume provides expert reviews from international contributors on the properties, applications and trends of some natural antimicrobials when used in combination with mild processing techniques for food preservation.

The introductory chapter presents concerns regarding food safety and issues about the use of antimicrobials in food processing. The following two chapters review the use of bacterial nisin in multifactorial food preservation and in meat decontamination processes respectively. Nisin is a bacteriocin peptide (composed of 34 amino acid residues) generated by lactic-acid bacteria that is non-toxic to humans. Its antimicrobial activity has been exploited in food preservation for more than 50 years, either as a simple material or in combination with physical treatments such as temperature or high pressure. The fourth chapter focuses upon the activity of pedicidin-like cystibiotic bacteriocins produced by lactic acid bacteria in food preservation, whilst the subsequent four chapters present the uses and trends of natamycin, organic acids, animal antimicrobials and chitosan, respectively. Chitosan extracted from marine exoskeletons displays an antimicrobial activity in vitro that is lost in complex food systems (which is the case for many natural antimicrobials). However, it is used in combination with synthetic anti-microbial agents as a food preservative. The next

three chapters focus upon the use of spices, herbs and plant antimicrobials, as applied to specific foods, fruits and vegetables. The final four chapters detail the use of natural antimicrobial agents as edible coatings, the use of natural antimicrobials in combination with gamma radiation, natural antifungal agents for bakery products, and EU regulations covering new food additives, ingredients and processes, respectively.

An appendix of useful websites, which includes UK and US government sites, sites for international organisations and food additive manufacturers, and food regulation websites, is also provided in this volume. In conclusion, *Natural Antimicrobials for the Minimal Processing of Foods* presents both detailed theoretical information as well as applied examples, making it a valuable reference tool for food industry professionals.

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