

# Preface

Capillary electrophoresis (CE) is a modern analytical technique that allows the rapid and efficient separation of sample components based on differences in their electrophoretic mobility as they move or migrate through narrow-bore capillary tubes. Since its inception in the early 1980s,<sup>1</sup> CE has become established as a routine technique within many fields of analysis. Indeed, CE has been available in the form of integrated and automated commercial systems for most of the past decade. In that time, several texts have been published that explain the theory of CE and many applications have also been published. However, the focus of these texts and applications has been predominantly in the fields of pharmaceutical science and biochemistry. There is a lack of practical knowledge of CE in food analysis laboratories and few applications have been developed that are specific to food analysis.<sup>2-5</sup>

The uptake of CE by food analysts has been hampered by the lack of literature resource dedicated to the application of CE to food analysis. To address this issue, this handbook *Capillary Electrophoresis for Food Analysis: Method Development* has been written to support and encourage the development of CE methods specifically for food analysis. For many food analysts, CE will be a new technique, while others may have some experience of it. Whatever the level of experience of CE, this handbook should offer the reader the basic information and guidance needed to make constructive use of CE for the development of new separation methods.

The handbook is organised into chapters, which take the reader through brief and accessible descriptions of CE theory and its modes of separation and detection, to more detailed explanations of the process of developing new CE methods. To give a summary of the current scope of CE applications to food analysis, a chapter has been included that tabulates details of methods from published papers. To support the method development chapters, appendices are included that contain worked examples of CE method development. As will become apparent to the reader, CE offers a great deal of flexibility, particularly in terms of tailoring the basis of separation to meet analytical needs. However, to maintain priorities and to keep to a manageable length, this handbook concentrates on the two most commonly encountered modes of CE, namely, capillary zone electrophoresis (CZE) and micellar electrokinetic chromatography

(MEKC). These two modes of separation between them account for the majority of published applications and a grounding in the development of CZE and MEKC methods will provide a firm basis for branching out further with CE.

The development of this handbook would not have been possible without the funding and support of the Ministry of Agriculture, Fisheries and Food (MAFF). The handbook is a result of a project that was funded in response to the 1998–99 MAFF Food Research Requirements Document. We thank MAFF for funding the Postdoctoral Research Fellowship for Richard Frazier and for providing the funding for Elizabeth Inns who assisted the development of the CE method for the simultaneous analysis of sweeteners, colours and preservatives in soft drinks that is described in Appendix C. We are also grateful to colleagues at several institutions for their valuable input to this handbook. Helen Brown, Li Day, Paul Drake and Nick Bird at Campden & Chorleywood Food Research Association (CCFRA), David Bright, Mike Housden and Patrick McCabe at Aspland & James Limited, and Patrice Larger and Chris Tier at Unilever Research all contributed their valuable time to meet with us and discuss their needs for the content of this handbook. We also thank John Salter at Dr Bernard Dyer & Partners and Mansoor Saeed at LGC for valuable discussions.

## References

- 1 J. W. Jorgenson and K. D. Lukacs, *Science*, 1983, **222**, 266–272.
- 2 P. F. Canalon, *J. AOAC Int.*, 1995, **78**, 12–15.
- 3 J. Lindeberg, *Food Chem.*, 1996, **55**, 73–101.
- 4 S. Swedberg, in 'Instrumental Methods in Food Analysis', ed. J. R. J. Paré and J. M. R. Bélanger, Elsevier, Amsterdam, 1997, Ch. 9, pp. 367–394.
- 5 R. A. Frazier, J. M. Ames, and H. E. Nursten, *Electrophoresis*, 1999, **20**, 3156–3180.