Preface

For ages reputed researchers have attempted to "create", or otherwise improve, analytical instruments and methods to respond to scientific problems. In recent years the analytical techniques have reached new prominence and the new techniques have gained the adjective of emergent.

This monograph, which is one more of a series of issues periodically published by Grasas y Aceites journal, surveys the analytical techniques that are today called emergent techniques, and are used in the field of fats and oils. At the outset it can be thought that for any food commodity there is invariably a traditional technique that can still be useful. As will be seen, however, almost all the emergent techniques, both complex and simple, produce results that are not easily attained with those traditional techniques.

Two common strands are evident in all these analytical techniques. One is the validation of the analytical method and the other is the handling of large amounts of data. There are deliberately two chapters at the end of the volume dealing with these subjects. The concept of validated methods of analysis and the explanation of their different elements are the main objectives of the validation chapter together with basic norms to follow in a validation process or how to conduct validation studies in house or by using inter-laboratory comparison studies. The chapter on Chemometrics presents its fundamentals by means of a quick overview of the most relevant techniques for data display, classification, modelling and calibration complemented with two emerging techniques based on Genetic Algorithms and Artificial Neural Networks.

Analytical laboratories worldwide demand methodologies providing rapid and reliable analytical information with reduced operating costs. Thus, direct analysis has become an important tool in the reduction of costs, by establishing a reliable by-pass to preliminary analytical operations, while the supercritical extraction is becoming a standard method for the preparation and analysis of lipid-containing sample matrices besides being an environmentally-benign technique.

The sophisticated analytical methods based on isotope analyses are included on both nuclear magnetic resonance and mass spectrometry as ways of obtaining information of the key stable isotopes and as an alternative to chromatographic techniques in the detection of adulteration among other subjects.

Spectroscopy is a set of techniques (near-infrared, mid-infrared and Raman) whose time has arrived because they are unusually fast compared to other analytical techniques, it is non destructive and often not sample preparation is required, although the price to be paid is the use of mathematical procedures. Other analytical techniques that each one has its own chapter include solid-phase extraction, which allows the isolation of certain lipid classes prior to chromatographic analysis, chromatography with thermostable polar capillary columns and chemiluminiscence, whose methods, though promising, have not been widely applied in food technology. Finally,

a chapter examines the current state-of-the-art of the design, technology and sensing mechanism of various types of sensors, placing special emphasis on the food applications.

Grasas y Aceites journal has endeavoured, by the recruitment of eminent and respected world experts, to ensure that the result is authoritative and up to date. The result is this monograph that is the work of the contributing authors.

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