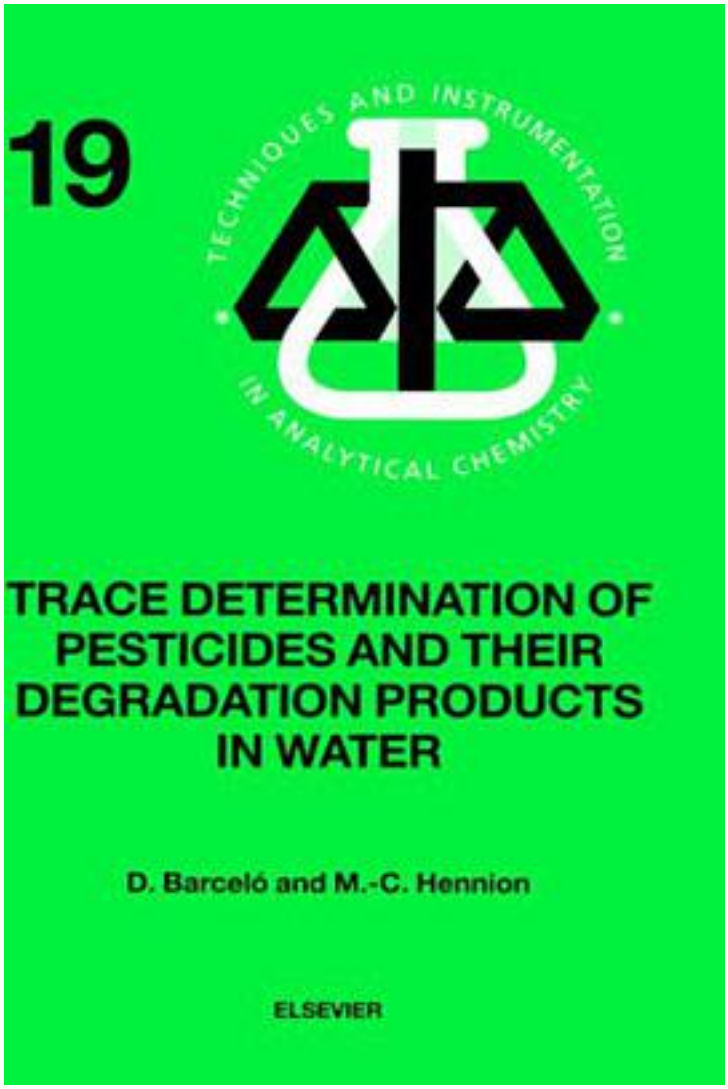
Trace Determination of Pesticides and their Degradation Products in Water (BOOK REPRINT), Volume 19 (Techniques and Instrumentation in Analytical Chemistry)



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The book covers a critical compilation of analytical methods used for the monitoring of pesticides and their degradation products in water. It contains up-to-date material and is the direct result of the authors' experience in the field of pesticide analysis. The book is structured in six chapters, starting from general aspects of pesticides like usage, physicochemical parameters and occurrence in the environment. A second chapter is devoted to sampling from water matrices, stability methods of pesticides in water and quality assurance issues. The general chromatographic methods for pesticides are reported, including the newly developed electrophoresis methods and GC-MS and LC-MS confirmatory analytical methods. Sample preparation methodologies, including off-line and on-line techniques are described in the next two chapters, with a comprehensive list of examples of pesticides and many metabolites, including the use of different GC-methods and LC-methods. The final chapter is devoted to the development of biological techniques, immunoassays and biosensors, for the trace determination of pesticides in water samples. The book answers one of the key problems in pesticide analysis: the diversity of chemical functional groups, with varying polarity and physicochemical properties. Pesticides and their metabolites have received particular attention during the last few years in environmental trace-organic analysis. For instance, in the case of groundwater, the use of pesticides has become a cause for concern. Under the right conditions, pesticides, such as fertilizer nitrogen, can move through the soil into groundwater, a phenomenon once thought improbable. The movement of agrochemicals in surface water flow can be, in some instances, a major problem, specially in the case of water soluble pesticides that are generally transported to estuarine and coastal waters. Estuarine waters feature gradients of both pollutant concentrations and physicochemical characteristics such as salinity, turbidity and pH, and all these parameters must be carefully considered when developing methods of analysis for trace organics in estuarine waters. One of the key parameters in analytical determination is the environmental sampling. Different protocols and devices are needed for sampling sea-water samples - usually using large sample volumes of more than 50 litres either with LLE or SPE, with the problems encountered due to dissolved and particulate matter - which is different from drinking water and well water sampling. The representativeness of the sampling is also of concern.The sample preparation of organic compounds from water matrices has been recognized to be a bottleneck and it has been traditionally neglected in the literature. We should comment following R.W. Frie's ideas - that the most sophisticated hardware is useless if the chemistry in the protocol does not work. During the last few years new adsorbents have appeared - carbon type, polymeric sorbents with high capacity and immunosorbents - which can more efficiently trap the more polar compounds. The development of advanced automation methods based, usually on solid phase extraction techniques - PROSPEKT, OSP-2 and ASPEC XL - are examples of commercially available equipment that are of growing importance. These systems are generally coupled to LC and GC techniques. Sampling and sample handling can not be regarded as separate techniques in the analytical process and both should be integrated into the whole analytical determination. For this reason, validation and confirmation methods, such as mass spectrometry, either GC-MS and/or LC-MS, are needed. These serve to check the quality assurance of the developed method. The discussion between multiscreening versus specific methods of analysis and the

influence of the matrix (ground, surface and estuarine-water), is also a point of concern due to the diversity of chemical classes within the compounds of study. Finally the use of rapid methods of analysis, which refer basically to biological techniques, biosensors and immunoassays are also of growing interest for the determination of pesticides in environmental matrices. The rapid development of these techniques, being more sensitive and that can work at different pH and drastic environmental conditions, like very different pH and salinity values, makes that these methods are very useful and complementary to conventional GC and/or LC techniques for the determination of pesticides.

作者介绍:

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