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FOREWORD

The *7th International Symposium on Liquid Chromatography–Mass Spectrometry, Supercritical Fluid Chromatography–Mass Spectrometry, Capillary Electrophoresis–Mass Spectrometry and Tandem Mass Spectrometry*, held in Montreux from October 31 to November 2, 1990, again showed the rapidly growing interest in this field of research. This was clearly reflected by the attendance of about 240 persons, the largest number so far in this series.

The scientific level of the symposium was very high, and good discussions were held, demonstrating, among other things, that the number of liquid chromatography–mass spectrometry (LC–MS) users is growing enormously, outnumbering the people in LC–MS development.

Basically, the combination of methods consists of the separation unit, the interface and the mass spectrometer. Although the emphasis was more on the last two aspects in the past, in this symposium developments were reported in all three areas, and this also reflects the fact that strong emphasis is placed on developing practical applications.

Separation techniques receiving greatest attention at present are based on LC, supercritical fluid chromatography and capillary electrophoresis. Several "incompatible" LC systems have been investigated. In particular, ion-pair and ion-exchange chromatography, coupled with electrospray interfacing, is apparently becoming a practical reality. The problem of non-volatile buffers in the mobile phase was addressed by several research groups. The replacement by volatile buffer systems was demonstrated, as was on-line mobile phase switching, miniaturization for low-flow-rate interfaces and the use of hybrid separation methods, such as pseudo-electrochromatography, which allows voltage programming across a packed fused-silica column.

A similar hybrid approach is also being adopted in interface development. At present, the four most widely used interfaces are particle beam, thermospray, continuous-flow fast atom bombardment (FAB) and electrospray. The recently introduced interfaces are often combinations of the various underlying basic principles.

Thermospray is still the most popular interface for routine use, because it operates at conventional flow-rates and can handle compounds with a wide polarity range. The particle-beam method is advancing strongly, because it is robust and very straightforward to use. While the instrumental aspects of continuous-flow FAB are hardly developing, it appears to provide a useful analytical tool for polar compounds in the m/z range < 2500. The heated nebulizer interface is clearly performing very well, being robust and, as a consequence, an attractive approach in high-throughput applications. The major interest with respect to new instrumental design centred on electrospray and ion spray techniques. In particular, they open up avenues to the detection of high-molecular-weight proteins and glycoproteins. Two manufacturers presented data on an antibody of 148 000 dalton, yielding molecular weight information with a triple quadrupole instrument.

Developments in mass analysers are also a strong influence in the field of combination methods. Recent work on ion traps demonstrates the high mass capability at 45 000 dalton, high sensitivity and extremely good MS–MS performance of these

devices. Further, high resolution and array detection was shown by a magnetic sector instrument with both thermospray and electrospray.

Analyte characteristics are very important for the overall success of any LC–MS approach. Derivatization was shown to improve detection performance substantially in both the particle-beam and thermospray techniques. The latter was demonstrated in even a fully automated system, exhibiting satisfactory quantification performance. A remarkable observation was that different folding of macromolecules probably results in differences in charge distribution in the electrospray technique. An interesting discussion was held on the basic mechanism of ionization in electrospray and on the nomenclature to be used in LC–MS.

The conclusion to be drawn from this symposium is that LC–MS and related combination methods have a great future, because all building blocks —separation, interfacing, ionization and mass analysis— are undergoing vigorous development, while the basic instrumentation is already a very useful analytical tool in many laboratories.

The next meeting will be held in Ithaca, NY, July 17–19, 1991, and the next European LC–MS meeting will be held on November 4–6, 1992, in Montreux.

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