Journal of Chromatography A, 1221 (2012) 41

Contents lists available at SciVerse ScienceDirect

Journal of Chromatography A

journal homepage: www.elsevier.com/locate/chroma

Editorial

Editorial on "Capillary and microchip electrophoresis: Challenging the common conceptions" by M.C. Breadmore

Capillary electrophoresis (CE) has been available as an analytical technique for more than 30 years and has been applied routinely to a wide range of samples. It is considered to be a high resolution technique, exhibiting good separation speed and also demonstrating broad flexibility arising from the ease with which the background electrolyte can be changed. On the other hand, CE is often considered to be a relatively insensitive technique and to be somewhat irreproducible. The latter aspect is particularly important when CE is to be considered for use in a regulatory method. Scaling of CE down to the microchip format has been a more recent development and microchip electrophoresis (ME) offers enormous promise for very rapid analyses using extremely small volumes of sample, performed at relatively low cost. However, ME also has some significant drawbacks and it is fair to say that the uptake of ME, especially in routine applications, has been less that initially expected.

In this review, the above conceptions relating to the advantages and disadvantages of both CE and ME are examined critically. These two techniques are evaluated in terms of their speed, sample size, cost, sensitivity and repeatability, with direct comparisons being made wherever possible with liquid chromatographic (LC) methods. It is shown that the commonly perceived disadvantages of CE and ME relate directly to the scale at which the separation is performed and to the amount of sample applied. Furthermore, the ability to easily apply sophisticated on-capillary sample enrichment techniques (generally referred to as stacking) can often bring CE and ME into the range where they are actually more sensitive than LC. In terms of improving the repeatability of CE and ME, the key parameter is maintaining a constant surface charge on the capillary or microchannel, leading to a stable electroosmotic flow. When this parameter is controlled, CE and ME can exhibit similar repeatability to LC.

Associate Professor Breadmore from the Australian Centre for Research on Separation Science (ACROSS) at the University of Tasmania, Hobart, Australia is an exciting young researcher who has become very well-known for his contributions to CE and ME. In particular, Associate Professor Breadmore is recognised widely for his innovative approaches to the design of highly effective stacking techniques which greatly enhance the sensitivity of CE and ME. I was therefore especially pleased that he agreed to accept my invitation to prepare a review for this Editors' Choice issue of *Journal of Chromatography A*. This thought-provoking and informative review will be of great value to both experts and novices in the field and I am sure that it will provide an outstanding resource of information on this topic.

Tasmania, Australia

Paul R. Haddad

Available online 25 October 2011

0021-9673/$ – see front matter
doi:10.1016/j.chroma.2011.10.064