

Multifunctional nanoflow sheath liquid interface for CE-MS

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Gold statement

- Understand a new nanoflow Sheath-liquid CE-ESI-MS interface
- Learn the benefits using this new interface
- Discover the new possibilities for sensitive and routine applications of this new concept

Introduction

CE-MS offers great separation of charged analytes, however, a major disadvantage of standard electrospray (ES) interfacing is the low concentration sensitivity, mainly due to the high sheath liquid flow rate in contrast to the small peak volumes. In recent years, novel designs focused in miniaturization with micrometer emitter tips to enable nanospray flow rates [1]. By these means, remarkable improvements in sensitivity from 10 to 100 times in comparison to conventional interfacing were reported [2, 3]. While these improvements in sensitivity are beneficial, the ease of use and handling might be limited because of fragile parts and small dimensions.

Body

Here, a nanoflow sheath liquid CE-MS interface with two movable capillaries inside a glass emitter is described [4]. The setup enables a separation mode and a conditioning mode to guide the separation capillary effluent either into the electrospray or to the waste, respectively. This allows to exclude parts of the analysis from MS detection and unwanted matrix components reaching the mass spectrometer, comparable to divert valves in LC-MS coupling. Also, this function improves the overall robustness of the system by reduction of particles blocking the emitter. Preconditioning with electrospray interfering substances as well as the application of coating materials in between analyses is possible, without removing the separation capillary even with running electrospray. The functionality of the interface is demonstrated by analyses of heavy matrix bioreactor samples. Applications for both anions and cations at both low and high EOF conditions in combination with both ESI positive and ESI negative at different ESI-MS instrumental set-ups demonstrate the versatility of the interface. Overall, this interface enables a more convenient installation of the interface, improved handling with an extended lifetime of the emitter tips and additional functions compared to previous approaches.

Conclusion

The presented novel CE-MS interface combines the advantages of sensitivity of nanoflow CE-MS-coupling with simplified handling and new possibilities for routine work with interfering conditioning or coating steps.

References

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