Online post-column solvent assisted and direct solvent-assisted electrospray ionization for chiral analysis utilizing LC-MS/MS

Hatem Elmongy, Mohamed Abdel-Rehim

Department of Environmental Science and Analytical Chemistry, Stockholm University, Stockhlom, Sweden

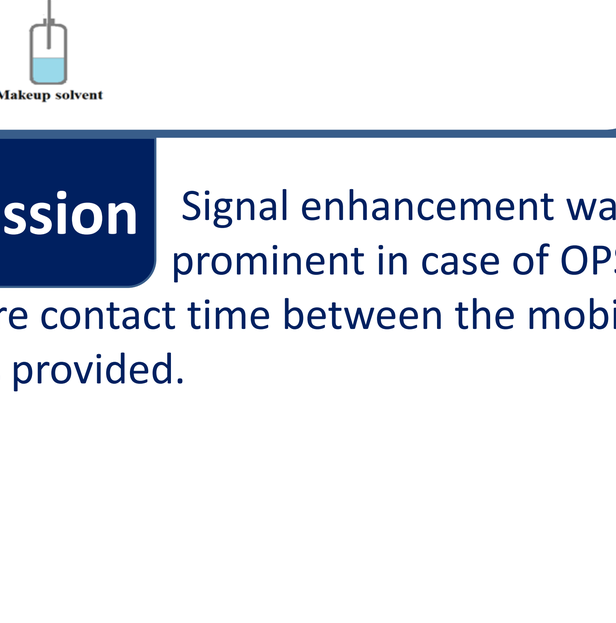
Introduction

The low or non-polar solvents of the mobile phase in normal phase chiral separations hinder the ionization of the analyte molecules at the ESI-interface. Incorporation of assistant polar solvents in the mobile phase would enhance the ionization of the analyte molecules at the ESI-interface hence the signal intensity. The solvent assisted electrospray ionization (SAESI) approach is based on the introduction of assistant polar solvent directly into the ESI-interface under atmospheric pressure with the aid of the nebulizing gas. Online post-column solvent assisted ionization (OPSAI) approach is based on introduction of the assistant solvent by using a T-coupling that aid mixing of the sample solution with the assistant solvent.

Methods

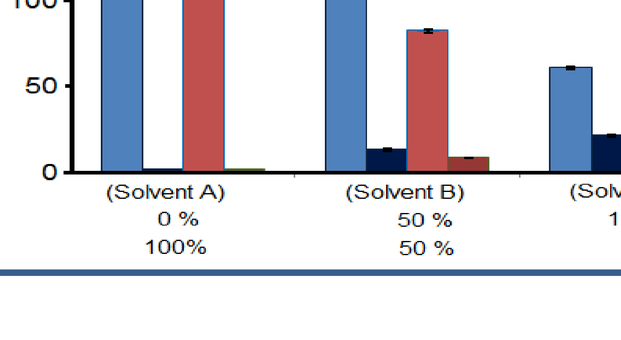
SAESI appraoch:

Based on direct insertion of the make-up solvent into the ESI chamber

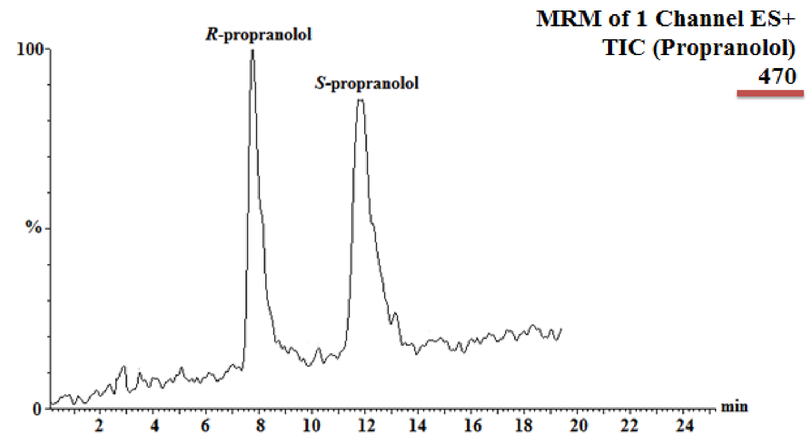


OPSAI appraoch:

Based on post-column solvent mixing in a T-coupling

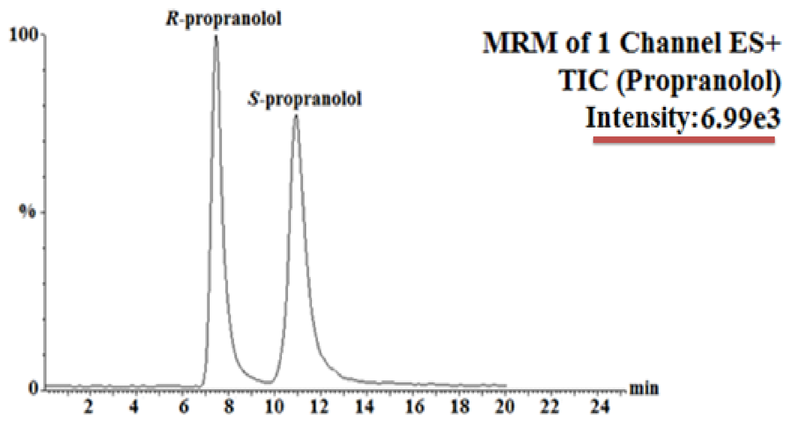


Chiral separation of propranolol without the use of make-up solvents showing low signal intensity and high base line drift.



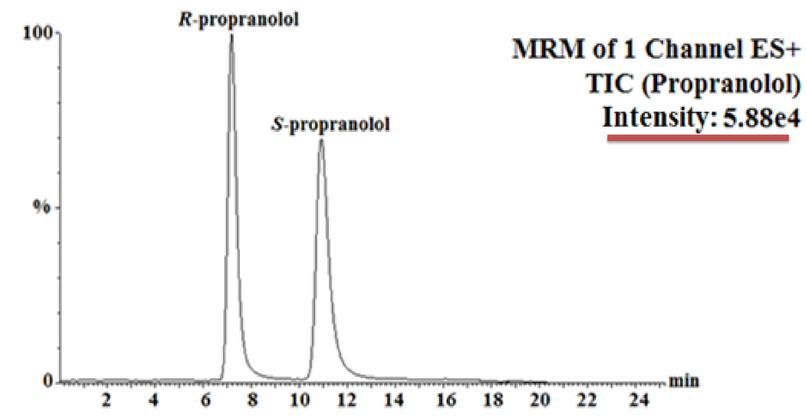
SAESI approach:

Best signal intensities were obtained using make-up solvent C (Water)



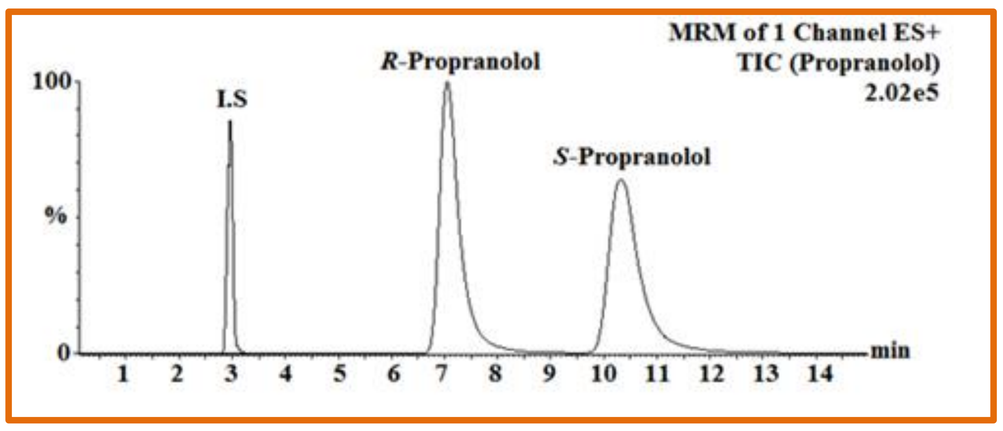
OPSAI approach:

Best signal intensities were obtained using make-up solvent A (IPA)



Chiral analysis of propranolol in **human plasma** utilizing MEPS & HPLC-MS

Spiked Plasma Sample



Results & Discussion

Signal enhancement was more prominent in case of OPSAI rather than SAESI due to more contact time between the mobile phase and make-up solvents was provided.

Conclusion

OPSAI and SAESI are two approaches that can be used to enhance sample ionization from non-polar solvent in normal phase chiral separations using HPLC-MS. Both approaches can enhance the peak signal intensity and can be easily integrated with the HPLC-MS system.

References:

[1] Hatem Elmongy, Hytham Ahmed, Abdel-Aziz Wahbi, Hirsh Koyi, Mohamed Abdel-Rehim, Online post-column solvent assisted and direct solvent-assisted electrospray ionization for chiral analysis of propranolol enantiomers in plasma samples, Journal of Chromatography A 1418, (2015)110–118.

[2]H.-Y. Wang, J.-T. Zhang, S.-S. Zhang, Y.-L. Guo, The remarkable role of solvent in reaction mechanism studies by electrospray mass spectrometry. Org. Chem. Front. 2 (2015) 990-994

Hatem Elmongy
PhD Student at Stockholm University
E-mail: hatem.elmongy@aces.su.se
Phone: +46-760936294