Nitromatrix provides improved LC-MALDI signals and more protein identifications

P. Kouvonen, L.A. McDonnell, R.M.A. Heeren, G. Corthals

The beneficial use of NC in MALDI-MS has previously been reported to provide better S/N and reproducibility as well as less alkali metal adducts. We have therefore investigated if additional beneficial properties of NC also existed for commonly employed proteomics-based LC-MALDI procedures. Specifically we studied the effects of NC as a matrix cofactor for prestructured sample supports (AnchorChip plates), and compared the performance with several alternative sample preparation methods recently reported in the literature. The work reported here describes a new method of mixing the NC-matrix solution with the LC-eluent prior to sample deposition and shows that a mixture of CHCA and NC in a complex solvent offers superior analytical results in several ways: most striking is the higher signal intensity, and that the signals last much longer, due to the robustness of the matrix formulation. We have tested the use of the nitromatrix on a single LC-MALDI preparation and found that at least ten reiterative analyses could be performed, resulting in total analysis times of more than 75 h (approximately 15 million laser shots). Consequently more than twice as many proteins could be identified than from a single analysis. This combination of longer, and stronger, MALDI signals provided an increase in the number of peptides, greater sequence coverage in MS/MS experiments and ultimately more confident peptide assignments.