Waters™

Note d'application

LCT Premier: Sensitive oa-Tof MS

Waters Corporation

This is an Application Brief and does not contain a detailed Experimental section.

Abstract

In this application brief, Waters provides an instrument that has ability to detect analytes with full spectral acquisition that would not have normally been detected without a pre-concentration step.

Introduction

The Waters LCT Premier Mass Spectrometer is the highest performance bench-top orthogonal acceleration time-of-flight (oa-Tof) LC-MS system available today. Improvements in ion source, transfer optics, vacuum system, Tof optics, and electronics have resulted in an oa-Tof instrument with unsurpassed ion transmission that gives an order of magnitude more sensitivity when compared to the previous Waters LCT Mass Spectrometer. With these improvements, Waters provides an instrument that has ability to detect analytes with full spectral acquisition that would not have normally been detected without a pre-concentration step.

Analytical application areas that benefit from sensitivity improvements include:

- Metabolite identification

- Impurity profiling in chemical synthesis
- Trace level component analysis in food or environmental samples
- Peptide/protein applications requiring full spectral sensitivity
- Natural product identification

Experimental

Infusion of leucine enkephalin

Leucine enkphalin (50 pg/µL in 50/50 MeCN/H_2O + 0.1% formic acid) was infused at 5 µL/min and measured by electrospray positive ionization on both the original LCT and the new LCT Premier mass spectrometers. Data was acquired in continuum acquisition mode at a rate of 1 spectrum/second. Figure 1 shows the comparative spectral data obtained from both instruments: the data from LCT Premier has typically 10 times more ion counts than the data from the LCT.

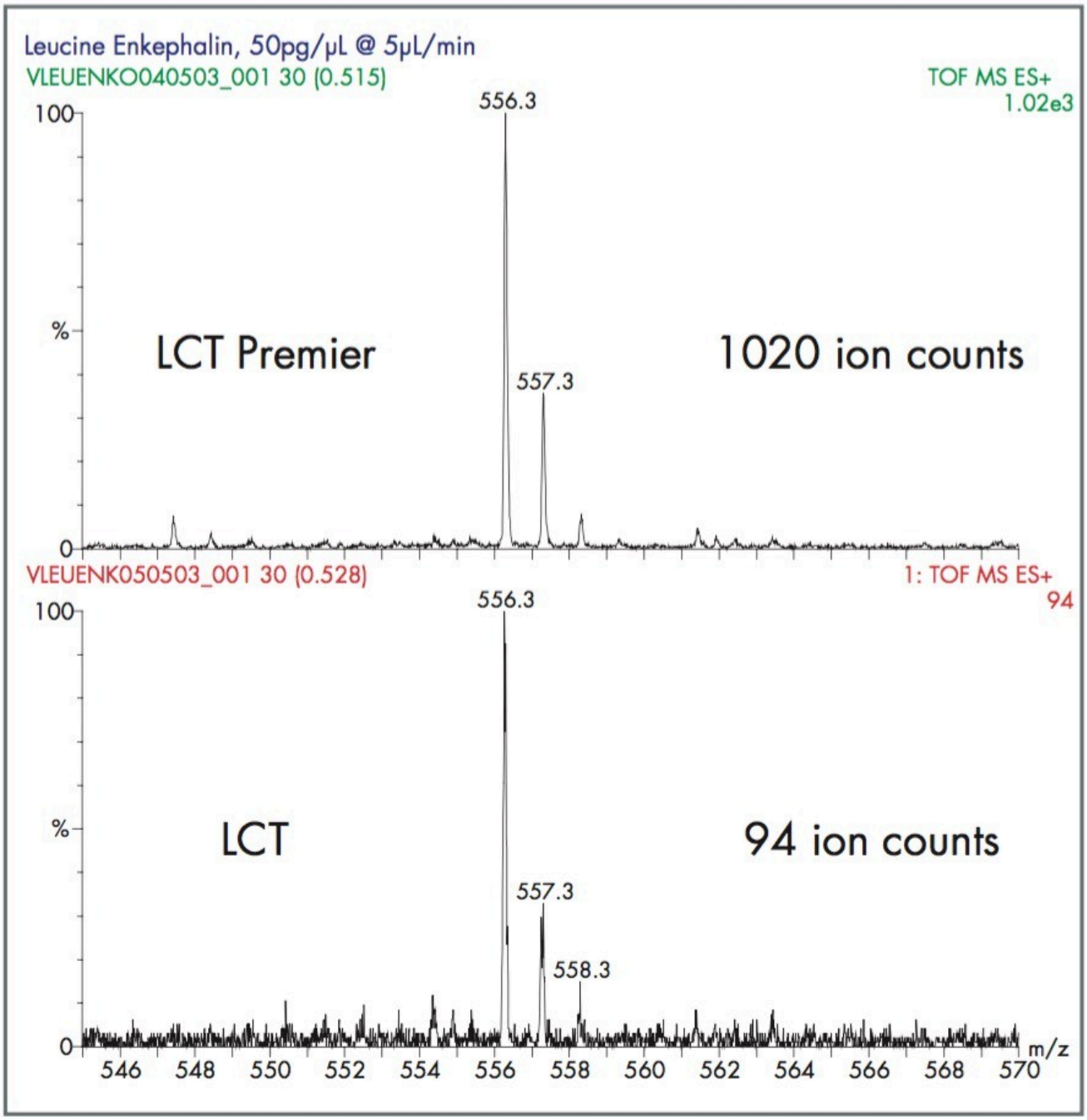

Figure 1. Infusion sensitivity of Leucine Enkephalin.

Chromatographic signal-to-noise measurement on the LCT Premier

Reserpine (1 pg/µL, 10 µL injection) was repeatedly injected onto a HPLC column. Using electrospray positive

ionisation, the ion at $[M+H]^+$ = 609.2812 was monitored and the signal-to-noise measurement was calculated for each of the peaks. The analytical conditions were:

HPLC:	Alliance HT 2795 Separations Module
Mobile phase:	75% methanol/25% water + 5 mM ammonium acetate
Column:	Waters Atlantis dC18, 3 µM, 2.1 x 30 mm
Injection vol.:	10 µL
Flow rate:	0.3 mL/min

Results and Discussion

Figure 2 shows the calculated signal-to-noise measurement for five repeat injections. The results show that the signal-to-noise measurement is typically in the region of 200:1 for 10 pg of reserpine on-column.

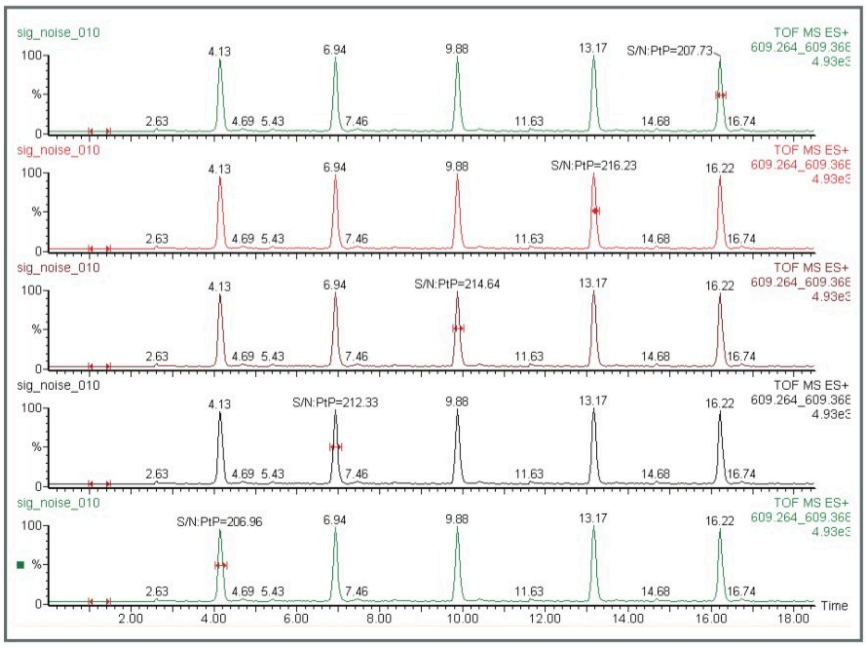

Figure 2. Signal-to-noise measurement of reserpine (10 pg).

In another example of the LCT Premier's full spectral sensitivity, Glu-fibrinopeptide (GFP) has been analysed by nano-LC with detection by NanoLockSpray. With positive ionisation, GFP produces a doubly charged ion at *m/z* 785.8. Figure 3 shows that with the LCT Premier's sensitivity, 500 attomoles of GFP have been detected with a signal to noise of approx 30:1 (upper trace). The peak just after the GFP peak at 22.12 mins is an interference at the same nominal mass.

The LCT Premier: high sensitivity oa-Tof MS for LC-MS applications.

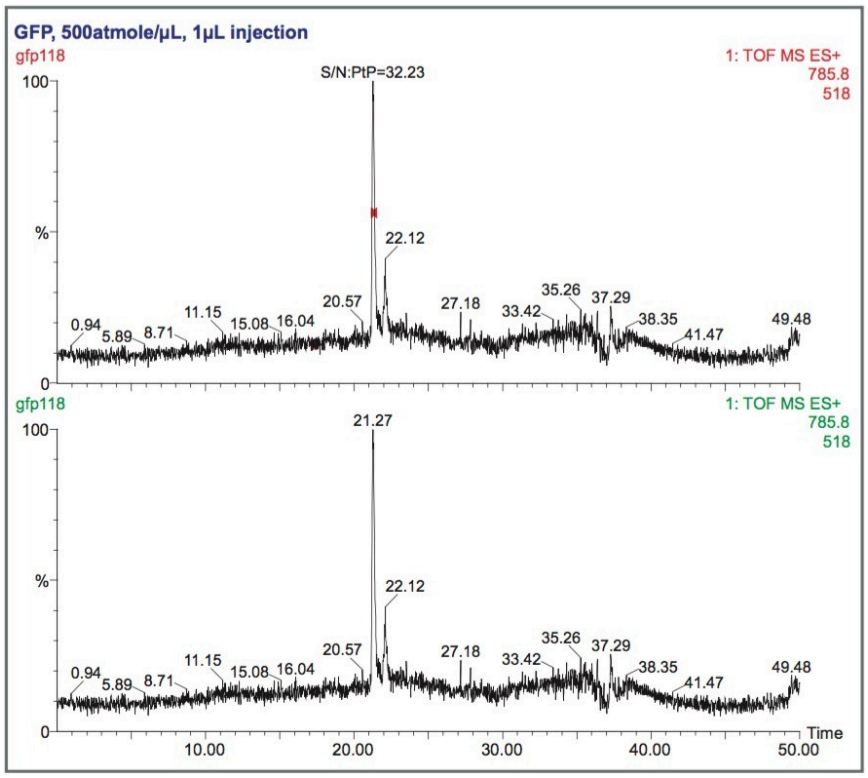

Figure 3. 500 attomole of GFP on-column.

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