

Southern L.J., Khan T
Waters Corporation, Manchester, UK.

INTRODUCTION

The Quattro Premier™ tandem quadrupole mass spectrometer has a newly developed ZSpray™ interface designed to meet the demands of high throughput analyses from biological matrices in the pharmaceutical industry. In this environment robustness and sensitivity are the driving forces for successful bioanalysis.

The following study has been developed to evaluate the source robustness by injecting samples of verapamil spiked into human plasma. The spiked plasma was protein-precipitated and the supernatant injected directly into the source. The study ran over a 24-hour period in positive ion electrospray ionization mode (ESI+ve).

OVERVIEW

The newly designed ZSpray source for the Waters® Micromass® Quattro Premier incorporates the best features of the Quattro micro™ API but with a smaller ion block that reduces the volume of the source chamber. The new features are highlighted in Figure 1 and are explained in Tech Note 720000826EN.

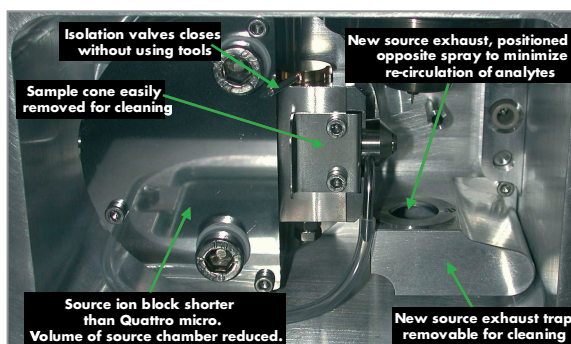


Figure 1. Features of the new ZSpray source of the Quattro Premier.

EXPERIMENTAL

A quality control (QC) solution of verapamil in human plasma was prepared at a concentration of 10 pg/mL. The QC's were then protein-precipitated by adding acetonitrile (1:1), the resultant mixture was centrifuged (ca 3000 rpm, 10 mins) and the supernatant taken for analysis by LC/MS/MS, 200 repeat injections were performed.

HPLC Conditions

LC System: Waters 2695
Column: Waters Atlantis™, C₁₈ 3.5 µm, 2.1 x 100 mm
Flow rate: 0.2 mL/min
Gradient: Isocratic at 55% water: 45% acetonitrile 0.1% Formic acid

MS Conditions

Mass Spectrometer: Waters Micromass Quattro Premier
Ion mode: ESI +ve
Capillary Voltage: 3.2 V
Cone Voltage: 40 V
Collision energy: 27 eV
Detection mode: MRM (455.40 > 165.10)
Dwell: 0.5 seconds
Collision gas: Argon (3.6 x 10⁻³ mbar)

RESULTS AND DISCUSSION

The MRM chromatograms for the verapamil analysis were integrated automatically using Waters proprietary ApexTrack™ peak integration algorithm and the resulting peak areas were plotted against injection number to show the reproducibility of response over the analysis period. A relative standard deviation of 3.0% was observed across all 200 analyses (see Figure 2).

The plot of peak area against concentration showed good linearity over the range 0.5-5000 pg/μL. The calibration line was plotted using a linear fit with 1/x weighting and gave a correlation coefficient of 0.9978, with all calibration points resulting in < 8% deviation (see Figure 3)

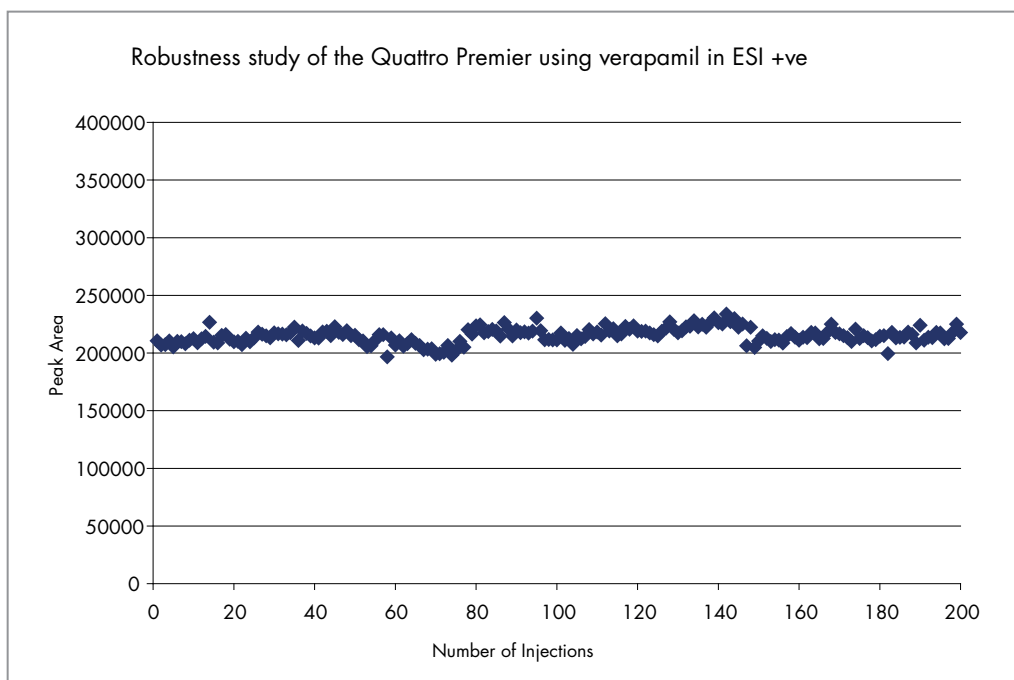


Figure 2. A plot of peak area for verapamil against a number of injections.

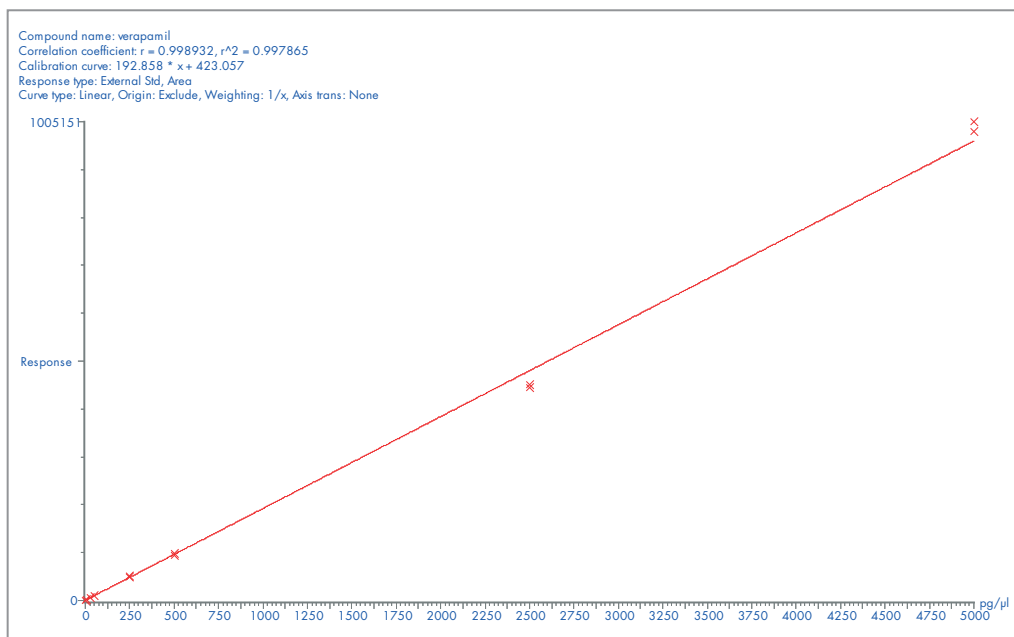


Figure 3. A calibration line for verapamil in protein-precipitated plasma.

CONCLUSION

The new Waters Micromass Quattro Premier tandem quadrupole mass spectrometer has been developed for quantitative LC/MS/MS. The robustness and reproducibility for samples on biological matrices has been evaluated by analyzing verapamil in protein-precipitated plasma.

The results also show that the Quattro Premier sensitivity was maintained with a relative standard deviation of 3.0% during 200 injections. This demonstrates the robustness of the modified ZSpray source for analyses from complex matrices. The calibration line resulted in a linear plot over 4 orders of magnitude (0.5 to 5000 pg/μl) with a correlation coefficient of 0.9978.

Sales Offices:

AUSTRIA 43 1 877 18 07

AUSTRALIA 61 2 9933 1777

BELGIUM AND LUXEMBOURG
32 2 726 1000

BRAZIL 55 11 5543 7788

CANADA 800 252 4752 X2205

CZECH REPUBLIC 420 2 617 11384

DENMARK 45 46 59 8080

FINLAND 358 09 506 4140

FRANCE 33 1 3048 7200

GERMANY 49 6196 400600

HONG KONG 852 29 64 1800

HUNGARY 36 1 350 5086

INDIA 91 80 2837 1900

IRELAND 353 1 448 1500

ITALY 39 02 27 4211

JAPAN 81 3 3471 7191

KOREA 82 2 820 2700

MEXICO 52 55 5524 7636

THE NETHERLANDS 31 76 508 7200

NORWAY 47 6 384 6050

PEOPLE'S REPUBLIC OF CHINA
86 10 8451 8918

POLAND 48 22 833 4400

PUERTO RICO 787 747 8445

RUSSIA/CIS 7 095 931 9193

SINGAPORE 65 6278 7997

SPAIN 34 93 600 9300

SWEDEN 46 8 555 11 500

SWITZERLAND 41 62 889 2030

TAIWAN 886 2 2543 1898

UK 44 208 238 6100

U.S.A. AND ALL OTHER COUNTRIES:

WATERS CORPORATION
34 Maple St.
Milford, MA 01757 U.S.A.
T: 508 478 2000
F: 508 872 1990
www.waters.com

Waters

WATERS CORPORATION
34 Maple St.
Milford, MA 01757 U.S.A.
T: 508 478 2000
F: 508 872 1990
www.waters.com



Opt-In! My Profile www.waters.com

For Complete Confidence

Waters, Micromass, ZSpray, Quattro Premier, Atlantis and Quattro micro are trademarks of Waters Corporation.
All other trademarks are the property of their respective owners.
©2004 Waters Corporation March 2004 720000824EN DE&LW-UL

