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# Analysis of Prostaglandins with the Quattro Premier XE

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

## Abstract

This application brief highlights about analysis of prostaglandins using Quattro Premier XE.


## Introduction

The accurate and precise measurement of candidate pharmaceuticals in biological fluids, environmental pollutants in soils and water or the measurement of toxins in various food matrices requires highly sensitive and specific assays. Over the past 10 years, LC-MS and LC-MS/MS using multiple reaction monitoring (MRM) has become the technique of choice for the trace analysis of analytes in complex mixtures. This has been made possible by the advent of atmospheric pressure ionization sources, such as ESI and APCI. The highly sensitive and specific nature of the tandem quadrupole mass spectrometer facilitates simple method development and highly selective assays.

The Waters Micromass Quattro Premier XE Mass Spectrometer with its T-Wave[1] technology has been specifically designed with high sensitivity analysis in mind. This new mass spectrometer incorporates enhanced electronics and a new high sensitivity detector for improved performance.

## Results and Discussion

### Increasing Negative Ion Sensitivity

The negative ion sensitivity of the Quattro Premier XE was compared to that of the Quattro Premier. The prostaglandin compounds were analyzed by LC-MS/MS using the Waters ACQUITY UPLC System. A 5 µL aliquot of the sample was loaded onto an ACQUITY UPLC BEH 2.1 x 50 mm $C_{18}$, 1.7 µm Column. The column was eluted with a gradient of 10–95% B over 2 minutes at 0.8 mL/min, where A=10% acetonitrile in 0.1% formic acid and B=80/20% acetonitrile/methanol. The column eluent was monitored by negative ion ESI, using the MRM transitions 351>271 for prostaglandins $D_2$ and $E_2$, and the MRM transition 353>193 for prostaglandin $F_{2a}$. The resulting XIC chromatograms for prostaglandin $F_{2a}$ using the Quattro Premier XE and Quattro Premier are displayed in Figure 1. Here we can see that with the Quattro Premier XE peak area of the

analyte is increased by a factor of approximately 10 compared to the Quattro Premier. A ~9-fold increase in peak area was obtained for prostaglandins $E_2$ and ~10-fold for $D_2$ (data not shown).

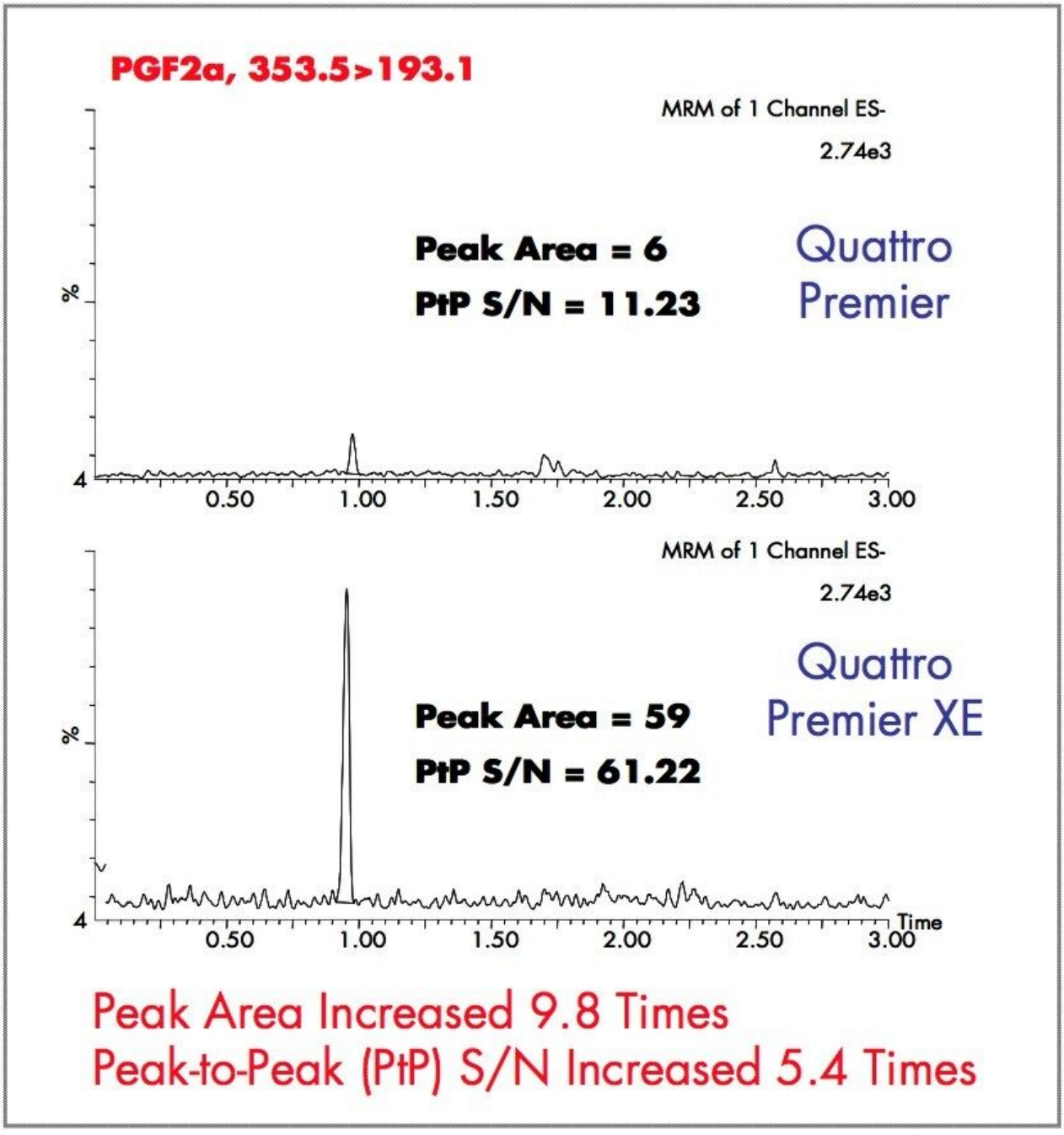


*Figure 1. Comparative response for prostaglandin $F_{2a}$ on the Quattro Premier and Quattro Premier XE.*

## Improving the Limit of Detection

To further illustrate the superior performance of the Quattro Premier XE, the Limit of Detection (LOD) was

compared to that of the Quattro Premier for both Prostaglandin $D_2$ and Prostaglandin $E_2$. The resulting data is displayed in Figure 2. It is shown that with the same on-column loading, the peak-to-peak signal-to-noise value obtained from the Quattro Premier increased from 9.4 to 47.1 for Prostaglandin $D_2$ and from 11.2 to 35.7 for Prostaglandin $E_2$. Therefore, from this data we can ascertain that the new Quattro Premier XE produces a 3-to 5-fold increase in signal-to-noise and a 10-fold increase in peak area sensitivity.

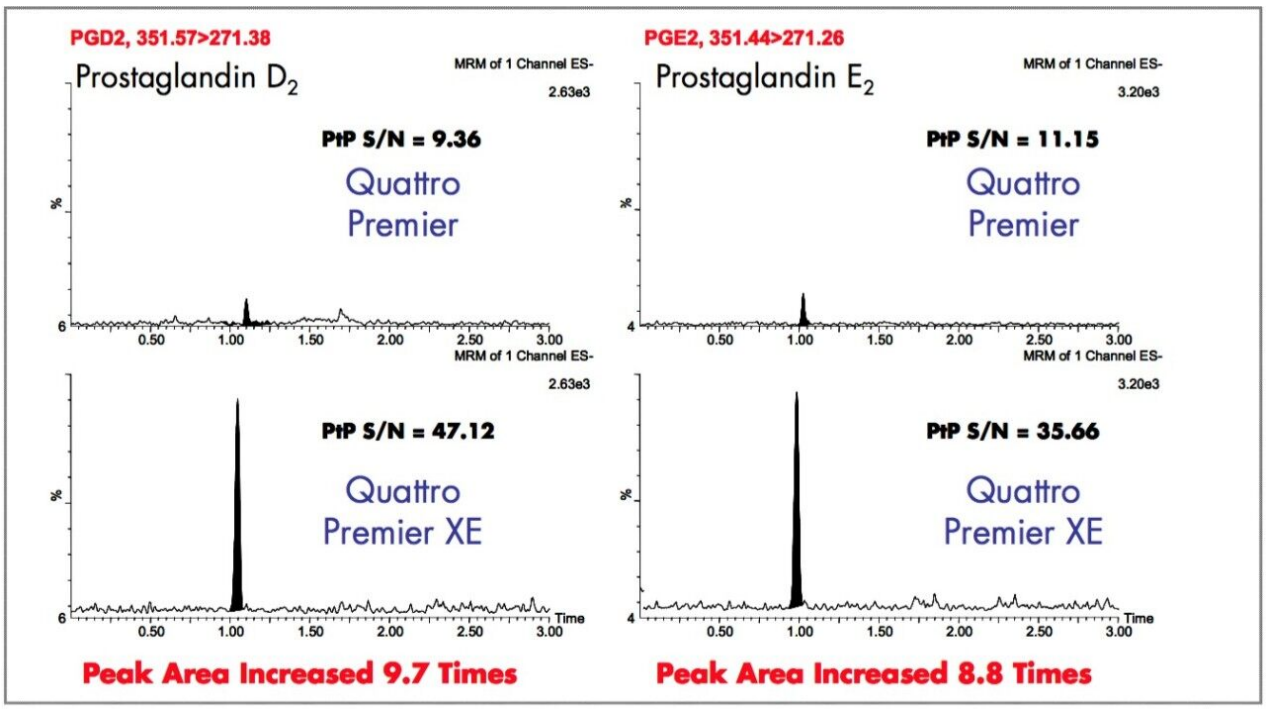


*Figure 2. Comparing the LOD of the Quattro Premier and Quattro Premier XE.*

## Conclusion

The new Quattro Premier XE Mass Spectrometer provides the ultimate in sensitivity in both positive and negative ion modes. This performance is further enhanced by the T-Wave-enabled fast scanning and fast MRM switching capabilities. The Quattro Premier XE, when combined with the superior chromatographic performance of the ACQUITY UPLC System makes this the ideal LC-MS/MS platform for high sensitivity, high throughput analysis.

## References

1. The traveling wave device described here is similar to that described by Kirchner in US Patent 5,206,506 (1993).

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ACQUITY UPLC System <https://www.waters.com/514207>

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