TechnicalNOTE

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QUATTRO PREMIER™: MRM INTER-CHANNEL CROSSTALK

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Introduction

Due to advances in HPLC and the arrival of UPLC™, chromatographic peaks are becoming extremely narrow. It is generally accepted that if reproducible peak area quantification is required chromatographic peaks should be defined by no less than 15 data points. To maintain this peak definition as peaks become narrower, tandem quadrupole mass spectrometers need to acquire faster. The Waters® Micromass® Quattro Premier™ benchtop mass spectrometer has been designed to operate in the multiple reaction monitoring (MRM) mode with the shortest of acquisition cycle times (10 milliseconds per data point, 100 data points per second).

An inter-channel delay period is required between successive MRM transitions to allow ions to be cleared from the collision cell. If two successive MRM transitions share a common daughter ion and the cell is not effectively cleared during the inter-channel delay a false signal contribution will occur between the transitions. This undesirable phenomenon is generally referred to as crosstalk.

At short MRM cycle times the ion transit time of ions in standard RF only collision cells (several milliseconds) is a significant problem in relation to crosstalk. The Quattro Premier mass spectrometer utilizes the patented T-Wave™ technology in the collision cell, enhancing the rapid acquisition MRM performance of the instrument. This new design of collision cell ensures that the undesirable phenomenon of MRM inter-channel crosstalk is virtually eliminated, even at the shortest of MRM cycle times.

Example Data

The data presented (Figure 1) is for the LC/MS/MS (MRM) analysis of verapamil. To measure inter-channel crosstalk a second dummy channel was simultaneously monitored (the two transitions share a common daughter mass). Rapid MRM acquisition was performed with a 10 ms dwell time and 10 ms MRM channel was considered to be a result of crosstalk occurring in the collision cell.

The data presented demonstrates that the travelling wave rapidly clears the collision cell between transitions, virtually eliminating crosstalk, even when using a very short inter-channel delay, enhancing the fast acquisition performance of the Quattro Premier mass spectrometer.

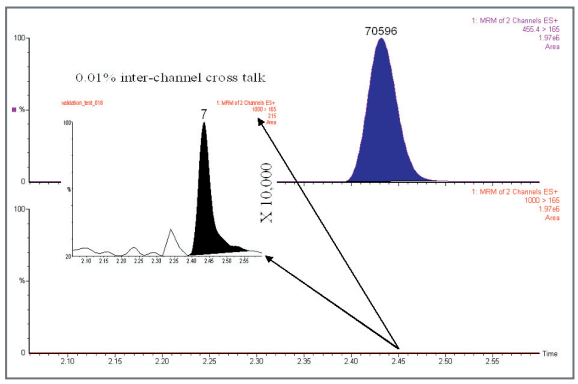

Figure 1. Rapid cycle time LC/MRM analysis of verapamil, demonstrating almost complete absence of inter-channel cross talk.

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