# ACQUITY™ UPLC™ I-Class/Xevo™ TQD IVD System: Analytical Performance for Antidepressant Drugs

Stephen Balloch, Gareth Hammond, Lisa J. Calton

Waters Corporation

Este es un resumen de la aplicación y no contiene una sección experimental detallada.

For *in vitro* diagnostic use. Not available in all countries.

## Abstract

The Waters ACQUITY UPLC I-Class/Xevo TQD IVD System enables the quantification of organic compounds in human biological liquid matrices.

This document describes a test of the analytical performance of the ACQUITY UPLC I-Class/Xevo TQD IVD System for the analysis of citalopram, desmethylfluoxetine, duloxetine, fluoxetine, fluvoxamine, O-desmethylvenlafaxine, mirtazapine, sertraline, trazodone, and venlafaxine in plasma.

## Experimental

The ACQUITY UPLC I-Class/Xevo TQD IVD System was controlled by MassLynx™ Software (v4.2) and the data processed using the TargetLynx™ XS Application Manager. Calibrators and Quality Controls were prepared by spiking commercially available reference material in plasma and the samples were processed using the following conditions:

### Sample Preparation Conditions

A 50 µL sample was processed with acetonitrile and centrifuged, then subsequently diluted with water prior to analysis.

### LC Conditions

| | |
|---|---|
| Column: | XSelect™ Premier HSS T3, 2.5 µm, 2.1 mm x 100 mm |
| Mobile phase A: | 2 mM ammonium acetate in water |
| Mobile phase B: | 2 mM ammonium acetate in methanol |
| Flow rate: | 0.4 mL/min / 0.6 mL/min |
| Gradient: | 40% A initial, hold until 1.70 minutes, then ramp gradient 6 until 20% A at 4.00 minutes, at 4.01 minutes switch to 100% B at a flow rate of 0.6 mL/min until 4.50 minutes, finally return to 40% A |

at 0.4 mL/min from 4.50 until 5.0 minutes.

## MS Conditions

Resolution:                                        MS1 (0.75 FWHM), MS2 (0.75FWHM)

Acquisition mode:                                  MRM

Polarity:                                          ESI+

## Results and Discussion

Chromatographic selectivity of a range of antidepressants using the ACQUITY UPLC I-Class/Xevo TQD IVD
System is illustrated in Figure 1. Performance characteristics of the antidepressant drugs are shown in Table 1.

| Compound | Calibration range* (ng/mL) | LLOQ (ng/mL) | Linear range ng/mL | Total precision | Repeatability |
|---|---|---|---|---|---|
| Citalopram | 10–1000 | 7.5 | 7.7–1300 | ≤7.2% | ≤2.6% |
| Desmethylfluoxetine | 10–1000 | 7.5 | 7.7–1300 | ≤7.6% | ≤3.2% |
| Duloxetine | 10–1000 | 7.5 | 7.7–1300 | ≤6.7% | ≤3.4% |
| Fluoxetine | 10–1000 | 7.5 | 7.7–1300 | ≤6.5% | ≤2.3% |
| Fluvoxamine | 10–1000 | 7.5 | 7.7–1300 | ≤7.3% | ≤2.6% |
| O-Desmethylvenlafaxine | 10–1000 | 5 | 7.7–1300 | ≤5.9% | ≤2.4% |
| Mirtazapine | 5–500 | 5 | 3.83–650 | ≤10.0% | ≤5.5% |
| Sertraline | 10–1000 | 5 | 7.7–1300 | ≤9.1% | ≤3.3% |
| Trazodone | 30–3000 | 15 | 23–3900 | ≤5.8% | ≤2.4% |
| Venlafaxine | 10–1000 | 7.5 | 7.7–1300 | ≤6.7% | ≤2.3% |

Table 1. Performance characteristics of the analytes evaluated. *Calibration Range was defined by linear fit where $r^2$ >0.995 for O-Desmethylvenlafaxine and duloxetine; for all other analytes a quadratic fit was used. LLOQ defined by S/N (PtP) >10 with %RSD ≤20% and ≤15% bias (with the exception of fluoxetine, for which bias was 17.6%). %RSD at LLOQ determined through analytical sensitivity experiments performed over five occasions (n=50). Total precision and repeatability of QCs performed over five occasions in plasma (n=25).
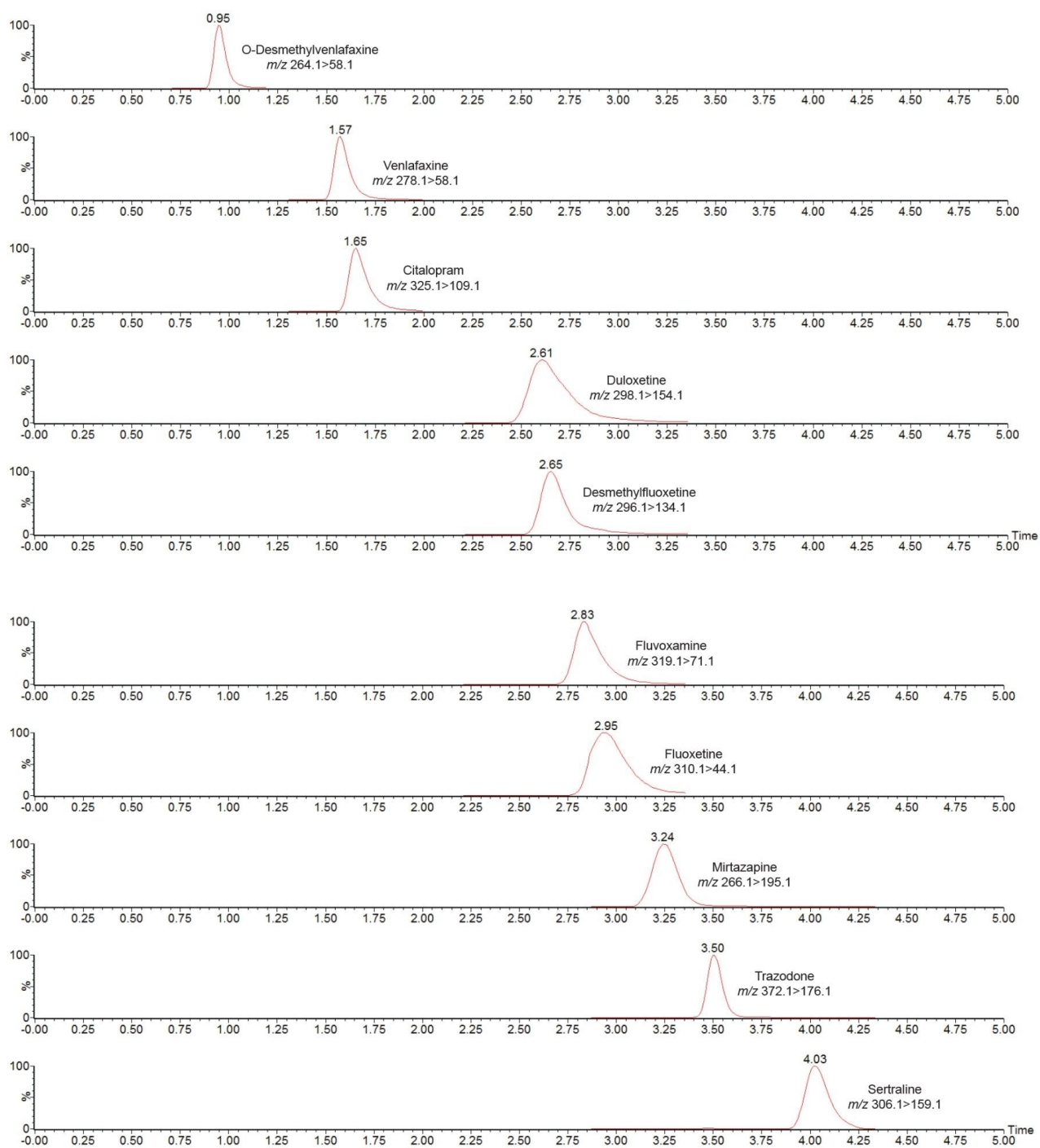
*Figure 1. Chromatographic selectivity of a range of antidepressant drugs using the ACQUITY UPLC I-Class/ Xevo TQD IVD System.*

## Conclusion

The Waters ACQUITY UPLC I-Class/Xevo TQD IVD System has demonstrated the capability to analyze a panel of antidepressant drugs in plasma.

## Disclaimer

*The analytical performance data presented here is for illustrative purposes only. Waters does not recommend or suggest analysis of the analytes described herein. These data are intended solely to demonstrate the performance capabilities of the system for analytes representative of those commonly analyzed using liquid chromatography and tandem mass spectrometry. Performance in an individual laboratory may differ due to a number of factors, including laboratory methods, materials used, intra-operator technique, and system conditions. This document does not constitute a warranty of merchantability or fitness for any particular purpose, express or implied, including for the testing of the analytes in this analysis.*

## Featured Products

MassTrak ACQUITY UPLC I-Class PLUS/Xevo TQD IVD System < https://www.waters.com/nextgen/us/en/products/mass-spectrometry-systems/masstrak-acquity-uplc-i-class-plus-xevo-tqd-ivd-system.html>

MassLynx MS Software <https://www.waters.com/513662>

TargetLynx <https://www.waters.com/513791>

720007860, February 2023