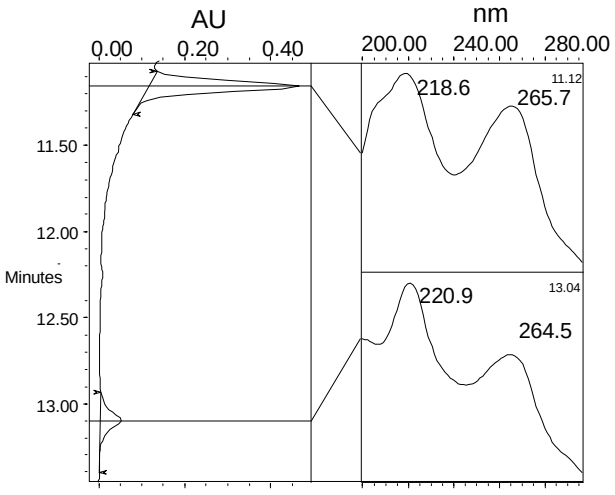
Waters Integrity System Applications

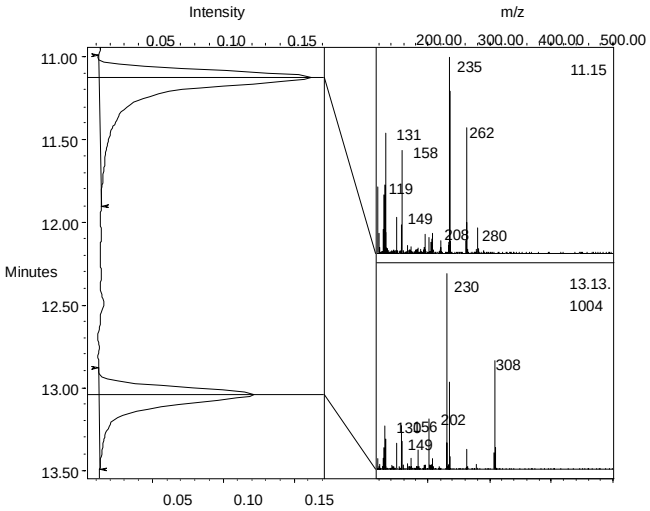
Separation and Identification of Parent Drug and Metabolite in Physiological Fluids

Highlights: Detection and identification of metabolite and parent in physiological fluids.

Photodiode array detectors with high resolution library matching and multi-component algorithms to uncover co-elution are useful for high sensitivity metabolite detection, but may lack specificity. The Waters Integrity system combines photodiode array and mass spectrometry detection to produce interpretable spectra in a single LC analysis.

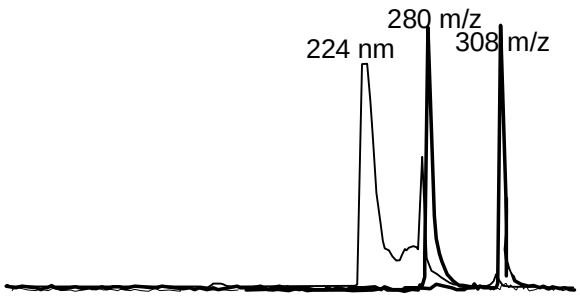


Photodiode Array Spectrum Index Plot of the Metabolite (11.12 Min) and Parent Drug (13.04 Min) of an anesthetic agent. Note the similar UV profiles.

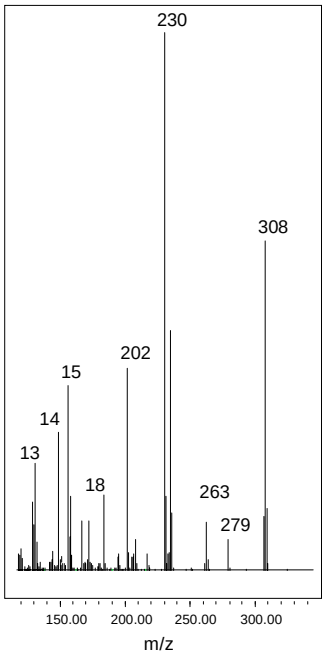


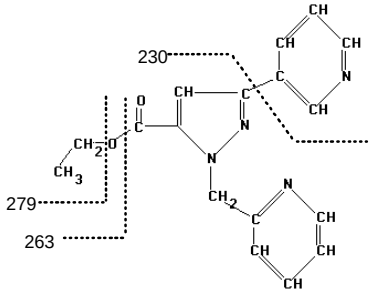
Mass Spectrum Index Plot of the Metabolite (11.15 Min) and Parent Drug (13.10 Min) of an anesthetic agent. Note the difference in the spectra, particularly the m/z of the molecular ions (280 m/z for the metabolite and 308 m/z for the parent compound).

The relatively different mass spectra for the metabolite and parent compounds provide a means for increasing the selectivity of the analysis by performing a selected ion monitoring (SIM) experiment.

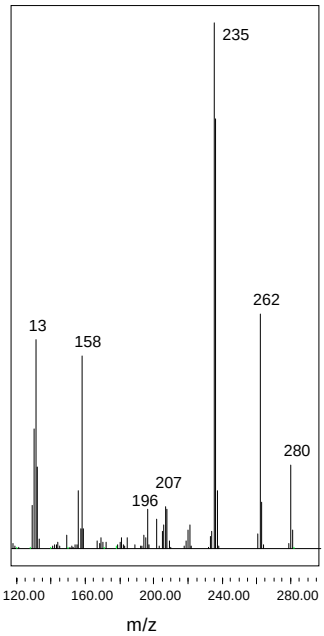


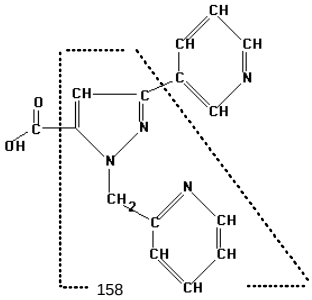
Monitoring the separation using the photodiode array at 224 nm and the mass spectrometer in SIM mode at 280 and 308 m/z illustrates the enhancement in sensitivity possible due to the increased selectivity of the mass detector.





This is the mass spectrum of the standard of the parent compound. The structure of the compound is shown to the right with the probable fragmentation pathways. Note the molecular ion at m/z 308.





This is the mass spectrum of the metabolite of the drug with its probable fragmentation pathways describing the major peaks in the mass spectra. The metabolite differs from the parent compound by the loss of an ethylene group. The molecular ion is at 280 m/z.