HIGH SENSITIVITY LC/MS/MS USING ION TRAP MASS ANALYZERS IN PHARMACEUITICAL AND LIFE SCIENCE RESEARCH

Paul C. Goodley, James A. Apffel, and Linda Lopez

Agilent Technologies, Life Science Units, Palo Alto, California 94304

The aim of this work is to provide the most recent developments using ion trap (IT) mass spectrometry (MS/MS) coupled to micro- and nano-flow chromatography systems. Lowering the liquid flow rates from traditional hundreds of microliter-per-minute, to low microliter and nanoliter-per-minute flows, enhances the sensitivity of the combined system by 5x to 30x. In addition, to sensitivity enhancements, the compound specificity is also enhanced by the use of tandem MS. Using tandem MSnth with an IT mass analyzer can uniquely provide additional compound specificity even in the presence of co-eluting or multiple co-eluting compounds from chromatographic analysis. These techniques can be applied to analyze femtomole levels of cancer chemotherapy agents, peptides, proteins, basic drugs and most pharmaceuticals. These results will be presented.

Using microflow rates between 100 and 3000nL/min, this paper describes femtomole detection from plasma of cancer chemotherapy agents, tamoxifen , 4-hydroxytamoxifen and paclitaxel (taxol) using MS/MS in the presence of complex matrices. In addition, full quantification results taken from plasma studies of benzodiazepines, with limit of quantification (LOQ) to less than 10 femtomole using IT-MS/MS.