**Introduction**

- Glyphosate (N-(phosphonomethyl)glycine) is arguably the most important herbicide ever discovered and is the most widely used herbicide in the world with U.S. of 185 million pounds in 2002.
- Its mode of action as a herbicide is via inhibition of synthesis of aromatic amino acids in plants.
- Main breakdown product is (aminomethyl)phosphonic acid (AMPA).
- Structure similar to many small organic acids in plants.
- Strong chelator of divalent metal cations.
- Charged molecules in biological matrices (e.g. glycine).
- Strong chelator of divalent metal cations.

**Analysis**

- LC: Agilent binary 1260 Infinity LC pump and autosampler injector
- MS: AB Sciex Triple Quad 5500 LC-MS/MS
- Column: Obelisc N column (100mm x 2.1mm x 5 µm, SILIC Technologies)
- Quantitation in urine done using standard addition with IS of 12C-glyphosate with spike concentrations at 0.2, 1, and 2 µg
- Quantitation in tap water done using stable isotope dilution method using peak area ratios.

**Results from Public Testing**

- Glyphosate residues were observed in 93% of urine samples in voluntary public testing in the U.S. general population; this is higher than the frequency observed in Europe using GC-MS (43.9%).
- Tap water obtained was free of glyphosate residues as expected; exposure is likely due to dietary intake or environmental exposure.

**Future Directions**

- Develop method for AMPA in urine.
- Develop direct LC-MS/MS method not requiring standard addition.
- Develop method for glyphosate and AMPA in other biological matrices such as serum and breast milk.

**References**

7. UC Berkeley Joint Medical Program, Berkeley, CA. Results obtained for different regions of the U.S.