



## **The use of stable isotopes to quantify macro- and micronutrient uptake from compound fertilizers**

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Isotopic techniques, especially with radioisotopes, have been commonly used to assess nutrient uptake from fertilizer. When it is impractical to use radioisotope, for example, where 1) a radiation permit for field trial is required, 2) tracing multiple forms of a particular element is desirable, and 3) radioisotope with sufficient half-life for uptake experiment is unavailable, the use of stable isotopes offers an alternative. The availability of relatively inexpensive stable isotopes nowadays and recent advances in mass spectrometry have made the use of stable isotope a perfect choice for fertilizer nutrient uptake experiments. Our studies over the past few years have employed the use of enriched stable isotopes of S, Zn, B, Cu, and Mo to measure the efficiencies of these nutrients supplied in different compound fertilizers. This presentation will highlight the method development for the use of different stable isotopes under different cropping conditions. Pertinent isotopic ratios of these elements have been measured in crops from both pot and field trials using either isotope ratio mass spectrometry (IR-MS) or octopole inductively-coupled plasma (ICP-MS). Efficiencies of different fertilizer have been calculated from these measurements, which offer a way of comparing fertilizer formulations.