PARTNERSHIP for AG RESOURCE MANAGEMENT
sustainability | profitability | science

Benefits of Enhanced Efficiency Fertilizers

KEY FACTS FOR FARMERS v012318

Enhanced Efficiency Fertilizer (EEF) refers to products that optimize nutrient uptake and prevent nutrient loss by controlling the speed of release or altering soil-fertilizer interactions.

Improving plant nutrient intake efficiency can improve yields, protect your fertilizer investment, and improve water quality which is important to growers, the public, environmentalists, regulators and legislators.

Types of EEF

Controlled Release Technology such as polymer-coated fertilizers (PCFs) release nutrients by osmosis and diffusion through the coating. Water passes through the outer layer of the polymer and dissolves the nutrients inside. Nutrients then move through the coating in response to a concentration gradient (high concentration inside the coating, low concentration outside the coating). Release rate and longevity are controlled by coating thickness and soil temperature. The release follows a consistent temperature response which allows the PCFs to provide a predictable, controlled release of nutrients over a desired timeframe (typically two to 12 months). Release is minimal when soil is cool and increases as soil temperatures rise, coinciding with plant growth and nutrient need.

Slow Release Technology

- **Sulfur-coated urea (SCU**) fertilizers are granules of urea coated with sulfur and wax. Imperfections (cracks, fissures, fractures) in the coating allow water to move in and dissolve the coating, which releases the urea. For fertilizer particles with coatings that are intact after application, water movement through the coating results in internal osmotic pressure that cracks the coating, releasing the nutrients.

© Retsch Technology 2011 - 66

- **Polymer-coated sulfur-coated urea (PCSCU)** is an evolution of SCU technology. A polymer layer around the sulfur provides more protection than the wax, resulting in longer and more predictable nutrient release.

- **Stabilized Nitrogen Technology**
  Urease inhibitors work on the soil surface to slow conversion of urea to ammonium through hydrolysis, which retains more N as plant-available ammonium. This reduces the amount of N converted to ammonia gas and lost to the atmosphere through volatilization.
  Nitrification inhibitors work in the soil by slowing microbial conversion of ammonium to nitrate. Ammonium can be held on soil particle exchange sites and remain available for plant use. Nitrification inhibitors can reduce ammonium losses for up to eight weeks under typical conditions.

Where can I go for more information?
Cornell University Extension
http://nmsp.cals.cornell.edu/publications/factsheets/factsheet45.pdf
University of Florida IFAS Extension
http://edis.ifas.ufl.edu/hs1247