Ag and Nano: the Future Is Bright

Read the next sentence , then stay with me, there is a point, I promise. Nanotechnology and it adaptation for use in the agricultural industry as a platform for nano-enabled targeted delivery, controlled release, or transfection platforms will follow nanoclays, nanoemulsions, and cyclodextrans already being utilized.

Since I started in Extension work we have come far in the protection of the farmer and improvement of the environment while increasing yields. We are well into the world of crop traits from bio-technology efforts. The emerging science coming along is from the AgBio companies. There are more than 100 companies and 35 University Research Groups, including the University of Nebraska Lincoln, in the United States working in this area including some notable giants like Syngenta, Bayer, BASF, Dow, and Monsanto.

Nanotechnology is the use of individual atom thick layers to coat or change properties of materials. Nano comes from the Greek word meaning "dwarf". In technical terms nano means one billionth of something. Nano thin materials can have very different properties of physical strength, chemical reactivity, electrical conductance, magnetism, or optical effects compared to the same bulk material.

Nano products already on the market include antibacterial dressings, transparent sun screen lotions, stain resistant fabrics, scratch free paints for cars and self cleaning windows. There are huge future applications for nano science in the food industry. Nano will change the way our food is produced, processed, packaged, transported, and consumed. Food safety will be vastly improved, and that in an industry where we have a very good track record in our country.

Nano will likely have significant impact in reduction of spray drift with aerodynamic nanoparticles for optimized deposition; controlled release for season-long treatment; more efficient formulations of pesticides with reduction in dose required to achieve the desired effect; combinations of previously incompatible active ingredients into a single treatment; advanced delivery systems of pesticides, herbicides, antimicrobials, fertilizers, etc.; seed treatments to improve plant health and stress resistance; encapsulation of toxic compounds to minimize occupational exposures; improved rain fastness, photo protection and reduced run-off of pesticides and fertilizers to surface waters. One area of particular interest is nano catalysts which will likely assist agriculture in lowering doses and being more effective with pesticide uses, while reducing possibilities of off target effects.

I am excited about the possibilities for the application of nano science to the world of producing food and fuel for America and the world. We certainly need to be sure products introduced are safe. We certainly know that the technological advancements that have driven our economy are alive and well in the nano world.

Paul C Hay, Extension Educator
University of Nebraska-Lincoln Extension in Gage County ● 1115 West Scott Street, Beatrice NE 68310
(402) 223-1384 ● FAX: (402) 223-1370 ● email: phay1@unl.edu