Nanotechnology in Agriculture: Nanocomposites as a Platform for Enhanced Plant Uptake of Nitrogen

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Worldwide, urea remains the most widely used nitrogen fertilizer contributing to global food security. However, 70–80% of urea is lost during fertilization, especially in rice cultivation. Therefore, solutions for increasing its plant availability while reducing adverse effects to the environment caused by eutrophication and increase in greenhouse gases are of major importance in the context of maintaining both global food security and environmental sustainability. A urea coated hydroxyapatite nanoparticle composite for slow release of nitrogen in soil is introduced. In field trials carried out in Sri Lanka under the supervision of the Ministry of Agriculture over a number of cultivation cycle for rice, the nanocomposite allows the amount of urea used to be reduced up to 50% compared to the standard amount recommended while also enabling a better yield.