

Micronutrient administration from high-swelling nanocomposite hydrogels

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For the efficiency of a crop, make up necessary parameters among many nutritional control of soil, which affects the quality of productivity of a crop, so the provision of macro and specific micronutrients must be controlled in order to achieve optimal performance. [1] However, the more conventional ways of dispersion of nutrients to the crops have some problems, mainly related to the low efficiency, difficulty of control, generation of waste and high cost. [2] In this work was synthesized a nanocomposite based on hydrogels loaded with different amounts of clay for use on the controlled release nutrients systems, especially release of micronutrients. Was studied three boron micronutrient sources (boric acid, borax and sodium octaborate) where it was observed that the solubility of the compound directly affects the loading capacity and release of the boron by the nanocomposites. All boron sources studied have ionic groups, which causes increased (nutrient/nanocomposite) interaction when compared to urea (molecular compound) used with this material in previous work of our research group. [3] The nanocomposites showed excellent properties of loading and release of boron. The hydrolysis treatment of the nanocomposites improved swelling properties due to the conversion of amide groups to carboxylic groups at the hydrogel structure. The presence MMT associated of material hydrolysis increases significantly the capacity of the nutrient solution loading by hydrogels, in addition, the MMT acts as an effective barrier to control release, which considerably slows desorption of nutrients, and furthermore contributes to a reduction of the final cost of the product. Due to the high swelling degree to greater than 2000 times in water and the capacity to providing micronutrients slowly for the soil, the nanocomposites synthesized are interesting materials to use in controlled release systems of nutrients.