Title:

Preparation of biocomposites for the controlled transport of fertilizer micronutrients

Author:

Dawid Skrzypczak

Abstract:

The paper presents a new concept of controlled release fertilizers for precision agriculture. The proposed technology includes immobilization of bio – based materials (eggshells, waste from supercritical CO_2 extraction – rapeseed meal, blackcurrant seeds, alfalfa, and goldenrod) in a hydrogel matrix (alginate, carboxymethylcellulose) and enrichment of prepared structures with microelement ions in the sorption process. The composition of biocomposites and the enrichment process were optimized by the Response Surface Methodology (RSM). Physicochemical properties and sorption capacity (Cu, Zn, Mn ions) were determined. The method of preparation of chitosan coatings was developed and the release of ions in various media was checked. High bioavailability of fertilizer components was confirmed by *in vitro* and *in vivo* tests. The prepared fertilizer formulations have a high commercialization potential.