

Method To Fabricate Biodegradable Microgels (Pdxs Mgs) For Slow Release Of Urea And A Source Of Phosphorus In The Soil

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ABSTRACT

A method (100) to fabricate biodegradable microgels (PDXE MGs) for slow release of urea and a source of phosphorous for the betterment of fertilization of soil may be provided. The method (100) may include the first step (110) by synthesizing DXE (104) with dextrin (102) and lauroyl chloride (103). Further in the next step (120), cross linkage (120) of DXE (104) with sodium tripolyphosphate (STP) (105) may be done to obtain phosphate cross-linked dextrin based microgels PDXE MGs (106). The method (100) in the next step (130) may include the encapsulating the urea (107) in the PDXE MGs (106) to form Urea@PDXE MGs (108). The Urea@PDXE MGs (108) may be used to facilitate the continuous slow release of urea (107) to boost the crop seed germination and may improve the growth of the crop by maintaining chlorophyll and nitrogen content.

KEY APPLICATION AREAS

- 1.Smart & Controlled-Release Fertilizers.
- 2.Sustainable Agriculture.
- 3.Agrochemical Delivery Systems.
- 4.Soil Nutrient Management.
- 5.Biodegradable Agricultural Materials.
- 6.Precision Farming.

POTENTIAL USE CASES

- 1.Slow-release urea fertilizer for sustained nitrogen supply (up to 24 days).
- 2.Dual nutrient delivery (Nitrogen + Phosphorus) to improve fertilizer efficiency and crop growth.
- 3.Enhanced seed germination and plant growth through controlled nutrient release.
- 4.Reduced fertilizer loss by minimizing nutrient leaching and volatilization in soil.
- 5.Biodegradable fertilizer carrier for environmentally sustainable farming.
- 6.Delivery platform for hydrophilic and hydrophobic agrochemicals with high encapsulation efficiency.
- 7.Precision nutrient management for improved crop productivity while reducing fertilizer usage and environmental impact.