

## Production of a Sustainable Slow-Release Urea Fertilizer Using Starch and Poly-Vinyl Alcohol

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**Abstract :** The environmental impacts caused by fertilizers call for the adaptation of more sustainable technologies in order to increase agricultural production and reduce pollution due to high nutrient emissions. One particular technique has been to coat urea fertilizer granules with less-soluble chemicals that permit the gradual release of nutrients in a slow and controlled manner. The aim of this research is to develop a biodegradable slow-release fertilizer (SRF) with materials that come from sustainable sources; starch and polyvinyl alcohol (PVA). The slow-release behavior and water retention capacity of the coated granules were determined. In addition, the aqueous release and absorbency rates were also tested. Results confirmed that the release rate from coated granules was slower than through plain membranes; and that the water absorption capacity of the coated urea decreased as PVA content increased. The SRF was also tested and gave positive results that confirmed the integrity of the product.

**Keywords :** biodegradability, nitrogen-use efficiency, poly-vinyl alcohol, slow-release fertilizer, sustainability

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