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Revision of Optimized Hydrogel Design for the Covering of NPK Fertilizers as a Strategy for Sustainable Development

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Abstract : The agricultural sector has been forced to use large quantities of fertilizers to increase food supply, which consequently increases production costs with the exponential growth of the world's population. Fertilizersare vulnerable to losses by volatilization and leaching, causing environmental pollution as well as eutrophication in different water bodies when they have been applied to crops. One approach that compensates for this environmental problem is the design of hydrogels for which several methods and polymeric materials have been reported used as a coating of controlled release fertilizers. In this way, both sustainable development and the economy has forced the global fertilizer industry to develop new nutrient recovery methods and strategies from alternative sources. Controlled Release Fertilizer (FCL) is a prominent green technology that helps to reduce the adverse effect of fertilizers on the environment, reducing the loss of nitrogen caused by volatilization and leaching, and alters nitrogen release kinetics, which provides nutrients to plants at a rate that is more compatible with their metabolic needs. This article reviews recent studies on the latest methods of NPK fertilizer coating, as well as its properties and release mechanisms, having a critical analysis of this alternative for crops, followed by suggestions for future research.
Keywords : Hydrogel, Slow-Release Fertilizers, Sustainable Development, Environmental Impact. Polymer.

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