



APPLICATIONS OF ZEOLITE IN AGRICULTURE SERIES

Part 1: Enhancing Fertilizer Efficiency

The official newsletter of Green Zeolite Co.

Introducing our new series: Zeolite in Agriculture. Due to its numerous applications, we will explore one application in depth in each edition. Get ready to dive into the world of zeolite and its impact on farming practices. In this inaugural edition, we will be shedding light on the topic of enhancing fertilizer efficiency using zeolite. Thank you for joining us!

ENHANCING FERTILIZER EFFICIENCY

It's astonishing to consider that despite the extensive use of chemical fertilizers, only a small portion is effectively retained in the root zone of plants. The majority is either lost through runoff or leached deep into the soil. This phenomenon of nutrient loss has profound consequences, contributing to two significant issues: eutrophication and groundwater contamination. Zeolite is a natural valuable gift shaped over millions of years. Since the 1960s, zeolite has been an integral part of agriculture due to its rare and useful microporous structure. How does zeolite enhance fertilizer efficiency?



Nitrogen Management:

Nitrogen's low use efficiency in agriculture (30-40%) poses a challenge. Natural zeolite offers a potential solution as it indirectly limits nitrification in the soil, ensuring an adequate nitrogen level for plant growth while reducing the leaching of nitrates into deeper soil layers. This application of zeolite positively impacts the environment by preventing the loss of mineral nutrients, particularly nitrogen, into groundwater. It also enhances nutrient efficiency in the soil without compromising the quality of cultivated crops. In conclusion, natural zeolite plays a beneficial role in supporting plant nutrition.



Phosphorus Management:

The combination of zeolite and rock phosphate has proven effective in phosphorus management. Zeolite acts as an exchange fertilizer, facilitating the exchange of Ca^{2+} onto the zeolite surface in response to plant uptake of nutrient cations (NH_4^+ or K^+). This exchange process enhances the dissolution of rock phosphate, thereby making phosphorus more available to plants. Ammonium-charged zeolites have demonstrated their ability to increase the solubilization of phosphate minerals and animal bone ash, promoting rock-phosphate dissolution across various soil types while reducing fixation in soils.



Slow-Release Fertilizers:

Zeolite possesses the unique ability to adsorb and release nitrogen, making it a valuable nano-enhanced green application. By incorporating zeolite into organic substrates or using it as a coating material, water absorption and the retention of NPK fertilizers can be improved. Zeolite also exhibits the potential to slow down the release of nitrogen, phosphorus, and potassium in sandy soil, while reducing ammonia volatilization when combined with it. These characteristics make zeolite a promising option for achieving slow-release of nutrients and advancing nutrient management in agriculture.