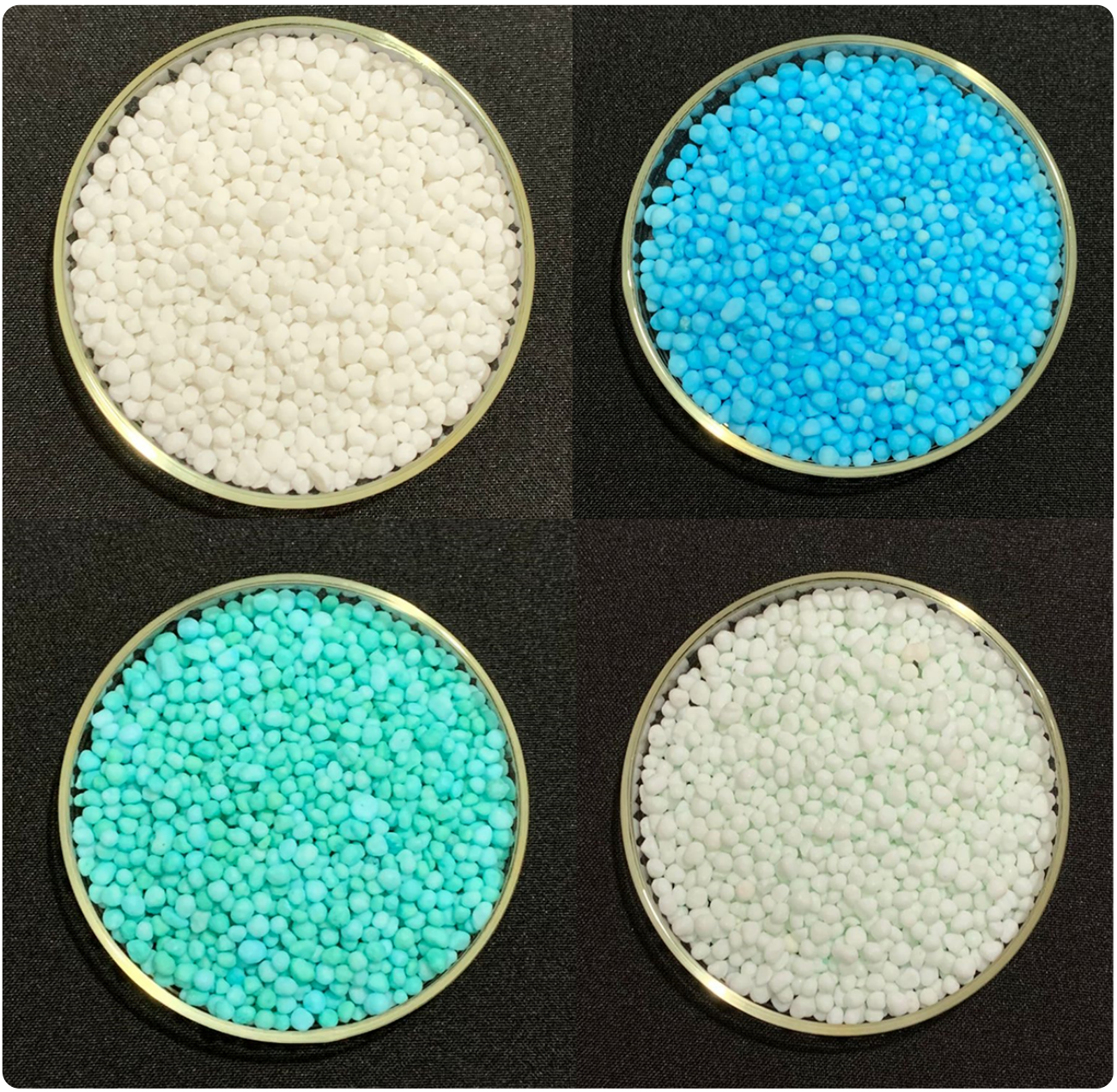
Science Societies

Enhanced-efficiency multinutrient nitrogen fertilizers

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Multinutrient nitrogen fertilizers produced in this study. Photo courtesy of Rafael Otto.

Urea is the most widely used fertilizer to supply nitrogen (N) to crops. However, the use of urea results in significant N losses through ammonia volatilization, causing

agronomic, economic, and environmental issues. The addition of urease inhibitors to urea has been used for decades as the best approach to overcome such limitations. However, cost and the uncertainty of yield gains have limited large-scale adoption.

In a recent study in *Agronomy Journal*, researchers proposed adding micronutrients to urea treated with urease inhibitors to further reduce ammonia formation in addition to serving as a plant nutrient. Since adding solution to the urea could compromise the fertilizer granules' integrity, the research team evaluated the physical, chemical, and physicochemical characteristics of fertilizers after micronutrient addition through microscopic X-ray fluorescence, microtomography, thermal analyzer, and scanning electron microscopy. They found that adding micronutrients to urea increases its salt index and hygroscopicity. Granule hardness was also increased This is a benefit for field application as harder fertilizers are less prone to breaking, which can impair homogeneity of nutrient application.

The multinutrient fertilizers produced by the research team could help address the challenges faced by modern crop production, such as micronutrient deficiency, that not only limit crop yields, but also quality of products.

Dig deeper

Cassim, B. M. A. R., Pinheiro Lisboa, I., Prestes, C. V., de Almeida, E., de Carvalho, H. W. P., Lavres, J., Lasso, P. R. O., Batista, M. A., & Otto, R. (2024). Development and characterization of enhanced urea through micronutrients and established technology addition. *Agronomy Journal*, *116*, 2573–2587. https://doi.org/10.1002/agj2.21635

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