

Researchers develop new plant-derived urease inhibitor to improve fertilizer performance

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Researchers from the Institute of Applied Ecology of the Chinese Academy of Sciences have developed a new plant-based inhibitor that can improve the efficiency and stability of fertilizers. The inhibitor, derived from natural plants, can slow down the breakdown of urea in the

soil and increase the nitrogen uptake by crops. The research team has obtained a U.S. patent for their invention, which is the first of its kind in China.

Fertilizers are essential for increasing [crop yields](#) and ensuring [food security](#). However, conventional fertilizers often contain synthetic inhibitors that can degrade quickly, cost more, and pose [environmental risks](#). These inhibitors are designed to prevent the loss of nitrogen from the soil through the action of enzymes such as urease and nitrifiers. Nitrogen loss can reduce the effectiveness of fertilizers and lead to pollution and [greenhouse gas emissions](#).

To address these challenges, researchers around the world have been searching for new and better inhibitors that can improve fertilizer performance. Some international [fertilizer](#) companies, such as BASF of Germany and Euro Chem of Russia, have launched new products, such as LIMUS and DMPSA, but these are still based on earlier inhibitors, such as NBPT and DMPP, and have limited innovation.

In this study, the researchers have taken a different technical approach. They have extracted and screened a plant-based inhibitor, called farnesene, from natural plants. Farnesene can effectively inhibit the activity of urease, an enzyme that catalyzes the hydrolysis of urea. As a result, farnesene can slow down the release of ammonia and nitrate from urea, increasing the availability of nitrogen to plants.

The team has tested the inhibitor in a microcosm experiment, and found that it can significantly improve the nitrogen utilization rate of fertilizers. They have also obtained a Chinese invention patent and a U.S. invention patent for their inhibitor, which is China's first plant-derived urease inhibitor to receive intellectual property protection in the U.S.

This [achievement](#) fills the gap in the research field of plant-derived inhibitors in China, enriches the material library of inhibitors, and enhances the international competitiveness of the institute in the field of new fertilizers. It also provides strong technical support for the development of new green and stable fertilizers.

Provided by Chinese Academy of Sciences

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