



# Hydra-Hume™ Increases Nitrogen Fertilizer Efficiency

## Nitrogen Efficiency Problem

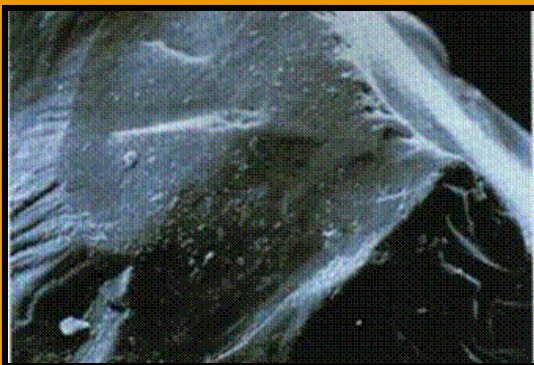
Fertilizing with nitrogen is necessary for most crops. A surprisingly large percentage of applied nitrogen never makes it to the plant. Depending on field conditions, typical efficiencies of applied nitrogen range from 40 to 75 percent. Applied nitrogen can be lost from several conditions. Two common losses are from leaching of nitrates and/or volatilization of ammonia. Regardless of the cause for nitrogen losses, their effects are expensive to the grower and may degrade the soil environment.

## More Efficient Nitrate Uptake

Nitrate ( $\text{NO}_3^-$ ) is the most common form of nitrogen taken up by crops. Rather than attaching to soil particles, nitrates are repelled by soils and can leach very quickly beyond the root zone. Additionally, soil bacteria consume large amounts of nitrate nitrogen in the process of breaking down crop residues. In this process, available nitrate nitrogen is converted to non-available nitrogen. Organic compounds from humus based products have demonstrated dramatic improvement in uptake of nitrate nitrogen.

## Longer "Hang-Time"

Nitrate leaching is most severe in sandy soils. The images shown below were taken with an electron microscope. A sand particle without organic compounds from humus looks bare. When exposed to organic compounds (such as *Hydra-Hume*), the sand particles become coated. Some of the nitrates that would normally pass through the sand will stick to the amine groups of the organic compounds and could make them available for a longer time. In simple terms, this increases the "hang-time" of the nitrate.



**Sand Particle without Organic Compounds**



**Sand Particle with Organic Compounds (ex. Hydra-Hume)**

Images from Greenkeeper Magazine Issue No. 51, page 26.