



UREA

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Urea is a white crystalline solid containing 46 percent nitrogen. It can be made as prills or as granulated material. Granulated urea is often used because the particles are larger and more dense than the prilled form. Urea is often the most economical N fertilizer except for anhydrous ammonia.

Urea has the chemical formula $\text{CO}(\text{NH}_2)_2$. When added to the soil, it is acted upon by the enzyme urease. Urease is present in soils from plant residues and microbial activity. The reaction is as follows:



This reaction is controlled by temperature and moisture. At the time that urea is usually applied in Michigan, there is sufficient moisture to allow this reaction to proceed. Soil temperatures above 50° favor this reaction. The ammonia produced in the second reaction may volatilize if not trapped in the soil. This fact influences the application management of urea discussed below.

Generally urea should be incorporated into the soil after application. Either tillage or rain (0.25 inches or more) are effective. Usually there is a window of 3 to 5 days before losses become unmanageable on conventionally tilled soils. There are few concerns about ammonia loss when urea is topdressed on wheat in late winter or early spring. Urea broadcast on conventionally tilled fields and incorporated with secondary tillage will have minimal volatilization losses.

Significant losses may occur when urea is broadcast on high residue situations. Most of the research on no-till corn shows significant yield loss as compared to ammonium nitrate when urea is broadcast on the soil surface. Topdressing sod crops with urea in late spring or during summer may lead to significant N loss if no rain occurs within 24 to 48 hours.

Guidelines for use of urea include:

Urea based fertilizer materials applied in a band should be separated from the seed by at least 2-inches of soil (2-inches to the side and 2 inches below the seed).

With small grains, 10 pounds of N as urea can be applied with the grain drill at seeding time even under dry conditions.

Urea should not be seed placed with corn.

Urea can be blended with mono-ammonium and di-ammonium phosphate fertilizers. However, it is not advisable to blend it with 0-46-0 because it results in a damp material which is difficult to store and apply.

Urea can be bulk spread either alone or blended with other fertilizers. It is suggested that the spreading width should not exceed 50 feet to avoid an uneven spreading pattern.

In late spring and summer, broadcast urea on sod crops when there is a high probability of rain within 24 to 48 hours.

Urea may be applied as a foliar spray on potatoes, wheat, vegetable crops and soybeans.

Urea with less than 0.25 percent biuret is recommended.

Urea is neither combustible nor explosive. It should not be stored with ammonium nitrate. These materials, when in contact, rapidly absorb water when the relative humidity is above 18 percent.