AGRONOMY BULLETIN

2012–2015

FŪSN
Fused-Safe Nutrients™

FŪSN™ Nitrogen Fertilizer Relationship to Ammonia Volatilization Compared to Traditional N Fertilizer Formulations

Introduction:

Nitrogen (N) loss by ammonia volatilization is associated with decreased air quality, increased greenhouse gases, and low nutrient efficiency. Incorporating dry N into the soil protects against airborne losses but is not always feasible when conservation tillage is used to protect from erosion and water runoff, or when nutrients are top-dressed early in the spring.

Challenge:

Several N-efficiency products and urease inhibitors have been developed to reduce rates of ammonia losses, and may prove to be valuable aids to growers who seek to conserve nutrients and protect the environment. The patented formula in FŪSN™ (26-0-0-14) was developed by chemically combining ammonium sulfate with ammonium nitrate. The resulting compound offers plant-available N without being highly detonable.

Research:

Tests were needed to verify that the fertilizer would provide financially significant improvements in yield, plant nutrition, and crop quality. Several studies have been undertaken to compare the effects of FŪSN to traditional N sources, including the three described below.

Methodology:

1: Chien et al, IFDC, 2013: Ammonium sulfate (ASN) and FŪSN were applied to calcareous Sumter soil. A 15-day trial measured NH_3-N volatilization during the critical time period.

2: Williams, BYU-I, 2015: A two-year study compared ammonia volatilization on acid, neutral, and calcareous soils when using seven N sources, including FŪSN, urea, ammonium sulfate (AMS), and a granulated 26-0-0-14 blend.

3: Del Moro and Horneck, OSU, 2014: Ammonia volatilization was measured during cool spring weather to determine the best practices for minimizing N losses on winter wheat crops that are commonly topdressed. Researchers applied eight different N sources to calcareous soils, then measured ammonia losses with each treatment over 43 days.

Results:

Chien's study found that while both granulated ASN and fused ASN had lower rates of volatilization than did urea, fused ASN kept 22% more N in the soil than did granulated N.

Williams' team discovered that a common practice, blending ammonium sulfate with urea, does not control ammonia losses into the atmosphere as well as FŪSN does.

Del Moro concluded that FŪSN gave plants better access to a readily absorbed form of N while minimizing atmospheric losses than the other N sources.

Practical Applications:

Growers who choose FŪSN to supply N to their crops can depend on better N availability for plants and less nutrient loss through volatilization. The benefits of this regimen include improved air quality and safer conditions for field workers and the community.

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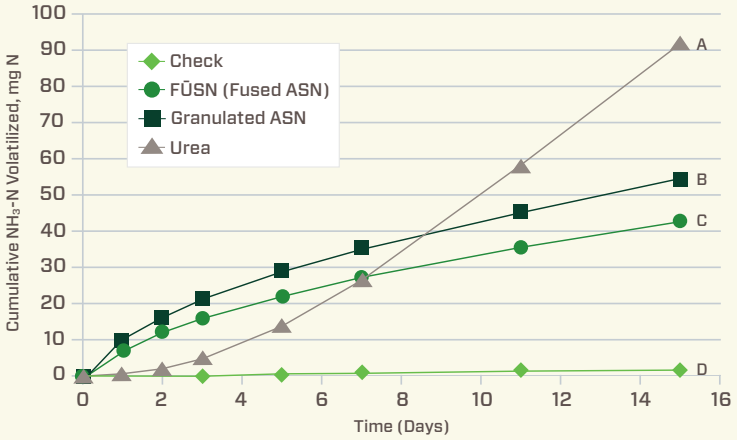

Figure 1. Relative comparisons of urea to granulated ammonium sulfate (granulated ASN) and FŪSN (fused ASN). (Chien et.al. 2013.)

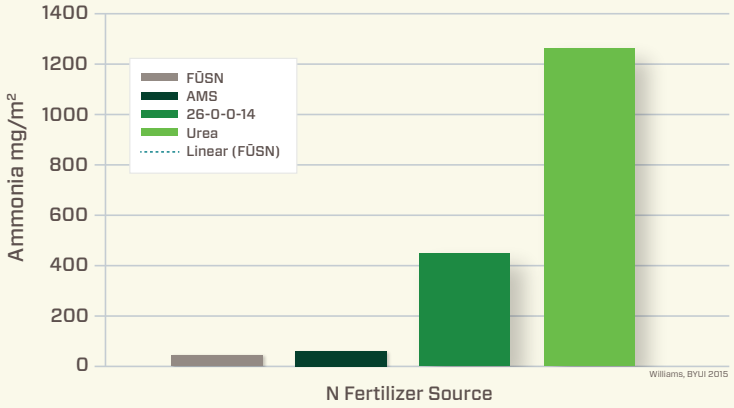

Figure 2. Ammonium volatilization comparisons for FŪSN, AMS, Granulated AMS (26-0-0-14) and urea. Values are the means of 3 soil pH acid, neutral, and calcareous soils. (Williams, BYUI, 2015.)

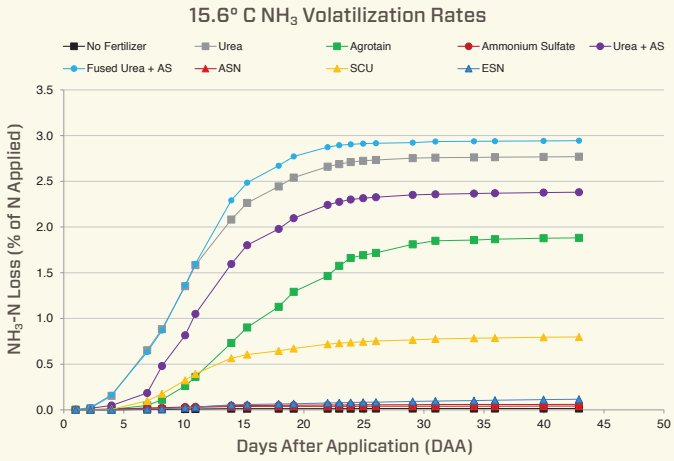

Figure 3. Ammonia volatilization studies in Oregon on low-temperature calcareous soils comparing various N fertilizer sources including ASN (FŪSN). (Sarah Del Moro and Don Horneck, Oregon State University, 2014.)