

## Public Abstract

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Title: Management Alternatives for Urea Use in Corn and Wheat Production

The objective of this project is to evaluate several strategies to reduce the risk of ammonia volatilization loss from urea applied to corn and wheat.

There is a high risk of N loss from broadcast urea. When urea is surface applied, an average of 25% and maximum of 50% of the applied N is lost via ammonia volatilization. There is a recommendation to incorporate urea by tilling the soil, to prevent ammonia volatilization losses of N from the urea. This option is not practical in no-till systems and may not be practical in some reduced-till systems.

There is a need to find ways to make urea a viable, reliable, economical, and low-risk N source for corn and wheat production. Promising ways to make urea work better include:

- treating urea with the urease inhibitor Agrotain before broadcasting. It slows down the breakdown of urea and delays volatilization losses until there is enough rain move the urea into the soil.
- the use of polymer-coated urea, a product that releases urea slowly, to reduce the risk of ammonia volatilization losses.
- knife injection of urea, which trap the ammonia gas in the soil as the urea hydrolyses.

As a result of the two years of experimentation with corn and wheat, we concluded that:

- nitrogen application doubled yields on average
- of the treatments tested to improve yields with urea, only Agrotain produced good evidence that it increased N delivery to the crop and yield
- polymer- and gel-coated did not increase yield relatively to urea. Exception: polymer-coated urea improved yields relative to urea when applied in January to wheat.
- all UAN treatments had lower yields than urea broadcast (N immobilization).