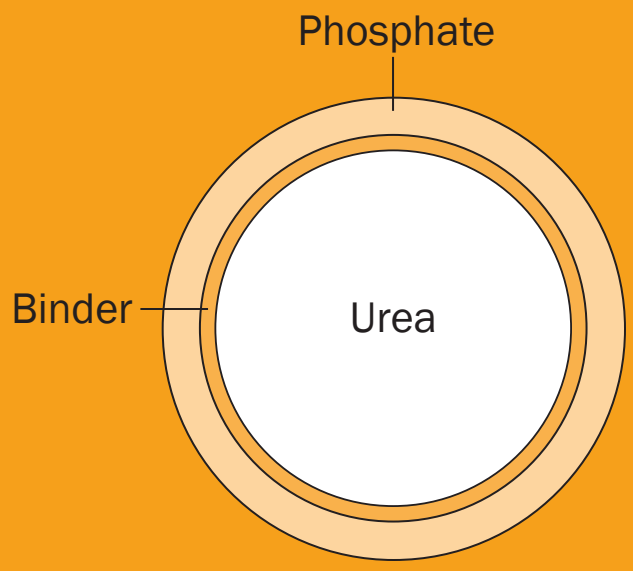
ARBORITE® CUF EC

PHOSPHATE COATED UREA FERTILIZERS

ARBORITE® Coated Urea Fertilizer (CUF) products are a family of coated and suspension fertilizer products for plant nutrition programs.



VOLATILITY CONTROL

ARBORITE® CUF phosphate coated urea fertilizer uses a patented binding system[1] to prepare volatility inhibited urea products with water soluble boron and water soluble phosphate as a single granule. Other nutrients may be added to the granule containing both N and P to *supply a broader spectrum of nutrients in a single granule*. ARBORITE® CUF EC or Extra Control provides the same multi-nutrient single granule fertilizer as ARBORITE® CUF with even greater N volatility control for conditions where greater volatility control is desired.

NITROGEN VOLATILITY

Volatile nitrogen losses are affected by many factors such as: rate of fertilizer application, soil and atmospheric temperature, soil moisture content, relative humidity, soil pH, soil buffer capacity and the cation exchange capacity of the soil[2].

NITROGEN LOSS MEASUREMENT

Volatile nitrogen losses are measured by collecting the ammonia released as the fertilizer decays after application to the soil surface. Laboratory measurements are made under controlled conditions of temperature, soil moisture and relative humidity with natural soils[3].

Larger volatile nitrogen losses than previously thought have been reported in forest environments associated with the timing of rainfall events after fertilization[4].

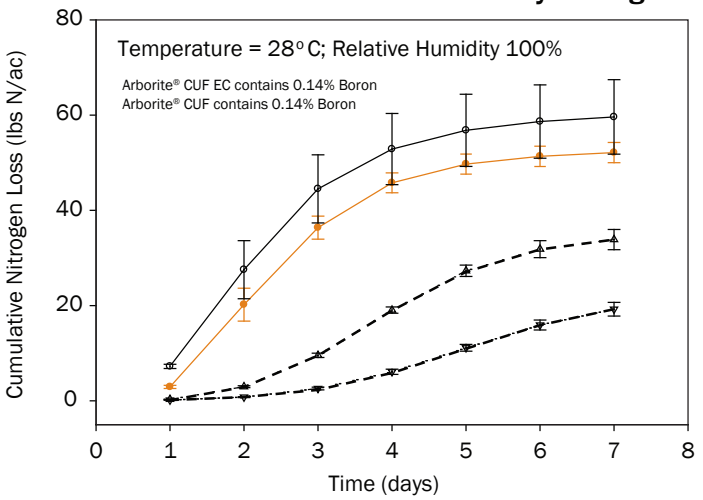
VOLATILITY PERFORMANCE DATA

The cumulative loss of nitrogen under laboratory conditions (82°F) for urea, urea and DAP and two formulations of ARBORITE®, ARBORITE® CUF and ARBORITE® CUF EC phosphate coated urea fertilizer (38.9–9.2-0 with 0.14% B) are shown in Figure 1.

The cumulative nitrogen loss under laboratory conditions (82°F) for urea and ARBORITE® CUF phosphate coated urea fertilizer (39-9-0 with 0.12% B) on soils of varying moisture content is shown in Figure 2.

Figure 1

Cumulative Nitrogen Losses (lbs N/ac) on Bare Forest Soil in a Laboratory Setting



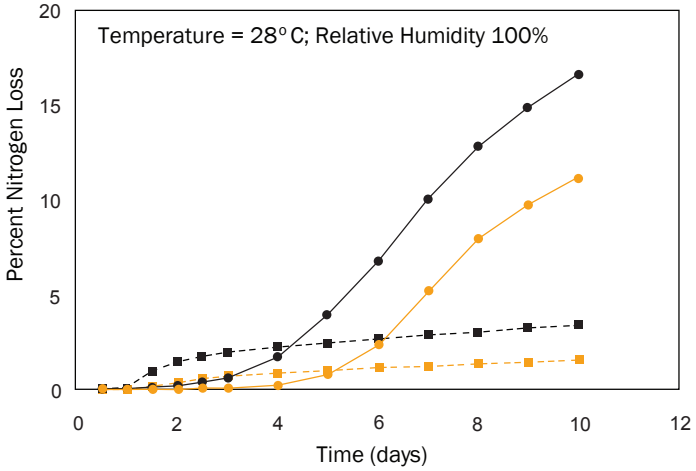
Volatile nitrogen loss measured on soil with a pH of 6.2 (soil moisture 17%) in chambers swept with moisture saturated air at a rate of 1.8 L/min.

Laboratory tests were conducted by Brooks Whitehurst Associates.

- Urea 150 lbs N/ac (N=8)
- Urea/DAP Blend 199 lbs N/ac (N=4)
- Arborite® CUF 150 lb N/ac (N=4)
- Arborite® CUF EC 150 lbs N/ac (N=4)

Figure 2

Cumulative Nitrogen Loss on a Forest Soil with a pH of 4.9 for Urea and ARBORITE® CUF 39-9-0 with 0.12% Boron at Varying Soil Moisture Contents in a Laboratory Setting



- ARBORITE® CUF 39-9-0 with 0.12% B on soil at 12% Moisture
- ARBORITE® CUF 39-9-0 with 0.12% B on soil at 36% Moisture
- Urea (46-0-0) on soil at 12% Moisture
- Urea (46-0-0) on soil at 36% Moisture

Laboratory tests were conducted by Brooks Whitehurst Associates.

FOREST FERTILIZATION PROGRAMS

Maximizing production of forest resources for the future may require intensive silviculture programs[5]. Traditionally, forest fertilization has been accomplished using uncoated urea and diammonium phosphate (DAP) at recommended rates of 150 lbs to 200 lbs of nitrogen per acre and 25 lbs of P per acre (approx 400 lbs urea and 125 lbs DAP per acre) depending upon site characteristics, history, and age of stand[6]. The fertilization program may be accomplished by using a split application of urea followed by DAP or DAP followed by urea or alternatively as a bulk blend of urea and DAP.

- Split application may increase costs since two passes are needed across a site.
- Because the densities of urea and DAP are different, spread patterns of the materials will probably be different; resulting in non-uniform application.
- Uncoated urea is subject to decomposition leading to losses of nitrogen as ammonia (volatilization) and volatilization losses can be reduced by applying the products in colder months. However, application in colder months does not coincide with the time of maximum uptake by the forest species[7].
- Fertilizer applied to wet soils may either leach or be incorporated into the microbial biomass if not captured by the plant.
- Denitrification reactions promoted by microbial action may reduce the available pool of nitrogen for the plant.

ARBORITE® PHOSPHATE COATED UREA IN FOREST FERTILIZATION

ARBORITE® CUF and ARBORITE® CUF EC phosphate coated urea fertilizers incorporate N, P and boron (B) in a single granule treated with a nitrogen volatility inhibitor thus a single pass application may be used to supply N, P and B in most forest fertilization programs. Compared to bulk blended formulations, a more uniform coverage of the field with N, P and B may be achieved.

ARBORITE® CUF and ARBORITE® CUF EC phosphate coated urea fertilizers may help the forester time fertilizer application to achieve higher utilization. Published reports indicate that nitrogen utilization for ARBORITE® CUF phosphate coated urea fertilizer is about the same as DAP/Urea blends on wet soil and better than DAP/urea blends when applied on dry soils[7].

The same report showed increased biomass growth compared to the control as a result of ARBORITE® CUF phosphate coated urea fertilizer application[7].

ARBORITE® CUF and ARBORITE® CUF EC phosphate coated urea fertilizer may aid in the design of a more complete fertilization program for existing stands.

REFERENCES

[1] US Patent 6,830,603

[2] Terman. Adv. Agronomy. 31:189-223, 1979; Kissel and Cabrera Nat. Fert. Development Center Bulletin Y-206. TVA Muscle Shoals Al. 1988.

[3] All soils used are characterized by standard soil tests including pH, N, P, Ca, K, buffer capacity and CEC.

[4] Kissel etal. Soil Sci. Soc. Am J. 68:1744-1750, 2004.

[5] Allen et al. Southern J. Applied Forestry. 2992): 62-69, 2005.

[6] Fox et al. Better Crops. 90(3): 12-15, 2006.

[7] Blazier et al. Southern J. Applied Forestry 30: 66-78, 2006.