

**SOLUTION pH EFFECT ON TWO K SOURCES
FOLIAR APPLIED TO COTTON TENNESSEE**

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Abstract

Cotton response to foliar potassium (K) applications have been inconsistent in research conducted throughout the cotton belt. This research was conducted evaluating growing conditions affecting foliar K response. Recent studies have been conducted evaluating the chemistry of the foliar solution on K responses. Enhanced K uptake and increased yields have been reported by adding surfactants to KNO₃ solutions buffering the pH to 5.5. Research was initiated in 1992 on a Collins silt loam soil evaluating solution buffering of two foliar K sources to pH 6.0 and 4.0. The experimental design was a RCB with treatments replicated six times. Individual plots were four rows (40 inch) wide and 30 feet long. 'D&PL 50' was planted by mid-May. Foliar solution of KNO₃ and K₂SO₄ were applied at 4.4 lb/A K₂O four times during the season on a 9 to 14 day interval beginning at early bloom. Solution pH's were adjusted at time of application using Buffer Xtra Strength (Helena Chemical). A pH meter and combination glass electrode was used in the buffering process. Solutions were buffered just before application. Spray cans were filled to maximum capacity reducing the air volume above the solution restricting any effects on solution pH. Treatments were applied within 30 minutes of pressuring the cans. Petioles were collected before each application. Yields were estimated by harvesting the two center plot rows.

Four-year yields were increased by buffering the application solution of both K sources to pH 4.0. Yields produced by buffering the solution to 6.0 were equal to or lower than unbuffered solution yields. The treatment effect on yields varied with year as indicated by a year-by-treatment interaction. In 1992 buffering the K₂SO₄ solution to pH 4.0 increase yields relative to the check and several other treatments. Buffering the K₂SO₄ solution to pH 6.0 produced the lowest yield, indicating the inconsistency of the foliar treatments. The 1993 yields were highest when both K sources were buffered to pH 4.0. Differences between other treatments were not observed. In 1994, the pH 4.0 buffered K₂SO₄ solution increased yields relative to the check and the unbuffered solutions while the 6.0 solutions resulted in the lowest yields. The 1995 yields were not increased by foliar applications. The top crop in 1995 was not as good as noted in previous years which may have reduced the effectiveness of the foliar applications.