

**INVESTIGATING THE RAIN-FREE PERIOD OF MEPIQUAT CHLORIDE AS IMPACTED BY ADJUVANT, RATE, AND INTERVAL BETWEEN APPLICATION AND SIMULATED RAINFALL**

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**Abstract**

Mepiquat chloride is the second most applied agrochemical to cotton, with 35% of the cotton acres being treated in 2019. The summer of 2021 was extremely wet in Georgia, with 68% of the days between June 1 and August 31 having a measurable rainfall event. The current mepiquat chloride label states that the rain-free period is 8 hrs, but this can be reduced to 4 hrs when an adjuvant is included in the mix. Although this is stated in the label, there is little research available in the literature. Therefore, an experiment was conducted in 2021 near Ty Ty, GA to evaluate the impact of adjuvant, rate, and dry time on mepiquat chloride uptake and efficacy. DP 2055 B3XF was planted on June 2, 2021 and managed according to UGA Extension recommendations except for PGR management. At approximately the second week of squaring the experiment was initiated. The experiment was arranged in a split-plot design with the whole plot being dry time, and the split plot being mepiquat chloride treatment. Each treatment was replicated four times. Four dry times were included: 0, 2, 4, and 8 hrs between application and simulated rainfall. Seven mepiquat chloride treatments were included: 1) None; 2) mepiquat chloride (MC) (16 oz/acre); 3) MC + crop oil concentrate (COC) (16 + 8 oz/acre); 4) MC + COC (16 + 16 oz/acre); 5) MC + nonionic surfactant (NIS) (16 oz/acre + 0.25% v/v); 6) MC + NIS (16 oz/acre + 0.5% v/v); and 7) MC (32 oz/acre). Following the final application, a center pivot system applied 0.5" of overhead irrigation to act as simulated rainfall and wash the treatments from the leaf surface. Beginning two weeks after application, heights (20 plants per plot) and nodes (10 plants per plot) were collected biweekly three times. Nodes above white flower was collected at first flower. Cotton was picked to determine if yield differences were present. Cotton heights were reduced 13 to 27% when two to eight hours passed between application and a simulated rainfall event at six weeks after treatment. Mepiquat chloride applied at 16 and 32 oz/acre reduced cotton heights 8% and 11%, respectively. Interestingly, tank-mixtures containing COC or NIS did not differ in height from nontreated plants. All treatments that were allowed to dry for two hours or more significantly reduced NAWF, and all treatments containing mepiquat chloride reduced NAWF as well. Regression analysis on height-to-node ratios determined that cotton growth over time was significantly impacted by mepiquat chloride dry time following application. Parameter estimates for crop growth rate and their accompanying 95% CI were utilized to determine differences in cotton growth over time. Cotton growth over time was significantly slower when mepiquat chloride treatments were allowed to dry four to eight hours prior to a simulated rainfall event compared to a simulated rainfall event immediately following application. This indicates that although there was some activity when MC only dried for two hours prior to simulated rainfall, this instance would require a sooner follow up application than if 4 or 8 hours of dry time was obtained. No yield differences were observed. These results indicate that cotton height was impacted with as little as 2 hrs of dry time and that adjuvants did not improve mepiquat chloride dry time. Additionally, growth was significantly slowed when 4 or 8 hours of dry time were obtained compared to the 0 hr treatments. To confirm results, this experiment will be repeated in 2022.