

Cotton Seed Sprouting Ability with Peracetic Acid Treatment

November 25, 2019
Joseph Donabed B.Sc.
Chrissa Easter M.S.
Nakeeta Sawyers B.Sc.

Background

Certain fungicides employed in agricultural applications can affect germination of seeds if contacted. Enviro Tech's Peragreen 5.6% is a peracetic acid (PAA) antimicrobial agent approved for various organic applications including soil, foliar, seed, and post-harvest applications. The goal of this study is to determine if treatment of seeds with PAA leads to decreased germination.

Materials and Methods

Enviro Tech obtained commercial grade cotton seed from a supplier. Three treatment groups were established: a control group, a treatment level PAA group, and a high concentration PAA group. For the treatment level PAA group, a 200-ppm PAA solution was made; which is the concentration used based of the Peragreen 5.6% label. The high concentration PAA group consisted of a 500-ppm PAA solution made from Peragreen 5.6% to simulate an extreme treatment. Test groups of cotton seeds were soaked in each solution for 10 minutes, then drained.



Figure 1. Untreated cotton seeds

The sprouting method used involved taking saturated paper towels and placing cotton seeds evenly spaced across the surface. The seeds were then covered with an additional saturated paper towel sheet and then placed into a re-closable bag. The bag was left opened to allow air ventilation. The bags were then placed into a warm environment for 4 days. (Figure 2)



Figure 2. 200-ppm PAA and 500-ppm PAA treated seeds before being placed into re-closable bags

Results and Discussion

Seeds were examined on Day 4 whereas most seeds had sprouts. The control and different treatment groups were enumerated for sprouting seeds (Table 1).

Table 1. Cotton seed sprouting results

Treatment Group	Number of Non-Sprouting Seeds	Total Number of Seeds	% of Sprouting Seeds
Control	2	13	84.6
200 ppm PAA	2	18	88.9
500 ppm PAA	2	17	88.2

Treatment groups can be seen in Figure 3. Interestingly, the sprouts in the 500 ppm PAA treatment group showed improved vigor and produced the largest sprouts of the three groups.

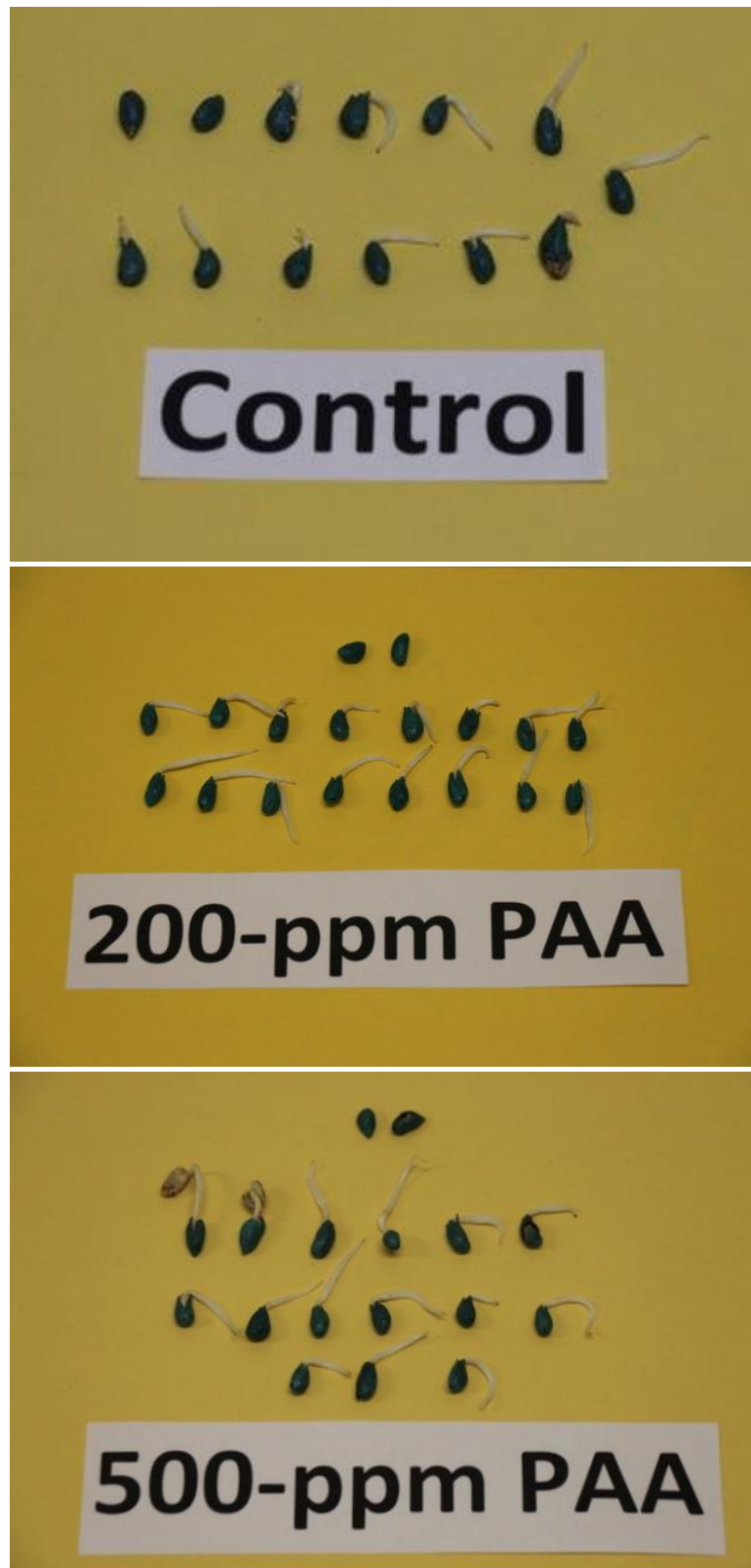


Figure 3. Method 1 cotton seeds after 4 days

Conclusions

Peragreen 5.6% pre-treatment of cotton seeds has no effect on the seeds' ability to sprout. Treatment groups of 200 ppm PAA (field conditions) and 500 ppm PAA (extreme conditions) both produced sprouting plants at the same rate as the control group. Additionally, and interestingly, the PAA treated seeds appeared to sprout larger than the water treated control, with the 200 ppm PAA treatment group producing larger sprouts than the control group and the 500-ppm PAA treated seeds producing larger sprouts than the water control and 200-ppm treated seeds.