

## Evaluation of Vital Oxide for control of bacterial leaf spot caused by *Xanthomonas campestris* pv. *vesicatoria* on tomato: Greenhouse and Field evaluations.

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### Greenhouse evaluation of Vital Oxide for phytotoxicity:

An initial test was conducted to determine the phytotoxicity (damage) potential of Vital Oxide to tomato seedlings when applied at different rates and different frequencies. The following treatments were assessed by spraying tomato transplants until runoff:

Treatments:

- T1- Water control
- T2- Product applied once per week at 40 ppm
- T3- Product applied once per week at 80 ppm
- T4- Product applied once per week at 160 ppm
- T5- Product applied once per week at 320 ppm
- T6- Product applied once per week at 40 ppm
- T7- Product applied twice per week at 80 ppm
- T8- Product applied twice per week at 160 ppm
- T9- Product applied twice per week at 320 ppm

A randomized complete block design (RCBD) was used for the experiment. Each treatment was replicated five times with each replicate of each treatment containing six seedlings. Transplants were watered as needed and maintained in a greenhouse. The seedlings were examined two times each week for signs of phytotoxicity (stunting, burning, or plant death). The product application continued for 4 weeks and since no obvious phytotoxicity was observed this portion of the test was terminated. Fresh weights of shoots were collected for all treatments. The plants were rated for vigor, condition of the foliage and the conditions of the roots.

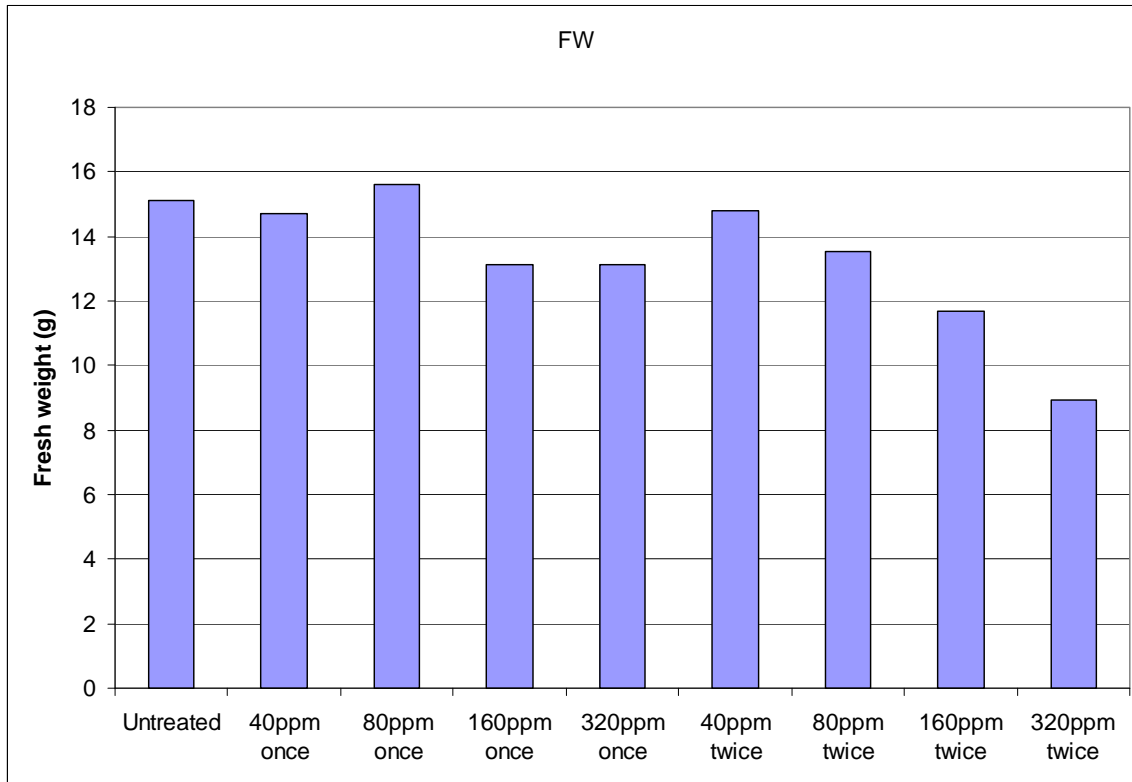
Conclusions: No visual burning or stunting was observed with any of the treatments except the two highest rates of Vital Oxide applied two times per week. These treatments showed some stunting and leaf distortion. The transplants were harvested at the soil line and fresh weights of the tissue were taken and were analyzed statistically (see the data in Table 1 and Chart 1). The treatments separated out with the fresh weight of the highest rate of Vital Oxide applied two times per week being significantly lower than any of the other treatments. Treatment 8 (160 ppm Vital Oxide) applied two times per week was significantly lower than the control, 40 ppm and 80 ppm of Vital Oxide applied once per week, and significantly greater than the applying 360 ppm of Vital Oxide two times per week but not significantly different from the remaining treatments.

Table 1. Tomato shoot fresh weight in grams after thirty days of weekly or twice weekly applications of various concentrations of Vital Oxide.

Treatment	Fresh Weight in grams
T1- Untreated control	15.13a <sup>*</sup>
T2-40 ppm once per week	14.71a
T3-80 ppm once per week	15.59a
T4-160ppm once per week	13.14ab
T5-320 ppm once per week	13.11ab
T6-40 ppm twice per week	14.08a
T7-80 ppm twice per week	13.55ab
T8-160 ppm twice per week	11.69b
T9-320 ppm twice per week	8.9c

\*Values followed by the same letter are not significantly different at  $P < 0.05$  determined using SAS v 9.1 and analysis of variance (ANOVA) and Duncan's Multiple Range test.

Chart 1. Comparison of fresh weight of tomato seedlings after seven applications of vital oxide at selected concentrations and application frequencies



#### Field evaluation of Vital Oxide for control of *Xanthomonas campestris* pv. *vesicatoria*

A field (Kendrick Loamy sand) at the University of Florida- IFAS Plant Science Research and Education Unit (PSEU) in Citra, Florida was used for experimentation. Tomato transplants (Florida 47) were transplanted into prepared field plots on May 4, 2006. The first pesticide application was made on May 25. A second pesticide application was made on June 1, 2006. A suspension of bacterial cells of *Xanthomonas campestris* pv. *vesicatoria* was prepared in the laboratory, adjusted to a final concentration of  $3.8 \times 10^7$  cells per ml on June 9, 2006. The plots were irrigated using Rain Bird overhead sprinklers for 30 minutes before 300 milliliters of a bacterial suspension were applied to each plot using a Solo backpack sprayer. The plots were examined for leaf infection on June 12, 2006. Thirty leaves were randomly collected from each plot and evaluated for infection on June 15, 2006; June 21, 2006 and again on June 27, 2006 [leaf spot incidence (+/- leaf spot)]. On July 5, 2006 ten leaves were randomly collected from each plot and rated, using the Horsfall -Barratt rating scale, for percent of leaf infected (leaf spot severity). An initial harvest was made of ripe fruit on July 5, 2006 and the final harvest was made on July 13, 2006. Data were analyzed by ANOVA followed by Duncan's Multiple Range test ( $P < 0.05$ ) using SAS 9.1.

Conclusions: The initial leaf spot incidence observed was between 36 and 52% and increased on each successive observation up to 77 to 85% bacterial leaf spot incidence. However, there were no significant differences between any of the treatments and the control at any observation interval. When bacterial leaf spot severity was evaluated 9 to 13 % area of the leaf was infected and there were no statistically significant differences between any of the treatments and the control. Yield was examined two times with no differences observed between the treatments and the control. This lack of difference between treatments and the control was also observed when the total yield was examined.

The application of the Vital Oxide product limited the initial infection to between 36 and 52 % of the leaves but the control was not durable as indicated by the spread of leaf infection after additional applications of Vital Oxide. There were some numerical difference in the total yield of fruit in the test, but due to the variability within the replicates of each treatment these differences are not statistically significant.

Test evaluating Vital Oxide for control bacterial leaf spot caused by *Xanthomonas campestris* pv. *vesicatoria* on tomato.

	Application schedule <sup>z</sup>	Leaf spot incidence June 15, 2006	Leaf spot incidence June 21, 2006	Leaf spot incidence July 5, 2006	Leaf infection (%) July 5, 2006	Yield (lb) July 5, 2006	Yield (lb) July 13, 2006	Total Yield (lb)
T1- Untreated Control		46.6a <sup>x</sup>	64a	83.9a	12.4a	28.2a	79.48a	107.7a
T2- Manex (1.2 qt/A) + Kocide 2000 (1.5lb/A)	ABCDEFGH	45.3a	69.3a	84.6a	11.0a	24.4a	79.67a	104.04a
T3- Vital Oxide product at 160 ppm	ABCDEFGH	51.9a	71.3a	82.6a	13.2a	25.2a	73.01a	98.2a
T4- Manex (1.2 qt/A) + Kocide 2000 (1.5 lb/A) Alternated with Vital Oxide product at 160 ppm	ACEG  BDFH	36.6a	67.3a	77.3a	9.9a	18.5a	71.26a	89.8a

<sup>z</sup>Application schedule; A= May 25, 2006; B=June 1, 2006; C=June 8, 2006; D= June 15, 2006; E=June 22, 2006; F= June 29, 2006; G= July 6, 2006; H= July 11, 2006

<sup>x</sup>Values followed by the same letter are not significantly different at P<0.05 determined using SAS v 9.1 and analysis of variance (ANOVA) and Duncan's Multiple Range test.