

US EPA ARCHIVE DOCUMENT

6-28-86

See term/Seed  
Emergence  
N/A

DATA EVALUATION RECORD

1. Chemical: Ammonium-DL-Homoalanin-4-yl (methyl) phosphinate
2. Test Material: HOE 039866 96.3% ai Technical
3. Study/Action Type: Nontarget Area Phytotoxicity--Seed Germination/  
Seedling Emergence
4. Study ID: HOE 039866--Active Ingredient Technical (Code:  
HOE 039866 OH ZC96 0002) Plant Effect Test: Seed  
Germination/Seedling Emergence Test Tier I,  
prepared by Eastman Kodak Company, June 18, 1987.  
(Unpublished study submitted by Hoechst Celanese  
Corporation under Accession No. 403456-51.)
5. Reviewed By: Charles Lewis  
EEB/HED  
Signature: *Charles Lewis*  
Date: *June 9, 1988*
6. Approved By: Doug Urban  
EEB/HED  
Signature: *Douglas Urban*  
Date: *6/28/88*
7. Conclusions:  

The study is scientifically sound but does not fulfill the Guidelines requirement for a Tier I seed germination/seedling emergence test.

HOE-039866 applied at a maximum rate of 3.5 lb ai/A resulted in a > 25% yield reduction for carrot, corn, cucumber, lettuce, oat, and soybean. A Tier II seedling emergence test is required for all 10 species. Seed germination was affected < 25% for only soybean. All 10 species must be tested at the Tier II level.
8. Recommendations: N/A
9. Background: N/A
10. Discussion of Individual Tests or Studies:

11. Materials and Methods (Protocols):

Test Species - Tomato	<u>Lycopersicon esculentum</u>
Cucumber	<u>Cucumis sativa</u>
Lettuce	<u>Lactuca sativa</u>
Soybean	<u>Glycine max</u>
Cabbage	<u>Brassica oleracea</u>
Carrot	<u>Daucus carota</u>
Oat	<u>Avena sativa</u>
Perennial Ryegrass	<u>Lolium perenne</u>
Corn	<u>Zea mays</u>
Onion	<u>Allium cepa</u>

Source: Harris Moran Seed Company and Livermore Seeds and Chemicals (oat).

Soil: Artificial soil--Jiffy Mix® also known as Cornell Mix. Approximately 50% sphagnum peat moss, approximately 50% No. 3 grade vermiculite, and minor amounts of granular dolomite and sand, major and minor nutrients, and a wetting agent. pH of control soil 6.5. Treated soil pH 5.8.

Containers: Plastic V-Line D-8 Paks®. One pot 5.0 cm x 31.5 cm. D-8 Paks were placed into plastic trays (V-L Tray®) 34.3 cm x 45.7 cm x 6.35 cm with drainage holes.

Greenhouse: Three-room greenhouse climatically controlled by an air system from an adjacent building. Light source was from the sun. Air temperature measured by a Taylor mini-max thermometer. Air temperature was also continuously monitored and recorded by using a Honeywell Temperature/RH 7-day recorder. Air temperature ranged from 20 to 35 °C. Soil temperature ranged from 22 to 28 °C. Relative humidity, daily low 23 and 54%, daily high 13 and 35%.

Duration: The number of seeds that germinated after 5 days was compared to controls. Radicle length was at least 5 mm to be considered a germinated seed. The emergence test was concluded on day 14 (postemergence). Phytotoxic symptoms were recorded and seedlings cut and weighed (dry weight).

Seeding Rate: Ten seeds were placed in each D-8 pak. Sixty seeds per treatment + control.

12. Reported Results:

The following was copied directly from the submitted study.

Overall Mean Germination Response and Radicle Length

Plant Species	Mean Percent* Germination Response			Mean Radicle Length (cm)**		
	Control	Treated	% Control	Control	Treated	% Control*
Cabbage	97	100	103	4.4	4.0	90
Carrot	77	67	87	2.9	2.9	98
Corn	97	100	103	7.6	5.8	76
Cucumber	97	93	97	6.7	6.3	95
Lettuce	93	97	104	4.6	3.8	82
Oat	87	87	100	4.9	4.8	99
Onion	97	80	83	2.5	2.5	101
Ryegrass	100	100	100	4.0	4.0	101
Soybean	100	97	97	6.2	3.7	60
Tomato	87	90	104	4.0	3.6	90

\*Rounded to nearest whole percent.

\*\*Rounded to nearest 0.1 cm.

Percent Seedling Emergence and Mean Day to Emergence

Plant Species	Mean Percent* Emergence Response			Mean Day** To Emergence	
	Control	Treated	% Control	Control	Treated
Cabbage	97	100	103	3.2	2.8
Carrot	90	83	93	5.9	6.3
Corn	93	93	100	3.2	3.7
Cucumber	93	97	104	2.7	2.3
Lettuce	100	97	97	3.8	4.6
Oat	87	100	115	3.5	3.4
Onion	90	90	100	5.3	5.3
Ryegrass	100	100	100	4.0	4.0
Soybean	100	20	20	3.2	A
Tomato	90	90	100	5.2	5.2

\*Rounded to nearest whole percent.

\*\*Rounded to nearest 0.1 day.

(A) Due to low emergence response a mean day to emergence could not be determined. One of the three replicates had a mean day emergence of 13.5 while the seedlings of the other two replicates never emerged.

Mean Phytotoxicologically Coded Effects\*

<u>Plant Species</u>	<u>Day 10 Postemergent</u>		<u>Day 14 Postemergent</u>	
	<u>Control</u>	<u>Treated</u>	<u>Control</u>	<u>Treated</u>
Cabbage	0.2	0.1	0.1	0.1
Carrot	0.1	1.7	0.1	2.2
Corn	0.0	2.0	0.0	2.1
Cucumber	0.0	1.8	0.0	2.4
Lettuce	0.1	1.9	0.1	2.2
Oat	0.2	0.3	0.3	0.9
Onion	0.1	0.9	0.4	1.6
Ryegrass	0.0	0.6	0.0	0.7
Soybean	0.1	**	0.1	**
Tomato	0.0	1.1	0.0	1.2

\*Values from 0 to 4, rounded to 0.1 units.

\*\*Not sufficient emergent response to calculate mean.

A point scoring system was used to evaluate five observable toxicological responses, zero (0) indicates no injury/effect; one (1) indicates slight plant effect, or restricted to one area, e.g., a leaf; two (2) indicates a moderate effect (engrossing complete plant); three (3) indicates a severe effect; and, four (4) indicates a total effect or kill produced by the test substance.

Overall Mean Yield Determinations

<u>Plant Species</u>	<u>Mean Dry Weight (mg)*</u>		<u>% Control**</u>
	<u>Control</u>	<u>Treated</u>	
Cabbage	32.2	33.4	104
Carrot (Shoot)	7.5	2.4	32
Carrot (Root)	6.2	2.5	40
Corn	180.6	53.2	30
Cucumber	176.5	49.9	28
Lettuce	21.2	6.3	30
Oat	50.9	33.3	66
Onion	5.0	4.0	80
Ryegrass	4.5	3.8	85
Soybean	206.2	***	***
Tomato	29.4	24.2	82

\*Rounded to nearest 0.1 mg.

\*\*Rounded to nearest whole percent.

\*\*\*Due to poor emergence response, the treated seedling yield could not be determined.

13. Study Author's Conclusions/Quality Assurance Measures:

The following was copied directly from the study:

"The environmental conditions (temperature, humidity, soil pH, photoperiod, and water characteristics) are considered acceptable for the plant species used in this study.

"The germination response for those seeds exposed to 26.25 ppmw of the test substance in the soil ranged from 83% of the control (onion) to greater than the control response. The radicle length for the corn, lettuce, and soybean germinating seeds exposed to the test substance were 76, 82, and 60% of the control values, respectively. The cabbage and tomato germination response was 10% less than the control response. The response of carrot, cucumber, oat, onion, and ryegrass were not considered different than the control values.

"The percent emergence data for all but soybean seedlings were similar to that of the control responses. Only 20% of the soybean seedlings emerged by test end, and little or no growth was observed from those that did emerge. The mean day to emergence did not differ between treated and control seedlings, with the exception of soybean which had not met the > 50% emergence criterion 17 days after planting.

"The overall mean for the phytotoxicologically coded effects for the controls ranged from 0 to 0.2 on day 10 postemergence and 0 to 0.4 (onion) by day 14 postemergence. In comparison to the control observations cabbage was the only species unaffected. The effects ranged from slight for oat, ryegrass, and tomato, to moderate for carrot, corn, cucumber, lettuce, and onion. Soybean could not be rated due to its poor emergence response; however, soybean was considered the most sensitive species. The order of sensitivity of the seedlings to the test substance as determined in this test, based on phytotoxicological effects, increased as follows:

"Cabbage < Ryegrass < Oat < Tomato < Onion < Corn  
< Carrot = Lettuce < Cucumber < Soybean

"An examination of the root yield of carrot in comparison to the shoot yield did not reveal that one portion of the seedling was more sensitive than the other.

"Based on the results of this study, cabbage does not appear to be adversely affected by the test substance during germination and early growth, except for slightly shorter (10%) roots five days after planting.

"Of the seeds planted in soil treated with the test substance at 26.25 ppmw oat, ryegrass, and tomato did not exceed the 25% yield reduction, but were observed to have slight phytotoxicological effects. Carrot, corn, cucumber, lettuce, onion, and soybean all exceeded the 25% criterion triggering a tier 2 test. Soybean seedlings, although germinated, they failed to emerge successfully."

A quality assurance statement was included with the study.

14. Reviewer's Discussion and Interpretation of the Study:

- a. Test Procedures - The study generally followed the protocol outlined in Subdivision J of the Guidelines except for the following: The soil used to germinate the seeds was described as having an organic matter content of 50% (sphagnum peat moss). The Guidelines recommend an unspecified "standard soil" for use as the growth medium. Use of a high organic matter material is not considered a standard soil and is not recommended.
- b. Statistical Analysis - Analysis was by inspection.
- c. Discussion/Results - Data provided indicate that HOE 039866 did not cause a > 25% reduction in germination of the 10 species tested. However, a 40% reduction in soybean radicle length was detected. For percent emergence, only soybean (80% inhibition) was affected at a level of concern. Overall yield data indicated a > 25% effect for carrot, corn, cucumber, lettuce, oat, and soybean.

Results of this test indicate Tier II testing is required for those species showing a > 25% effect. However, because the growth media contained an excessively high level of organic matter (50% sphagnum peat moss) testing for all 10 species for germination and seedling emergence will be required. If soil is used when conducting Tier II germination and seedling emergence tests, it should contain no more than 3% organic matter or data provided indicating that organic matter does not have an effect on chemical availability. If there is difficulty in obtaining a soil that meets the above requirement, testing should be conducted in acid-washed quartz sand as indicated in Subdivision J of the Guidelines.

d. Adequacy of the Study

- 1) Classification - Supplemental
- 2) Rationale - The study was conducted with a soil that contained 50% sphagnum peat moss. No data were provided on whether the test chemical is affected by organic matter content.
- 3) Reparability - Submission of data on the effect of organic matter content on HOE 039866 may result in upgrading the study to CORE.

15. Completion of One-Liner for Study:

One-liner form completed.

16. CBI Appendix: N/A