FINAL REPORT

2,4-D: Magnitude of the Residue on Almond (Reregistration)
Almond Board Project No. 96-TS1

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Abstract

The Interregional Research Project No. 4 (IR-4) developed and signed a research protocol to conduct the necessary field trials and laboratory analyses for the reregistration of 2,4-D on almonds in February 1996. Field trials were started in May 1996, with samples collected in August 1996. IR-4 performed laboratory analyses for residues of 2,4-D on the almond hulls and meats in August and September 1996. Most samples contained no detected residues, except those from one site. These residues may be attributed to the management of the orchard. All orchards, except the one with the residues, were sprinkler irrigated. The orchard with residues is drip irrigated. Sprinkler irrigation helps to degrade the 2,4-D residues and to incorporate them into the soil where further degradation can occur. The drip irrigated orchard has large areas of dry soil where the 2,4-D residues will degrade much more slowly. When the nuts were shaken from the tree, dust containing 2,4-D residues likely covered the hulls and entered the shells through handling.

The field and laboratory reports were submitted to the Study Director at IR-4 Headquarters. The Study Director prepared a tolerance reregistration petition which was sent to the USEPA on January 31, 1997.

Introduction

The herbicide 2,4-D is currently registered and labeled for use on weeds on almond orchard floors. This is an effective herbicide for control of various broad leaf weed species especially during the dormant season. This use falls under the requirements of the USEPA's reregistration requirements. The registrants of 2,4-D products formed a Task Force to decide which uses of 2,4-D they would support during the USEPA's reregistration of pesticides. The Task Force is not pursuing the use on almonds. However, they will allow a third party to develop the necessary residue data. The registrants will label the use, if a third party develops the data.

The Interregional Research Project No. 4 (IR-4) is an USDA-sponsored program able to conduct the field and laboratory trials necessary to support pesticide tolerances on minor crops. The IR-4 has determined that this use is important to almond growers. IR-4 has the necessary field and laboratory cooperators to conduct the field and lab trials, under Good Laboratory Practices (GLP) requirements, to develop the data and petition to the USEPA in support of the continued use of 2,4-D on almonds.

Materials and Methods

The IR-4 Study Director wrote a research protocol that satisfies the USEPA's GLP requirements. The IR-4 Quality Assurance Unit reviewed and approved the protocol signed on February 1, 1996. Five field sites were selected in the San Joaquin Valley of California. Four were in Fresno County and one in Madera County.

Two formulations of 2,4-D were used in these trials: Weedar 64™ a dimethylamine salt formulation of 2,4-D (EPA Reg. No. 264-2-AA) and Esteron 99™ an isooctylester formulation of 2,4-D (EPA Reg. No. 62719-9-264). GLP characterized test substance was obtained from the manufacturers.

Each test site consisted of one untreated and two treated plots. Adequate buffer zones were employed between plots to prevent contamination of other plots. Sites were selected that had been maintained following good local agricultural practices for the production of almonds including fertilization, irrigation and other practices that ensure good crop production.

Application equipment that provided uniform applications of the test substance in 20 to 40 gallons of water per acre were used. The test substance was applied in a way that represented the major application techniques used by local commercial growers. All application equipment was calibrated to ensure accurate delivery rates.

Three application treatments were made to each site:

1.	Untreated	
2.	Weedar 64	1.425 lb. acid equivalent/acre
3.	Esteron 99	1.425 lb. acid equivalent/acre

Two applications were made to the orchard floor in a broadcast spray. Treatment numbers 2 and 3 were made 28(±3) days apart with the second treatment 60(±3) days before harvest. The first applications were made in May followed by the second applications in June.

Duplicate samples were collected in August from each plot in a manner to assure a representative, impartial sample. Ten to fifteen pounds of almond with hulls were collected per sample from a minimum of four trees per site. Hulls were separated from nut meats and packaged separately. Each hull sample weighed between one and two pounds and each nut meat sample weighed between two and four pounds. Samples were labels and placed in a cooler until frozen.

Samples were frozen and maintained at less than -18 degrees C until shipped to the UC Davis Trace Analytical Laboratory.

Analyses followed a modified EN-CAS Method No. ENC-2/93[1]. This method allows a detection limit of 0.050 ppm.

Results and Discussion

	Nut Meat	Hulls
Recoveries (%)	71-97	67-103
Control (ppm)	<0.050	<0.050
Residues (ppm):		
1.425 lb. ae/ac Weedar 64	<0.050-0.141	<0.050-0.098
1.425 lb. ae/ac Esteron 99	<0.050-0.077	<0.050-0.072
Stabilities (%)	69-73	80-96

Samples from four of the five sites contained no detected residues. These residues may be attributed to the management of the orchard. All orchards, except the one with the residues, were sprinkler irrigated. The orchard with residues is drip irrigated. Sprinkler irrigation helps to degrade the 2,4-D residues and to incorporate them into the soil where further degradation can occur. The drip irrigated orchard has large areas of dry soil where the 2,4-D residues will degrade much more slowly. Tarps were not used to collect the nuts when they were shaken from the tree. Dust containing 2,4-D residues likely covered the hulls and entered the shells through brushing the nuts into wind rows for collection, thus contaminating the nut meats and hulls from this one site.

Pecans and almonds are the representative commodities for the Tree Nuts Group. Once tolerances are established on the representative commodities, a group tolerance may be requested. The tolerance would then cover all members of the group that currently contains almond, beech nut, Brazil nut, butternut, cashew, chestnut, chinquapin, filbert, hickory nut, macadamia nut, pecans and walnut (black and English) established on almonds and pecans. A sixty-day interval from last spray to harvest was selected to match the same interval on residue studies for pecans so that a Tree Nuts Group tolerance may be requested. This interval is unlikely to be used in California due to state restrictions on phenoxy herbicide use from March 16 and October 15[2]. Soil residues would likely be degraded before harvest under typical use conditions.

The field and laboratory reports were submitted to the Study Director at IR-4 Headquarters. The Study Director prepared a tolerance reregistration petition which was sent to the USEPA on January 31, 1997.

References

[1]The Determination of 2,4-Dichlorophenoxyacetic Acid (2,4-D) in/on Various Raw Agricultural Commodities and Their Fractions (Wheat Straw, Grain and Forage). EN-CAS Method No. ENC-2/93, EN-CAS Analytical Laboratories.

[2]1996 California Code of Regulations, Title 3. Food and Agriculture, Division 6. Pesticides and Pest Control Operations, Chapter 2. Economic Poisons, Subchapter 4. Restricted Materials, Article 4. Use Requirements, Section 6464. Phenoxy and Certain Other Herbicides.

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Acknowledgments

We gratefully acknowledge the financial support of the Almond Board of California for the field trials. We extend appreciation to Mr. Bill Fischer, University of California Farm Advisor Emeritus and Dr. Timothy Prather, University of California Cooperative Extension, for the conduct of the field trials. Mr. Charles Mourer, University of California, Davis Trace Analytical Laboratory, analyzed the samples without delay to meet year end deadlines. Finally, the IR-4 Program's willingness to expedite this project through the system allows for continued use of 2,4-D on almonds.

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February 3, 1997

Ms. Chris Heintz
Almond Board of California
1104 Twelfth Street
Modesto, California 95354

RE: Final Report for Project No. 96-TS1: 2,4-D: Magnitude of the Residue on Almond (Reregistration)

Dear Chris:

Enclosed is the final report for the subject project funded by the Almond Board.

If you have any questions, please contact me at (916) 752-7634.

Sincerely,

Rick Melnicoe

Rick Melnicoe
Regional Field Coordinator
Western Region IR-4

RM

Enclosure

cc Taka Shibamoto (w/enclosure)
Office of Research (w/enclosure)

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