



# Department of Pesticide Regulation



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Director

## MEMORANDUM

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Protection Agency

TO: Joshua Johnson **HSM-01011**  
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FROM: Bernardo Z. Hernandez [original signed by B. Hernandez]  
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445-4203

DATE: August 22, 2001

SUBJECT: CARBOFURAN RESULTS FOR ALFALFA DFR COLLECTED IN  
IMPERIAL COUNTY IN MARCH 2001

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These samples were collected as part of Project 9505, which evaluates dislodgeable foliar residue (DFR) at expiration of the restricted entry interval (REI). The REI for carbofuran is 48 hours. All fields were treated with the product Furadan® 4F insecticide/nematocide, Environmental Protection Agency registration number 279-2876, containing 4 lbs. carbofuran per gallon. The product was identified from notice of intents filed with Imperial County Agricultural Commissioner's Office, where all fields were located.

DFR samples were collected between 48 and 60 hours post-application. Two DFR samples were collected for each field. Leaves showed no morning dew at the time of sampling. DFR samples Fd01-1516 through Fd01-1518 were collected using a Rabbit® leaf punch, which cut a leaf disk of 1.25 cm<sup>2</sup> area. This procedure was discontinued because leaves were being selected by size and not randomly throughout the field. The remaining samples were collected randomly by clipping the leaves at the petiole, so the leaf dropped into the 4-oz jar. Samples were capped with a Teflon®-lined lid. The jars were double bagged, packed on ice in insulated coolers, and shipped to the California Department of Food and Agriculture, Center for Analytical Chemistry, in Sacramento, for next-day extraction.

Three sequential washings removed foliar residues, each consisting of a 30-minute rotation on a mechanical rotator with 50 mL distilled water and 4 drops of sodium dioctyl sulfosuccinate solution. The solution was decanted between washings and the combined wash extracted with ethyl acetate. The organic extract was then dried by anhydrous sodium sulfate. The samples were analyzed on a Hewlett-Packard 1050 liquid chromatograph equipped with HP 1046A programmable FL detector. The conditions for carbofuran and its metabolites were:

- Pickering Laboratories analysis column, 5µ, C18, 4.6 mm x 250 mm
- HPLC pump gradient: acetonitrile/H<sub>2</sub>O 1mL/min, stoptime = 23 min, posttime = 5 min
- 1050 ALS Injector program: 40 µL drawn from sample
- Post column parameters: heated reactor temperature=100° C,
- Column temperature=42° C
- Fluorescence detector: excitation at 330 nm, emission at 464 nm.



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After the washing, each clipped leaf sample was pressed between three layers of newspaper to dry for a period of 24 – 48 hours. Leaf surface area measurements were then taken using a Licor<sup>®</sup> LI-3100 Area Meter following standard operating procedure WHS-EQ06. Analytical results were reported as micrograms per sample and recorded in Microsoft Access<sup>®</sup> database. The results were then converted to micrograms/square centimeter ( $\mu\text{g}/\text{cm}^2$ ) by dividing the sample result by the sample surface area from both sides of the leaves.

Six samples had residues below the 1  $\mu\text{g}/\text{sample}$  limit of quantification (LOQ) ( $0.0025 \mu\text{g}/\text{cm}^2$ ). Mean DFR levels for the 19 detectable samples were  $0.54 \pm 0.5 \mu\text{g}/\text{cm}^2$  and a range of 0.16 -  $1.58 \mu\text{g}/\text{cm}^2$ . Sample results are reported in Table 1.

Table 1. Carbofuran dislodgeable foliar residue results for alfalfa sampled in Imperial County

Sample NO	µg/cm <sup>2</sup>	Lbs. of A.I. <sup>a</sup>	GPA <sup>b</sup>	Applied by
Fd01-1516	0.19	0.5	5	Air
Fd01-1517	0.34	0.5	5	Air
Fd01-1518	0.23	0.5	5	Air
Fd01-1519	0.34	0.5	5	Air
Fd01-1520	0.29	0.5	5	Air
Fd01-1521	0.24	0.5	5	Air
Fd01-1526	ND <sup>c</sup>	0.5	5	Air
Fd01-1527	ND	0.5	5	Air
Fd01-1528	ND	0.5	5	Air
Fd01-1529	ND	0.5	5	Air
Fd01-1530	ND	0.5	5	Air
Fd01-1531	ND	0.5	5	Air
Fd01-1532	0.91	0.4	5	Air
Fd01-1533	1.42	0.4	5	Air
Fd01-1534	0.79	0.4	5	Air
Fd01-1535	1.58	0.4	5	Air
Fd01-1536	1.40	0.4	5	Air
Fd01-1537	1.19	0.4	5	Air
Fd01-1550	0.17	0.25	10	Ground
Fd01-1551	0.18	0.25	10	Ground
Fd01-1552	0.23	0.25	10	Ground
Fd01-1553	0.22	0.25	10	Ground
Fd01-1555	0.22	0.4	10	Ground
Fd01-1556	0.18	0.4	10	Ground
Fd01-1557	0.19	0.4	10	Ground
Fd01-1558	0.16	0.4	10	Ground
Fd01-1559	0.23	0.4	10	Ground

<sup>a</sup> A.I. = active ingredient

<sup>b</sup> GPA = gallons per acre; diluent is water

<sup>c</sup> ND = non-detected, limit of quantification 0.0025 µg/cm<sup>2</sup>

cc                    S. Edmiston  
                           C. Andrews  
                           J. Frank