

Memorandum

To: Gary Sprock, Registration Specialist
Pesticide Registration Branch

Date: June 30, 1993

Place: Sacramento

Phone: 654-0455

HSM-93007 [# assigned after
original issuance of memo]

From: **Department of Pesticide Regulation** - Michael H. Dong, Staff Toxicologist
Worker Health and Safety Branch

Subject **PRODUCT NAMES:** CONFIDOR 2 FLOWABLE®
ACTIVE INGREDIENT: Imidacloprid
COMPANY NAME: Miles Inc.
I.D. NUMBERS: 140962-E
DOCUMENT NUMBER: 51950-122
EPA REGISTRATION NUMBER: 3125 -
STUDY TITLE: Confidor (Imidacloprid) Estimated Foliar Dislodgeable Residues

This study report was submitted in support of an emergency exemption (Section 18) request use of imidacloprid on cotton for control of whiteflies in Imperial, Riverside, and San Bernardino Counties. Such use would allow imidacloprid to be applied to cotton 5 times per season at a maximum single application rate of 0.05 lb/acre. One issue of concern is whether dermal exposure to imidacloprid would be substantial for workers (e.g., cotton scouts) coming into contact with the dislodgeables that might have been accumulated on treated cotton foliage. The resolution of this issue would require certain information regarding the dissipation of imidacloprid dislodgeables on cotton.

The dissipation data for imidacloprid dislodgeables on cotton foliage are not yet available, however, since this insecticide is not a registered product in any cotton-growing states. To fulfill this part of the data requirements, the registrant proposed to estimate the level of imidacloprid dislodgeables on cotton immediately after an application using dislodgeable foliar residues (DFR) data from other compounds. WH&S supports this approach in that the DFR immediately following an application supposedly are not influenced by the chemical-specific properties of the compound being applied but, rather, are expected to be directly proportional to the application rate. The surrogate DFR data were obtained from the published literature [1-4] and constituted the bulk of the discussion in the study report. The remaining part of the study report dealt with estimation of a safe residue level for imidacloprid using NOELs that apparently were unacceptable to MedTox [5].

The surrogate data provided by the registrant are reproduced in Table 1, which represent 14 different DFR studies involving 10 different compounds applied to cotton at rates that range from 0.02 to 1.0 lb AI/acre. Also included in Table 1 are the DFR levels extra-polated for the imidacloprid dislodgeables immediately after application. These estimates were extrapolated from the surrogate data after adjustment for differences in application rates. From these estimates, the arithmetic mean DFR level for imidacloprid on cotton immediately after a single application was calculated to be 0.09 (\pm 0.05) $\mu\text{g}/\text{cm}^2$.

This reviewer finds the above mean DFR level for imidacloprid on cotton to be slightly lower than expected, since 7 additional DFR studies from the same literature were inadvertently omitted by the registrant. The recalculation is summarized in Table 2, which indicates that the mean DFR level should have been 0.10 (\pm 0.04) $\mu\text{g}/\text{cm}^2$.

Table 1. Imidacloprid Dislodgeable Foliar Residues (DFR) Estimated by the Registrant for Levels Immediately After Application at a Rate of 0.05 lb AI/Acre^a

Pesticide	Application Rate (lb AI/acre)	Measured DFR ($\mu\text{g}/\text{cm}^2$) ^b	Extrapolated DFR ($\mu\text{g}/\text{cm}^2$) ^c	Reference ^d
bifenthrin	0.10	0.18	0.09	1
chlorpyrifos	1.00	1.82	0.09	2
fenvalerate	0.20	0.43	0.11	2
permethrin	0.20	0.44	0.11	2
sulprofos	1.00	2.18	0.10	2
cyhalothrin	0.02	0.05	0.13	3
fenvalerate	0.06	0.13	0.11	3
flucythrinate	0.04	0.19	0.24	3
curacron	1.00	1.00	0.05	4
deltamethrin	0.02	0.02	0.05	4
endosulfan	1.00	0.88	0.04	4
fenvalerate	0.10	0.10	0.05	4
permethrin	0.10	0.10	0.05	4
sulprofos	1.00	1.40	0.07	4
mean ($\pm \sigma$)			0.09 (± 0.05)	

a reproduced from those provided by the registrant (Eberhart, 1993).

b all measured DFR were for the time period immediately following application and were based on the surface area for both sides of the leaf.

c as expected for imidacloprid dislodgeables immediately after application; the extrapolated DFR were calculated by multiplying the measured DFR by the ratio of the application rate for imidacloprid (0.05 lb/acre) to the application rate for the surrogate compound in question.

d based on the following literature: (1) Dong *et al.*, 1991; (2) Buck *et al.*, 1980; (3) Estes and Buck, 1990; and (4) Estes *et al.*, 1979.

Table 2. Imidacloprid Dislodgeable Folia r Residues (DFR) Estimated by WH&S for Levels Immediately After Application at a Rate of 0.05 lb AI/Acre^a

Pesticide	Application Rate (lb AI/acre)	Measured DFR ($\mu\text{g}/\text{cm}^2$) ^b	Extrapolated DFR($\mu\text{g}/\text{cm}^2$) ^c	Reference ^d
bifenthrin	0.10	0.18	0.09	1
chlorpyrifos	1.00	1.82	0.09	2
EPN	1.00	2.55	0.13	2
fenvalerate	0.20	0.43	0.11	2
methyl parathion	1.00	2.25	0.11	2
methyl parathion	1.00	2.10	0.11	2
oxamyl	0.37	0.75	0.10	2
permethrin	0.15	0.44	0.15	2
permethrin	0.15	0.32	0.11	2
profenofos	1.00	1.75	0.09	2
sulprofos	1.00	2.18	0.11	2
sulprofos	1.00	2.90	0.15	2
cyhalothrin	0.03	0.05	0.08	3
fenvalerate	0.04	0.13	0.16	3
flucythrinate	0.06	0.19	0.16	3
curacron	1.00	1.00	0.05	4
deltamethrin	0.02	0.02	0.05	4
endosulfan	1.00	0.88	0.04	4
fenvalerate	0.10	0.10	0.05	4
permethrin	0.10	0.10	0.05	4
sulprofos	1.00	1.40	0.07	4
<i>mean</i> ($\pm \sigma$)			0.10	(± 0.04)

^a based on those provided by the registrant (Eberhart, 1993); including 7 DFR studies (from the same literature) that were inadvertently omitted by the registrant.

^b all measured DFR were for the time period immediately following application and were based on the surface area for both sides of the leaf.

^c as expected for imidacloprid dislodgeables immediately after application; the extrapolated DFR were calculated by multiplying the measured DFR by the ratio of the application rate for imidacloprid (0.05 lb/acre) to the application rate for the surrogate compound in question.

^d based on the following literature: (1) Dong *et al.*, 1991; (2) Buck *et al.*, 1980; (3) Estes and Buck, 1990; and (4) Estes *et al.*, 1979.

Surrogate data as submitted cannot be used to estimate how imidacloprid dislodgeables on cotton dissipate, since residue decay is a chemical-specific phenomena. In light of this deficiency, the registrant suggested that the (mean) DFR level for imidacloprid dislodgeables after the maximum 5 applications be set at 5 times the DFR level expected after a single application. This factor of 5 is unrealistically conservative to use, however, in that there should be no additional application necessary if the imidacloprid dislodgeables on the cotton foliage could be preserved completely from a single application. This reviewer thus recommends that at most a factor of 2.5 (i.e., half of what was suggested) be used instead. This recommendation is based on the argument that if the imidacloprid dislodgeables on the cotton foliage were in fact very persistent or not easily removed, then the transfer factor used in the exposure extrapolation from DFR data should have been much smaller. The transfer factors used by the registrant were those estimated earlier by WH&S [6]. They were based on compounds whose foliar residues were seen to be relatively highly dislodgeable.

Recommendation/Conclusion

WH&S finds the mean DFR level of 0.1 and of 2.5 $\mu\text{g}/\text{CM}^2$ to be a reasonable surrogate estimate, respectively, for imidacloprid dislodgeables on cotton after a single application and for those after 5 applications. The part in the study report that dealt with estimation of a safe residue level for imidacloprid is immaterial here, as it is beyond the scope of this review.

References

1. Dong, M. H., Thongsinthusak, T., Ross, J. H. 1991. Estimation of daily dermal exposure and absorbed daily dosage for agricultural workers exposed to bifenthrin in California cotton fields. HS-1 561, Worker Health and Safety Branch, California Department of Pesticide Regulation.
2. Estes, B. J., and Buck, N. A. 1990. Comparison of dislodgeable and total residues of three pyrethroids applied to cotton in Arizona. *Bull Environ Contam Toxicol* 44:240-245.
3. Estes, B. J., Buck, N. A., and Ware, G. W. 1979. Dislodgeable insecticide residues on cotton foliage: permethrin, curacron, fenvalerate, sulprofos, Decis, and endosulfan. *Bull Environ Contam Toxicol* 22:245-248.
4. Buck, N. A., Estes, B. J., and Ware, G. W. 1980. Dislodgeable insecticide residues on cotton foliage: fenvalerate, permethrin, sulprofos, chlorpyrifos, methyl parathion, EPN, oxamyl, and profenofos. *Bull Environ Contam Toxicol* 24:283-288.
5. MedTox. 1993. Data package summary and recommendation sheet - imidacloprid (new active ingredient). Medical Toxicology Branch, California Department of Pesticide Regulation, dated 6/18/93.

Gary Sprock
June 30, 1993
Page 5 of 5

6. Dong, M. H. 1990. Dermal transfer factor for cotton scouts. Memorandum to John H. Ross within the Worker Health and Safety Branch, California Department of Pesticide Regulation, dated 6/8/90.

cc: Joshua Johnson (1 original, 5 copies)
John Ross