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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

Memorandum

Subject: Fish Action Level Reevaluation for Aldrin/Dieldrin, Chlordane, DDT, Heptachlor and Mirex.
No Accession Number
RCB Numbers 2058, 2062, 2063, 2064, 2065 and 2066.

From: Michael S. Metzger, Chemist
Residue Chemistry Branch
Hazard Evaluation Division (TS-769C)

Thru: Edward Zager, Section Head, SRS 2
Residue Chemistry Branch
Hazard Evaluation Division (TS-769C)

To: Mr. Jack Housenger
Emergency Response and Minor Use Section
Registration Division (TS-767C)

Introduction

RCB has been asked to reevaluate the current action levels for residues of the following pesticides in fish:

Aldrin/Dieldrin
Chlordane
DDT
Heptachlor
Mirex

EPA Headquarters (HQ) sent a memorandum (Ferial S. Bishop, Chief, Registration Support and Emergency Response Branch, RD, 8/28/86) to EPA regional programs, FDA and the Office of Water Programs outlining an Action Plan for reevaluation of these action levels which would entail collection/generation of fish residue data, fish consumption data and benefits analysis. EPA HQ also requested that the regional offices submit any available fish residue data which might be useful in fish action level reevaluation. Several regions responded to these requests with comments on the Draft Action Plan, and with residue data (see M. Metzger, 1/29/87, 12/9/86). The

residue data submitted had limitted value for action level reevaluation primarily because these were not recent data, or because adequate validation for the analytical method was not available.

FDA surveillance monitoring data were generally used by RCB to determine appropriate action levels for pesticide residues in or on food. However, these data are not adequate to accomplish one of OPP's goals in this project, i.e., identification of regional or local residue problems. The reason for this is the impracticality, and in some cases impossibility, of identifying the origin of a fish sample which has been taken by FDA from the channels of interstate commerce for analysis. Additionally, game or sport fish are not targetted for representative sampling by FDA.

Since the purpose of action levels is to establish national standards, not regional standards, with regard to acceptable and unavoidable pesticide residues in foods, OPP has decided to consider recommending action levels for fish based on nationally representative residue data (FDA surveillance monitoring data), and to defer the issue of locally high residues until decisions are made regarding the delegation of responsibility in this regard among EPA HQ, EPA regional offices and other agencies.

Data Analysis

RCB has received FDA surveillance monitoring data (FY'85 and FY'86) for residues of the subject pesticides in fish. These data were generated using the FDA Pesticide Analytical Manual, Volume I (PAM I) Multi-Residue Method for Chlorinated Compounds. This method is capable of determining the entire residue of concern for these pesticides. Table 1 on the next page lists the subject pesticides together with a description of the residue of concern for each pesticide and the approximate limit of detection which was used in statistical analysis of the residue data. For each sample, detectable components of the residue of concern were summed to determine the total residue level for that sample.

Since a single analytical method is employed to measure residues of all of these compounds, the same total number of sample analyses were performed for each. The total number of analyses performed is shown in Table 2 on the next page.

As can be seen in Table 2, a large number of bluefish were sampled in FY 1985 and FY 1986. These analyses were performed

Table 1: Residue of Concern and Limits of Detection for the Subject Pesticides

Pesticide	Residue of Concern	Limit of Detection (ppm)
Aldrin/Dildrin	Aldrin	0.01
	Dieldrin	0.01
Chlordane	cis-, trans-chlordane	0.01
	cis-, trans-nonachlor	0.01
	chlordene (4 isomers)	0.01
	oxychlordane	0.01
DDT	o,p' and p,p' DDT	0.01
	o,p' and p,p' DDE	0.01
	o,p' and p,p' TDE	0.01
Heptachlor	heptachlor	0.01
	heptachlor epoxide	0.01
Mirex	mirex	0.01

Table 2: Total Number of Fish Samples Analyzed in FDA Surveillance Monitoring for FY 1985 and FY 1986

Sample	Total Number Samples
FY 1985 Domestic Surveillance without Bluefish	299
FY 1985 Domestic Surveillance, all samples	886
FY 1985 Import Surveillance	48
FY 1986 Domestic Surveillance without Bluefish	308
FY 1986 Domestic Surveillance, all samples	541
FY 1986 Import Surveillance	49

as part of a special bluefish survey. Statistical analysis of the data was performed both with and without inclusion of the bluefish data since bluefish sampling was not designed to be nationally representative, and therefore, could skew the data to show either higher or lower 95% confidence limit depending on whether bluefish tend to concentrate residues more or less than other fish, and depending on whether the location from which the bluefish were sampled has larger or smaller degrees of pesticide contamination. No trend is evident among the subject pesticides indicating that 95% confidence limits

will be skewed either up or down when bluefish are included in the data analyses. Rather, 95% confidence limits for aldrin/dieldrin are lower when bluefish are included, for chlordane higher with inclusion of bluefish, and for DDT are approximately the same. Since including bluefish in the statistical analysis did not cause a consistent trend in the 95% confidence limits among the subject pesticides, we will consider the 95% confidence limits calculated both with and without bluefish included, and use the higher value of these two in recommending action levels to insure that these action levels will not be exceeded.

Average and 95% confidence limits were calculated for both domestic and import samples for FY 1985 and FY 1986. Residue values designated as "trace" were assigned a value at the limit of detection in the statistical analyses, and non-detectable residues were calculated as one-half the limit of detection. These results, together with recommended action levels, are summarized in Table 3. In determining recommended action levels, the following factors were considered:

(1) The 95% confidence levels for FY'85 and FY'86

(2) The decline in residues from FY'85 to FY'86

(3) The total number of samples and the representativeness of the samples (eg. 95% confidence limits for imported samples weren't weighed as heavily in determining recommended action levels as domestic samples because the total numbers of import samples analyzed were small and not likely to be representative).

Codex Considerations

There are no Codex Maximum Residue Limits for residues of the subject pesticides in fish.

Table 3: Summary of FDA Surveillance Monitoring Data for the Subject Pesticides in Fish (FY 1985 and FY 1986) and Recomended Action Levels

		Residues (ppm)									
		FY' 1985				FY' 1986					
		Domestic		Import		Domestic		Import			
Pesticide	Sample	Average	95% Conf. Limit	Average	95% Conf. Limit	Average	95% Conf. Limit	Average	95% Conf. Limit	Recommended Action Level (ppm)	Current Action Level (ppm)
Aldrin/ Dieldrin	without bluefish	0.041	0.089			0.025	0.056				
	all samples	0.02	0.036	0.009	0.015	0.018	0.035	0.008	0.014	0.1	0.3
Chlordane	without bluefish	0.043	0.116			0.036	0.099				
	all samples	0.075	0.369	0.011	0.019	0.052	0.202	0.007	0.011	0.3	0.3
DDT	without bluefish	0.401	0.993			0.227	0.828				
	all samples	0.236	0.862	0.045	0.143	0.172	0.729	0.041	0.133	1	5
Heptachlor	all samples	0.007	0.011	0.006	0.01	0.007	0.012	0.006	0.009	0.02	0.3
Mirex	No positive findingd in FDA surveillance monitoring for FY' 1985 or FY' 1986									None[1]	0.1

[1]No action level is recommended for Mirex since no residues of Mirex were found in fish in FY'85 and FY'86.

Conclusions and Recommendations

TOX considerations permitting, RCB concludes that the following action levels are appropriate to cover unavoidable residues of the subject pesticides in fish:

Pesticide	Recommended Action Level (ppm)	Current Action Level (ppm)
Aldrin/Dieldrin	0.1	0.3
Chlordane	0.3	0.3
DDT	1	5
Heptachlor	0.02	0.3
Mirex	None[1]	0.1

[1] No action level is recommended for Mirex since no residues of Mirex were found in fish in either FY 1985 or FY 1986.

cc: Aldrin/Dieldrin, Chlordane, Heptachlor, DDT and Mirex
S.F., R.F., Action Level S.F. (reviewer), Circu, PMSD/ISB
RDI:E.Zager:3/18/87:RDS:3/18/87
TS-769C:RCB:M.Metzger:MM:Rm803a:CM#2:3/18/87