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OFFICE OF
PREVENTION, PESTICIDES, AND
TOXIC SUBSTANCES

MEMORANDUM

DATE: January 30, 1996

SUBJECT: Fenthion - Review of Pesticide Poisoning Incident Data

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The following data bases have been consulted for the poisoning incident data on the active ingredient fenthion (PC Code: 053301):

- 1) OPP Incident Data System (IDS) - reports of incidents from various sources, including registrants, other federal and state health and environmental agencies and individual consumers, submitted to OPP since 1992.
- 2) Poison Control Centers - as the result of Data-Call-Ins issued in 1993, OPP received poison control center data covering the years 1985 through 1992 for 28 organophosphate and carbamate chemicals. Most of the national Poison Control Centers (PCCs) participate in a national data collection system, the Toxic Exposure Surveillance which obtains data from 70 centers at hospitals or universities. PCCs provide telephone consultation for individuals and health care providers on suspected poisonings, involving drugs, household products, pesticides, etc.
- 3) California Department of Food and Agriculture (replaced by the

Department of Pesticide Regulation in 1991) - California has collected uniform data on suspected pesticide poisonings since 1982. Physicians are required, by statute, to report to their local health officer all occurrences of illness suspected of being related to exposure to pesticides. The majority of the incidents involve workers. Information on exposure (worker activity), type of illness (systemic, eye, skin, eye/skin and respiratory), likelihood of a causal relationship, and number of days off work and in hospital are provided.

4) National Pesticide Telecommunications Network (NPTN) - NPTN is a toll-free information service supported by OPP. A ranking of the top 200 active ingredients for which telephone calls were received during calendar years 1984-1991, inclusive has been prepared. The total number of calls was tabulated for the categories humans, animals, calls, incidents and others.

FENTHION REVIEW

IDS

There were 18 incidents involving fenthion reported to IDS as of January 29, 1996. The number of incidents and animals/humans involved are as follows:

	<u>Number of Incidents</u>	<u>Number of Animals</u>	<u>Number of Deaths</u>
Cats	1	3	1
Dogs	4	4	1
Calves	1	9	2
Wild Birds	6	Unknown	Unknown
Humans	6	6	2

The signs reported in domestic animals were consistent with organophosphate toxicity. The cases in humans appeared in a literature article¹ describing extrapyramidal manifestations² in six patients in Sri Lanka who attempted suicide by ingesting fenthion over a period of 10 years.

¹ Senanayake N; Sanmuganathan PS. Extrapyramidal manifestations complicating organophosphorus insecticide poisoning. Human and Experimental Toxicology 1995; 14:600-604.

² The pyramidal tracts are a collection of motor fibers arising in the brain and passing down through the spinal cord. Extrapyramidal refers to outside the pyramidal tracts. Signs of extrapyramidal disease include involuntary movements, alterations in muscle tone and postural disturbances.

Fenthion products for use on domestic animals are regulated by both EPA and FDA. Two concentrations, 3% and 20%, are registered by EPA for use on cattle to control lice. An additional concentration, 3%, is registered for use on cattle and swine by EPA. Products approved by FDA for flea control on dogs contain either 5.6 or 13.8% fenthion. The mechanism of action of fenthion for flea control is through systemic absorption which is the likely basis for its regulation by FDA. Reports of toxicity in dogs and cats may involve either the FDA-approved product, or misuse/inadvertent exposure to the EPA-approved products. The National Animal Poison Control Center reported 101 calls involving dogs and cats during 1986-1987; 50% of the canine calls and 70% of the feline calls were classified as toxicosis or suspected toxicosis.³ Dogs were involved more than twice as often as cats. It is likely that the majority of these calls involved the FDA-approved product. Some forms of the EPA-regulated RID-A-BIRD (11% fenthion) were occasionally associated with toxicosis in dogs.

Poison Control Center Data

Fenthion was one of the 28 chemicals for which poison control center data were requested. The following statistics are taken from an analysis of these data; see December 5, 1994 memo from Jerome Blondell to Joshua First.

Occupational and Non-occupational Exposure

There were a total of 52 cases of occupational exposure to fenthion reported to the Poison Control Centers; 50 (96%) involved exposure to fenthion alone and 2 (4%) involved exposure to multiple chemicals, including fenthion. There were a total of 417 non-occupational exposures; 407 (98%) involved this chemical alone and 10 (2%) were attributed to multiple chemicals.⁴

In this analysis, four measures of hazard were developed based on the Poison Control Center data, as listed below.

1. Percent of all accidental cases that were seen in or referred to a health care facility (HCF).
2. Percent of these cases (seen in or referred to HCF) that were admitted for medical care.
3. Percent of cases reporting symptoms based on just those cases where the medical outcome could be determined.

³ Beasley VR; Trammel HL. Incidence of poisonings in small animals. In Kirk RW (ed.): Current Veterinary Therapy, X. Philadelphia, W.B. Saunders, 1989, pp. 97-113.

⁴ Workers who were indirectly exposed (not handlers) were classified as non-occupational cases.

4. Percent of those cases that had a major medical outcome which could be defined as life-threatening or resulting in permanent disability.

Exposure to fenthion alone or in combination with other chemicals was evaluated for each of these categories, giving a total of 8 measures.

The following table presents the analyses for occupational and non-occupational exposures. The number in parenthesis is the median score for that category.

	Occupational Exposure	Non-occupational Exposure
Percent Seen in HCF		
Single chemical exposure	48.0 (68.2)	25.3 (44.0)
Multiple chemical exposure	48.1 (69.8)	25.4 (46.1)
Percent Hospitalized		
Single chemical exposure	12.5 (12.2)	16.5 (9.9)
Multiple chemical exposure	12.0 (14.3)	16.0 (12.6)
Percent with Symptoms		
Single chemical exposure	70.6 (85.8)	54.8 (74.0)
Multiple chemical exposure	71.4 (85.8)	56.1 (75.2)
Percent with Life-threatening Symptoms		
Single chemical exposure	0.0 (0.0)	0.7* (0.0)
Multiple chemical exposure	0.0 (0.5)	0.7* (0.05)

* Included in the top 25% of insecticides.

A ranking of the 28 chemicals was done based on each of the above eight measures, with the lowest number being the most frequently implicated in adverse effects. Fenthion ranked high (top 25%) on only two measures. It ranked number 4 in percentage of non-occupational exposures with life-threatening illnesses when applied alone and number 7 when applied in combination with other chemicals. Both of these rankings were based on the same two cases of life-threatening poisonings.

Exposure in Children

A separate analysis of the number of exposures in children five years of age and under from 1985-1992 was conducted. For fenthion, there were a total of 165 reports; 161 (98%) involved exposure to this chemical alone while 4 (2%) were attributed to multiple chemicals. Further analysis showed that 26.1% with exposure to fenthion alone were seen at a health care facility. The percentage was 26.7 when fenthion was used in combination with other chemicals. Of these cases, the percentage hospitalized was 19.0%⁵ and 18.2%⁶ with single and multiple chemical exposures, respectively.

California Detailed Data - 1982-1993 - Circumstances of Poisoning

There were 6 case reports of adverse reactions received by the California Pesticide Illness Surveillance Program from 1982 to 1993; 3 involved use of fenthion alone while in 3 cases other chemicals were also used. Of the cases involving fenthion alone, one each occurred in the years 1982, 1983 and 1987. The cases in 1982 and 1983 involved wind blowing the pesticide in the face of applicators spraying for mosquitoes. Both experienced systemic effects. The third incident involved a veterinary technician who developed systemic symptoms after spilling the chemical on her smock and wearing it all day.

NPTN

A total of 237 calls on fenthion were handled by NPTN from 1984 to 1991, inclusively. A total of 57 incidents, involving 41 humans and 15 animals, were reported.

Use Information

Fenthion has relatively low reported usage in agriculture. Therefore, it is not possible to make a meaningful comparison between the number of reported poisonings to the number of applications or pounds reported in use. Fenthion has major use in mosquito control abatement where the population at risk is very different from that found in agricultural settings.

CONCLUSIONS

1. Data from the Poison Control Centers demonstrated that occupational exposure to fenthion was less likely to result in symptoms requiring medical attention than the other organophosphate

⁵ This percentage was the third highest of the 17 chemicals with 25 or more incident reports.

⁶ This percentage was the fourth highest of the 17 chemicals with 25 or more incident reports.

and carbamate insecticides evaluated. While the non-occupational exposure was less likely to result in referral to a health care facility, those which were referred were more likely to be hospitalized. In addition, those with symptoms were more likely to have life-threatening symptoms.

2. Of the 17 insecticides involved in childhood exposures, fenthion ranked third and fourth (single and multiple pesticides, respectively) on a list of the most likely to require hospitalization.