Office of Environmental Health Hazard Assessment

Joan E. Denton, Ph.D., Director
Headquarters • 1001 I Street • Sacramento, California 95814
Mailing Address: P.O. Box 4010 • Sacramento, California 95812-4010
Oakland Office • Mailing Address: 1515 Clay Street, 16th Floor • Oakland, California 94612

Linda S. Adams
Secretary for Environmental Protection

Arnold Schwarzenegger
Governor

M E M O R A N D U M

TO: Gary T. Patterson, Ph.D., Chief
Medical Toxicology Branch
Department of Pesticide Regulation
1001 I Street, P.O. Box 4015
Sacramento, California 95812-4015

FROM: Anna M. Fan, Ph.D. Chief
Pesticide and Environmental Toxicology Branch
Office of Environmental Health Hazard Assessment
1515 Clay Street, 16th Floor
Oakland, California 94612

DATE: July 31, 2007

SUBJECT: COMMENTS ON DPR'S DRAFT RISK CHARACTERIZATION, THIRD ADDENDUM DOCUMENT FOR THE ACTIVE INGREDIENT DICHLORVOS (DDVP)

We have received for our review the Department of Pesticide Regulation's (DPR) draft risk characterization document, third addendum, for the pesticide active ingredient dichlorvos (also known as 2, 2-dichlorovinyl dimethyl phosphate or DDVP), dated June 20, 2007. The Office of Environmental Health Hazard Assessment (OEHHA) reviewed and commented on DPR's draft risk characterization document (RCD) for dichlorvos in 1994, but did not review the first and second addenda of the final RCD for dichlorvos.

OEHHA reviews risk assessments prepared by DPR under the general authority of the Health and Safety Code, section 59004, and also under the Food and Agricultural Code, section 13129, which gives OEHHA the authority to provide advice, consultation, and recommendations to DPR concerning the risks to human health associated with exposure to pesticide active ingredients.

Dichlorvos is used to control a wide variety of insects in agricultural, commercial, and industrial settings. It is also used in and around homes (i.e., as resin strips) and on pets. Dichlorvos is an organophosphate, its neurotoxicity related to cholinesterase activity inhibition is the main concern in human exposure. Our comments on the draft third addendum are presented below, divided into general and specific comments.

GENERAL COMMENTS

1. We agree with DPR's decision in using the cholinesterase activity inhibition data derived from animal toxicity studies (as indicated in the draft third addendum) instead of the acute human toxicity studies reported by Gledhil (1997a and b) (as used in the first addendum issued in 1997) for the evaluation of acute oral and dermal exposures. As pointed out in the draft addendum, the inappropriate sampling time of the human studies might have missed the peak effects and under-estimated the cholinesterase activity inhibition potential of dichlorvos. We also agree with DPR in the use of benchmark dose modeling for evaluating the dose-response relationship of the cholinesterase activity inhibition data. In general, benchmark dose modeling is superior to the LOEL/NOEL approach as it uses all the data points in the study and the result is less affected by the spacing of the doses. The ability of benchmark dose modeling to include the variability of the data in its estimation is another advantage.

2. At present, if one needs to understand the risk assessment of dichlorvos by DPR, one has to read four documents: the dichlorvos RCD (DPR, 1996), the first (DPR, 1997) and second addenda to the dichlorvos RCD (DPR, 1998) and the subject of this review – the draft third addendum to the dichlorvos RCD. All three addenda were used by DPR, when new toxicological and/or exposure data became available, to modify and update the original dichlorvos RCD of 1996. However, this method of revision has increased the complexity of the risk assessment and made it difficult to understand. For instance, the main focus of the draft third addendum is to nullify some of the changes made in the first addendum. We suggest DPR consider either updating the RCD document itself or consolidating all the changes into one single addendum.

3. OEHHA notes that using the new critical equivalent NOEL of 0.8 mg/kg-day, some of the margins of exposure (MOE) calculated for home fogger exposure scenarios are below the benchmark of 100. For the dermal route, the MOEs calculated for the adult and the child are 14 and 10, respectively. For the oral route, the MOE calculated for the child is 48.

4. The current draft third addendum focuses only on dichlorvos. We suggest DPR includes exposures to naled and trichlorfon in the evaluation since these two pesticides are metabolized or degraded to dichlorvos in food, water, or the environment.

SPECIFIC COMMENTS

1. Table 1. Some exposure scenarios (e.g., 1-30 days oral and short to intermediate term inhalation) were evaluated by the U.S. EPA (2006) but not by the DPR. The draft third addendum should explain the differences.

2. Table 7. The title of Table 7 does not match the footnote of the table.

3. Table 11. Based on the acute toxicity data reported by Milburn (2003), DPR found that at 1 hour post-dosing, both the brain and red blood cell (RBC) acetylcholinesterase (AChE) were inhibited by about 50% for both the pre-weaning and the young adult rats. However, we noted that at 3 hours post-dosing, the AChE inhibitions in the brain (51%) and RBC (52%) of preweaning rats were much higher than the inhibitions in the brain (38%) and RBC (34%) of young adult rats. This information suggests that the pre-weaning rats were less capable of recovering from the exposure to dichlorvos than the young adult rats.

4. Page 27, the first paragraph. A 10% inhibition of AChE activity was chosen as the reference point in the benchmark dose analyses. The draft third addendum should discuss the reason(s) for this decision.

5. Table 18. The region (i.e., cerebellum, cortex, hippocampus, or the remainder) of brain should be specified for the PND42+ rat data (Twomey, 2002) reported in the table.

6 Page 30, the third paragraph. There is a typo. It should be “Table 21" instead of “Table 2.”

Thank you for the opportunity to review this document. We hope that you find our comments useful. Should you have any questions regarding OEHHA’s review, please contact Dr. David Ting, Dr. Jolanta Bankowska, or me at 510-622-3170.

Attachment
cc: See next page

cc: Allan Hirsch
Chief Deputy Director
Office of Environmental Health Hazard Assessment

George V. Alexeeff, Ph.D., D.A.B.T.
Deputy Director for Scientific Affairs
Office of Environmental Health Hazard Assessment

David Ting, Ph.D., Chief
Pesticide and Food Toxicology Section
Pesticide and Environmental Toxicology Branch
Office of Environmental Health Hazard Assessment

Jolanta Bankowska, Ph.D.
Staff Toxicologist
Pesticide and Food Toxicology Section
Pesticide and Environmental Toxicology Branch
Office of Environmental Health Hazard Assessment

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Gledhill, A.J., 1997a. Dichlorvos: A study to investigate the effect of a single oral dose on erythrocytes cholinesterase inhibition in healthy male volunteers. Report No. CTL/P/5251 Amvac Chemical Corporation. DPR Vol. 235-173 #153926.

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