Shaughnessy No.: 032201

Date out EAB: 07 MAR 1984

To: Mountfort
Product Manager 23
Registration Division (TS-767)

From: Samuel M. Creeger, Chief
Environmental Chemistry Review Section 1
Exposure Assessment Branch
Hazard Evaluation Division (TS-769c)

Attached, please find the EAB review of:

Reg./File No.: 239-ELNL

Chemical: Diquat Dibromide

Type Product: Herbicide

Product Name: Otho Diquat Concentrate

Company Name: Chevron Chemical Company

Submission Purpose: Assess exposure to EDB impurity

ZBB Code: other

Action Code: 161

Date In: 11/18/83

EFB No.: 4079

Date Completed: 07 MAR 1984

TAIS (Level II) Days

62 5

Deferrals To:

_____ Ecological Effects Branch

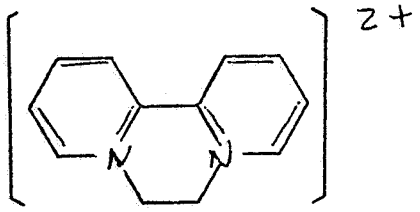
_____ Residue Chemistry Branch

_____ Toxicology Branch

## 1.0 INTRODUCTION

EAB has been asked to determine the potential levels of EDB in water sprayed with diquat dibromide, a contact herbicide which is used for aquatic weed control. Representative labels are attached.

## 2.0 Diquat dibromide: diquat 6,7-dihydrodipyridol(1,2-a:2',1'-c)pyrazinediium dibromide




## 3.0 DISCUSSION

Diquat dibromide is a contact, non-selective vegetation killer. It is applied to ponds, lakes and drainage ditches where there is little or no outflow of water. Treated water should not be used in any manner for two weeks after treatment.

EDB is present in diquat dibromide products as an impurity. The reported levels of EDB residues range from a high of 0.01% (100 ppm) to a low of 0.003% (30 ppm) in the Ortho Diquat Concentrate. Each gal of the Concentrate is similar to the product Ortho Diquat Water Weed Killer (35.3% salt) which contains 2 lb cation or 3.73 lb salt (the cation's weight is 54% of the weight of the salt).

The weight of 1 gal of product is determined from the following equation:

$$\frac{\text{weight (lb) of product}}{\text{gal}} = \frac{\text{weight (lb) of ai (salt)/gal}}{\text{\% ai (salt)}}$$

The approximate weight of 1 gal product is 10 lb. Since EDB levels range from 0.003% to 0.01%, then the weight of EDB/gal product ranges from 0.0003 lb/gal to 0.001 lb/gal.

Sample Calculation of EDB residues

If, for illustrative purposes, a pond -- 1 acre by 1 ft deep -- is to be treated, it is possible to determine the potential EDB residue levels.

The weight of the water to be treated is:

$$43{,}560\ ft^2 \times 1\ ft \times 62.4\ lb/ft^3 = 2.72 \times 10^6\ lb\ water$$

If one gal of product is introduced into this pond, then

$$\frac{0.001\ lb\ EDB/gal}{2.72 \times 10^6\ lb\ H_2O} = 0.37 \times 10^{-9} \text{ or } 0.4\ ppb$$

$$\frac{0.0003\ lb\ EDB/gal}{2.72 \times 10^6\ lb\ H_2O} = 0.11 \times 10^{-9} \text{ or } 0.1\ ppb$$

According to the Ortho Diquat Water Weed Killer Label, the maximum label recommended application rate calls for 2 gal/acre of water, 1 ft deep which seems to result in a diquat dibromide concentration of 1.5 ppm cation. If the minimum diquat cation concentration is about 0.3 ppm, then 0.4 gal of product is needed. The range of EDB levels could then range from

0.4 ppb/gal added x 2. gal = 0.8 ppb

0.1 ppb/gal added x 0.4 gal = 0.04 ppb

or

0.04 ppb - 0.8 ppb EDB

These numbers indicate a range of EDB residue levels that could be found regardless of depth and acreage since the amount of product used to treat the aquatic site varies directly with the volume of water to be treated.

4.0 CONCLUSION

It is estimated that potential (theoretical) EDB residues levels could be found in the range of 0.04 ppb - 0.8 ppb as a result of a single application to ponds. This range should be considered a 'worst-case' estimate for a one application of the product since factors that may reduce these levels under actual environmental conditions are not considered. Repeat applications for heavy weed infestations would increase these levels.

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