US EPA ARCHIVE DOCUMENT

Shaughnessy Number: 128857

Date out of EAB: AUG 24 1988

To: Lois Rossi/Larry Schnaubelt
Product Manager 21
Registration Division (TS 767C)

From: Emil Regelman, Supervisory Chemist
Review Section #3
Exposure Assessment Branch
Hazard Evaluation Division (TS 769C)

For ER

Thru: Paul F. Schuda, Chief
Exposure Assessment Branch/HED (TS 769C)

Attached, please find the EAB review of...

Reg./File #: 707-ROG, 707-ERN, 707-ERR, 707-ERE

Chemical Name: Myclobutanil

Type Product: fungicide

Company Name: Rohm and Haas Company

Purpose: to submit additional information on aqueous photolysis of myclobutanil, and adsorption/desorption of its triazole degradate

Date received: 6/27/88

Action Code: 126, 111

Date Completed: _____

EAB #(s): 80855 -80858

Monitoring Study Requested: _____

Total Reviewing Time: 3.5 Days

Monitoring Study Volunteered: _____

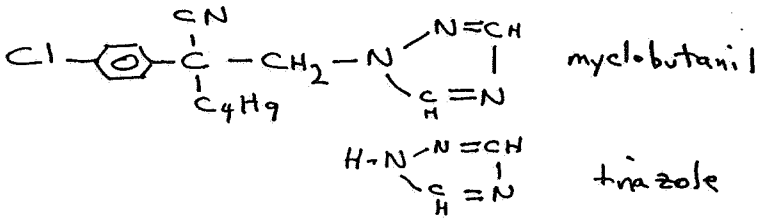
Deferrals to: ___Ecological Effects Branch

___Residue Chemistry Branch

___Toxicology Branch

1. CHEMICAL:

chemical name: [α-butyl-α(4-chlorophenyl)-1H-1,2-triazole-1-propanenitrile
common name: Myclobutanil
trade name: Systhane, Rally
structure:



CAS #: 66871-89-0
Shaughnessy #: 128857

2. TEST MATERIAL: see individual reports

3. STUDY/ACTION TYPE:

submission of additional information on aqueous photolysis of myclobutanil (systhane) and adsorption/desorption of its degradate 1,2,4-triazole

4. STUDY IDENTIFICATION:

Ackermann, I.B. and Streelman, D.R. Supplemental Information for Aqueous Photolysis Study No. 31H-86-08: Comparison of the Light Source Intensity to Sunlight. performed and submitted by Rohm and Haas Company, Spring House, PA. dated 5/31/88. received EPA 6/2/88 under MRID # 406415-01.

Keller, A. Adsorption and Desorption of 1,2,4-Triazole in Various Soil Types. performed by Ciba-Geigy Ltd. Basle, Switzerland. submitted by Rohm and Haas Company, Spring House, PA. dated 10/5/83. received EPA 6/2/88 under MRID # 406415-02.

5. REVIEWED BY:

Typed Name: E. Brinson Conerly
Title: Chemist, Review Section 3
Organization: EAB/HED/OPP

E.B. Conerly 8/23/88

6. APPROVED BY:

Typed Name: Emil Regelman
Title: Supervisory Chemist, Review Section 3
Organization: EAB/HED/OPP

Dan Spatz for ER
AUG 24 1988

7. CONCLUSIONS:

The aqueous photolysis information on Myclobutanil provided in this submission completes this data requirement. The adsorption/desorption information on 1,2,4-triazole provides useful supplemental information which indicates a high degree of mobility, but does not fulfill the data requirement. It may become acceptable with additional information as described in the DER.

8. RECOMMENDATIONS:

The applicant should, if possible, submit the necessary additional information on the adsorption/desorption study, including data points, details of the experimental procedure, etc. If this is not possible, a study done on 1,2,4-triazole under standard conditions as prescribed by the Guidelines for 163-1 will be necessaary. EAB defers to Toxicology Branch as to the significance of the current information on this compound.

9. BACKGROUND:

In a previous review (EBC 4/12/88), the applicant was informed that submittal of satisfactory information comparing the experimental light source in Study TR 31-H-86-08, EPA Acc. # 405-28801, with natural sunlight would complete the requirement for aqueous photolysis data. Document 1 supplies the missing information.

Document 2 is a response to the request for leaching/mobility data on the degradate.

The status of data requirements is as follows:

hydrolysis -- satisfied -- stable at pHs 5, 7, 9
photolysis in water -- satisfied as of this review. The applicant has provided a satisfactory comparison of the intensity of the light source to natural sunlight. The compound is apparently stable to photolysis in water.

photolysis in soil -- satisfied -- The compound is stable to photolysis on soil, extrapolated half-life of ca. 143 days. Although there are serious deficiencies in this study also, it is likely that no further useful information would be gained by an additional study.

anaerobic soil metabolism -- satisfied -- The temperature at which it was performed has been supplied [the same temperature as the aerobic phase]. The compound is resistant to anaerobic metabolism -- no detectable degradation after ca. 60 days.

leaching - additional data required re "aged" compound -- degradates must be identified and quantified.

terrestrial field dissipation -- unacceptable, due to inadequacy of sampling; to lack of immediate post-treatment sampling of the PA site (which means that application rate was not confirmed); a difference of almost an order of magnitude in soil concentration between the two sites, in what should have been comparable samples; and apparent difficulties with the analytical method.

fish bioaccumulation -- waived, based on low k_{ow}s for parent and degradates. The compound is not expected to bioaccumulate.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES: see DER

11. COMPLETION OF ONE-LINER: update attached

12. CBI APPENDIX: attached to individual DER

DATA EVALUATION REVIEW

I. Study Type: batch adsorption/desorption on 1,2,4-triazole, degradate of Myclobutanil

II. Citation:

Keller, A. Adsorption and Desorption of 1,2,4-Triazole in Various Soil Types. performed by Ciba-Geigy Ltd. Basle, Switzerland. submitted by Rohm and Haas Company, Spring House, PA. dated 10/5/83. received EPA 6/2/88 under MRID # 406415-02.

III. Reviewer:

Typed Name: E. Brinson Conerly
Title: Chemist, Review Section 3
Organization: EAB/HED/OPP

EB Conerly 8/23/88

IV. Conclusions:

This study is apparently scientifically sound, but fails to meet Guidelines requirements for reasons detailed below. Additional information may make it acceptable.

It does provide the supplemental information that the compound is highly mobile, with $k_a$ads under these non-standard conditions ranging from 0.19-3.35, and $k_a$des ranging from 0.41 - 10.1. In comparison with reference pesticides, it is more mobile than any tested, including atrazine.

V. Materials and Methods:

test soils -- details attached
test protocol -- 100 ml of aqueous solutions (2.5 to 20 ppm) of 1,2,4-triazole were equilibrated with 10 - 50 gm oven-dried soil [individual amounts of soil not specified] for 24 hours at 20°C. The suspensions were centrifuged and total radioactivity in the supernatant solutions determined by LSC. Desorptions were done by replacing the removed supernatant with fresh distilled water, equilibrating for 24 hours, and centrifuging. The desorption procedure was repeated once.
reference compounds -- diazinon, methidathion, ametryne, and atrazine under the same conditions as described above

VI. Study Author's Results and/or Conclusions:

The adsorption constants k were found to be between 0.19 and 3.35 ug/gm soil demonstrating that 1,2,4-triazole is weakly adsorbed onto soil particles. The adsorption figures based on organic matter content ranged from 8 - 22 ug adsorbed/gm organic matter. The compound is more mobile under test conditions than any of the reference compounds, based either on total soil weight or on weight of organic material. Details are attached.

VII. Reviewer's Comments:

The study deviates from Guidelines protocol in the following respects:

1) Only one soil tested was from the United States. Soil characteristics are attached. The American soil is a sand, and the four Swiss soils are one loamy sand, two silt loams, and one organic. The applicant may remedy this deficiency by relating the Swiss soils to specific American soils per Pesticide Guidelines, 160-5 #9.
2) The solutions tested were in distilled water, not 0.01 M $CaCl_2$. The effect, if any, of this non-standard condition is unknown.
3) The range of concentrations tested was somewhat limited, since it did not cover even one order of magnitude.
4) The report is only a summary and fails to give sufficient detail-- e.g. no data points for the various concentrations and soils are provided. This deficiency may repaired by providing the necessary detail, e.g. data points for the various concentrations, amount of soil relative to amount of solution for individual soils, etc.

Although the study was not done under standard conditions, EAB is not rejecting it at this time, since a study done under standard conditions would almost certainly produce very similar results -- 1,2,4-triazine would be shown to be highly mobile. If the applicant is able to provide the needed additional information on soils and experimental procedure, the study may become acceptable.

VIII. CBI Information Addendum: attached

ORIGIN AND PROPERTIES* OF SOILS USED FOR ADSORPTION/DESORPTION MEASUREMENTS

Origin	pH	Organic Matter %	$CaCO_3$ %	Cation Exchange Capacity [mmol/z/100g soil]	Mechanical Analysis Clay %	Silt %	Sand %
Collombey VS, Switzerland loamy sand	7.4	1.4	10.2	1.75	2.5	13.6	83.9
Lakeland, Florida, U.S.A. Sand	6.5	1.0	0.1	1.02	1.1	0.9	98.0
Les Evouettes VS, Switz. silt loam	6.2	2.6	0.1	3.25	10.3	64.0	25.7
Vetroz VS, Switzerland silt loam	7.3	9.3	55.6	8.92	21.5	60.4	18.1
Illarsaz VS, Switzerland	6.9	43.1	7.8	13.1	**	**	**

* The soils were characterized by the Swiss Federal Institute for Agricultural Chemistry and Environmental Hygiene, 3097 Liebefeld-Bern, Switzerland.

** Due to the high organic matter content mechanical analysis could not be carried out.

CONSTANTS OF FREUNDLICH ADSORPTION ISOTHERMS FOR 1,2,4-TRIAZOLE IN VARIOUS SOILS:

Soil type	k [$\mu g \cdot g^{-1}$]	Q [$\mu g \cdot g^{-1}$ OM*]	1/n	r**
Collombey	0.19	14	0.65	0.999
Lakeland	0.22	22	0.71	0.994
Les Evouettes	0.52	20	0.88	0.999
Vetroz	1.32	14	0.80	0.996
Illarsaz	3.35	8	0.85	0.998

* OM = organic matter

** r = correlation coefficient

FREUNDLICH ADSORPTION CONSTANTS OF 1,2,4-TRIAZOLE IN COMPARISON TO THOSE OF SOME PESTICIDES.

soil type → / compound ↓	Collombey k*	Collombey Q**	Lakeland k	Lakeland Q	Les Evouettes k	Les Evouettes Q	Vetroz k	Vetroz Q	Illarsaz k	Illarsaz Q	Mean Q value
1,2,4-Triazole	0.19	14	0.22	22	0.52	20	1.32	14	3.35	8	16
Diazinon	3.75	272	-	-	8.13	314	23.2	250	-	-	279
Methidathion	2.48	180	4.05	393	4.53	175	14.8	159	66.1	153	212
Ametryne	1.52	110	-	-	4.55	176	7.68	82	58.1	135	126
Atrazine	0.86	62	-	-	1.98	76	2.88	31	28.0	65	59

* μg adsorbed per g of soil

** $\mu g \cdot g^{-1}$ organic matter

ADSORPTION 1,2,4-TRIAZOLE

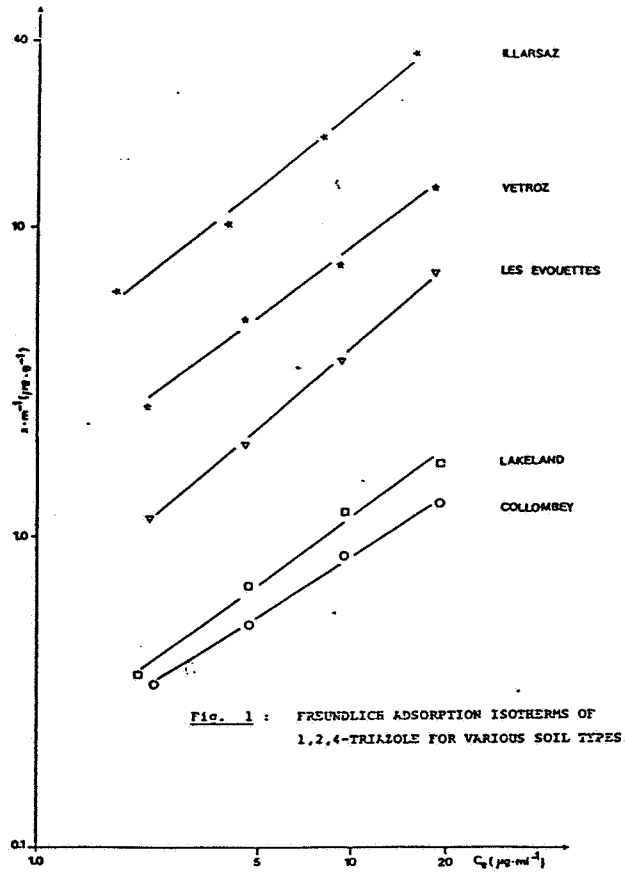


Fig. 1 : FREUNDLICH ADSORPTION ISOTHERMS OF 1,2,4-TRIAZOLE FOR VARIOUS SOIL TYPES.

CONSTANTS OF FREUNDLICH ADSORPTION ISOTHERMS FOR 1,2,4-TRIAZOLE IN VARIOUS SOILS:

Soil	DESORPTION, Step 1			DESORPTION, Step 2		
	k*	1/n	r**	k*	1/n	r**
Collombey	0.41	0.90	0.96	1.58	1.12	0.92
Lakeland	0.47	1.05	0.95	4.48	1.51	0.91
Les Evouettes	1.99	0.97	1.00	11.6	1.12	0.99
Vetroz	5.36	0.79	0.99	23.9	0.93	0.98
Illarsaz	10.1	0.85	1.00	24.9	0.95	1.00
Average O mass value ($\mu g \cdot g^{-1}$OM)	47	-	-	264	-	-

* µg desorbed per g of soil

** r = correlation coefficient

DESORPTION OF 1,2,4-TRIAZOLE FROM VARIOUS SOILS
(Values in percent of the amount adsorbed)

Soil	% 1,2,4-triazole desorbed		
	Step 1	Step 2	Step 1 + 2
Collombey	31.4	21.8	53.2
Lakeland	49.1	16.5	65.6
Les Evouettes	42.0	13.0	53.0
Vetroz	31.5	13.9	45.4
Illarsaz	25.4	15.0	40.4