

DP Barcode : D191061
 PC Code No : 039003
 EEB Out : OCT 1 1993

To: *Tom Myers, RS-1*
~~Barbara Briscoe ARB~~
~~Product Manager 51~~
 Special Review and Reregistration Division (H7508W)

From: Anthony F. Maciorowski, Chief
 Ecological Effects Branch/EFED (H7507C)

Attached, please find the EEB review of...

Reg./File # : 039003-010182
 Chemical Name : Sodium N-methyldithiocarbamate (SNMDC)
 Type Product : Microbiocide
 Product Name : SNMDC
 Company Name : Buckman Labs Inc.
 Purpose : Submission of additional information support-
ing why potassium methyldithiocarbamate aquatic studies can be
used to support SNMDC. (Case No. 2390)
 Action Code : 627 Date Due : 08/05/93
 Reviewer : A. Vaughan Date In : 05/11/93

EEB Guideline/MRID Summary Table: The review in this package contains an evaluation of the following:

GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT
71-1(A)			72-2(A)			72-7(A)		
71-1(B)			72-2(B)			72-7(B)		
71-2(A)			72-3(A)			122-1(A)		
71-2(B)			72-3(B)			122-1(B)		
71-3			72-3(C)			122-2		
71-4(A)			72-3(D)			123-1(A)		
71-4(B)			72-3(E)			123-1(B)		
71-5(A)			72-3(F)			123-2		
71-5(B)			72-4(A)			124-1		
72-1(A)			72-4(B)			124-2		
72-1(B)			72-5			141-1		
72-1(C)			72-6			141-2		
72-1(D)						141-5		

Y=Acceptable (Study satisfied Guideline)/Concur

P=Partial (Study partially fulfilled Guideline but additional information is needed)

S=Supplemental (Study provided useful information but Guideline was not satisfied)

N=Unacceptable (Study was rejected)/Nonconcur

DP BARCODE: D191061

REREG CASE # 2390

CASE: 804403
SUBMISSION: S440392

DATA PACKAGE RECORD
BEAN SHEET

DATE: 05/07/93
Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REREGISTRATION ACTION: 627 GENERIC DATA SUBMISSION
CHEMICALS: 039003 Metam-sodium 100.00 %

ID#: 039003-010182
COMPANY: 010182 ZENECA INC
PRODUCT MANAGER: 51 BARBARA BRISCOE 703-308-8177 ROOM: CS1 3H3
PM TEAM REVIEWER: TOM MYERS 703-308-8074 ROOM: CS1 4N1
RECEIVED DATE: 05/07/93 DUE OUT DATE: 08/05/93

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 191061 EXPEDITE: N DATE SENT: 05/07/93 DATE RET.: / /
CHEMICAL: 039003 Metam-sodium
DP TYPE: 999 Miscellaneous Data Package
ADMIN DUE DATE: 08/05/93 CSF: N LABEL: N

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	5/11/93	/ /
BRAN: EEB	5/11/93	/ /
SECT:	/ /	/ /
REVR :	/ /	/ /
CONTR:	/ /	/ /

* * * DATA REVIEW INSTRUCTIONS * * *

ATTENTION: AL VAUGHAN

Attached is the additional information provided by the registrant to demonstrate why the potassium methyldithiocarbamate aquatic studies can be used to support the sodium methyldithiocarbamate requirements. Also included is the reasoning for the discrepancy in toxicity values between these two chemicals based on the static vs flow-through testing conditions.

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
-------	----------------	----------	----------	-----	-----	-------



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

OCT 1 1993

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Use of PNMD C Aquatic Data to Support SNMDC
Reregistration (D191061)

FROM: *for* Anthony F. Maciorowski, Chief
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C) *Anthony F. Maciorowski*

TO: Tom Myers, RS-1
Accelerated Reregistration Branch
Special Review and Reregistration Division (H7508W)

EEB has reviewed the additional information provided by the Metam Sodium Task Force to support the use of PNMD C aquatic data for SNMDC reregistration. The attached submission clearly explains the reasons for apparent toxicity differences between the two chemicals, and provides adequate support for the use of PNMD C data to support the reregistration of both chemicals. EEB concurs with the original Agency Response to Phase 3 Submission for PNMD C, which stated that testing for ecological effects is interchangeable for SNMDC and PNMD C.

Any questions or comments on this memo should be referred to Allen Vaughan at 305-6464.

Attachments

3



Recycled/Recyclable
Printed with Soy/Canola Ink on paper that
contains at least 50% recycled fiber



Buckman Laboratories International, Inc.

1256 NORTH McLEAN BLVD./P. O. BOX 80305/MEMPHIS, TN 38108-0305, U.S.A./TELEPHONE (901) 278-0330/FAX (901) 276-5343/TELEX 6828020 or 534587

via **FEDERAL EXPRESS** 056193

February 18, 1993

Mr. Tom Myers
Chemical Review Manager
Accelerated Reregistration Branch
Special Review and Reregistration Division (H7508W)
US Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Re: Potassium N-Methyldithiocarbamate, Case Number 2390
Chemical Number 039002
Response to review of guideline 72-1 (a & b) studies
and use as analog studies to support data requirements.

Dear Mr. Myers:

The Agency has reviewed the bluegill sunfish (MRID No. 42363201) and rainbow trout (MRID No. 42363202) acute toxicity studies, 72-1 (a+b), performed with Potassium N-methyldithiocarbamate (PNMDC) and the analog request associated with these studies. Because of apparent discrepancies in toxicity values for warmwater fish, the EPA is requesting additional aquatic toxicity testing with the sodium-salt analog. Buckman Laboratories, on behalf of the Metam Sodium Task Force, believes this additional testing is inappropriate for these guideline requirements based on the following discussion and rationale.

Potassium N-methyldithiocarbamate (PNMDC) is the potassium salt analog of metam sodium, sodium N-methyldithiocarbamate (SNMDC). These two chemicals are simple salt analogs. This has been recognized by the EPA as indicated from comments on the attached Response to Phase 3 Submission for Chemical No. 039002, PNMDC (see attached sheet, GDLN # 63-13.. "Testing for Ecological Effects, Toxicology and Environmental Fate is interchangeable for metam-sodium and potassium N-methyldithiocarbamate."). Our position remains, in accord with the EPA's original opinion, that these data may be interchangeable.

The apparent "discrepancy" in toxicity values is created primarily from the variation in study designs, not inherent toxicological differences between the parent salt analogs. Previous metam-sodium acute aquatic toxicity studies for bluegill sunfish (MRID No. 41106201) and rainbow trout (MRID No. 41106202) conducted and submitted by BASF were performed under static test conditions. The PNMDC studies were conducted under flow-through test conditions, as is currently recommended by the EPA. SNMDC has a relatively short hydrolytic half-life.

4

PNMDC Waiver Request
February 18, 1993
Page 2

Hydrolysis half-lives of SNMDC in buffered solutions at a test temperature of 25 °C are approximately 180 hrs at pH 7 and 45.6 hrs at pH 9. More rapid degradation is seen under elevated temperatures (40 °C) with half-lives being 27.4 hrs at pH 7 and 19.4 hrs at pH 9. Recent studies with PNMDC show it also rapidly degrades within minutes to hours depending on aerobic and anaerobic conditions. Therefore, by use of flow-through test conditions exposure to parent compound is enhanced; inverse to hydrolytic degradates. Under static conditions, there is a greater potential for exposure to hydrolytic degradates to occur. If the degradate(s) is more toxic than the parent compound, as is the case here, then toxicity values can be markedly different.

For both salt analogs, the major hydrolysis product of the N-methyldithiocarbamates is the oxidation degradate, methyl isothiocyanate (MITC). MITC is known to be highly toxic to aquatic organisms. Reported toxicity ranges from MITC are 0.13 mg/L for bluegill sunfish, 0.37 mg/L for rainbow trout, and 0.37 for carp (The Agrochemicals Handbook, 2nd Ed.; see attachment). Toxicity data reported for SNMDC, 96-hr LC50 of 0.46 mg/L for bluegill, is within the same toxicity range observed for MITC in warmwater species. This latter study was conducted under static conditions which facilitated conversion of N-methyldithiocarbamate to MITC.

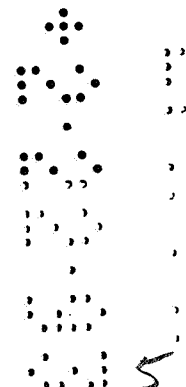
These differences in design and test conditions easily explain the disparity in toxicity values in warmwater fish species due to the hydrolytic nature of these analogs. Under cooler temperatures, such as those used for testing rainbow trout, SNMDC/PNMDC undergo a much slower rate of hydrolysis. Thus, toxicity values are within similar magnitudes of order. These circumstances clearly demonstrate the classical case of parent compound being less toxic than its metabolite. It further shows how significant environmental factors such as temperature and hydrolysis can influence chemical toxicity.

We feel that reasonable arguments presented have provided sufficient information upon which the Agency can evaluate and grant exemption from conducting these additional fish toxicity studies. We ask that you review information presented and provide us with your comments as soon as practical. If there are any questions, please give me a call.

Sincerely,

BUCKMAN LABORATORIES INTERNATIONAL, INC.

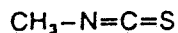
Carl F. Watson, Ph.D.
Environmental Toxicologist



5

Nematicide/Fungicide/
Insecticide/Herbicide

methyl isothiocyanate



Common name: methyl isothiocyanate (BSI, ISO-E, JMAF)

Chemical names:

methyl isothiocyanate (IUPAC)
isothiocyanatomethane (CA)

Other names: isothiocyanate de methyle (ISO-F); MIT.

Trade names: Trapex (Schering).

Chemical family: isothiocyanate

Molecular formula: C₂H₃NS

Molecular weight: 73.11

CAS Registry Number: 556-61-6

Manufacturers: Schering.

Physical form: Colourless crystals with a horseradish-like odour.

Melting point: 35-36°C.

Boiling point: 118-119°C (technical).

Vapour pressure: 2.7 kPa at 20°C.

Specific gravity: 1.069 at 37°C.

Stability: Unstable and reactive. Rapidly hydrolyzed by alkalis, more slowly in acidic and neutral solutions. Sensitive to oxygen and to light.

Corrosiveness: Corrosive to iron, zinc, and other metals.

Solubility: In water at 20°C, 7.6 g/l. Readily soluble in common organic solvents, such as ethanol, methanol, acetone, cyclohexanone, dichloromethane, chloroform, carbon tetrachloride, benzene, xylene, petroleum ether, and mineral oils.

Analysis of products: By reaction with *n*-butylamine, followed by potentiometric titration (M. Ottvad et al. *Anal. Methods Pestic. Plant Growth Regul.* 1978, 10, 565-568). Details from Schering.

Analysis of residues: By GLC with FPD (G. J. Sirons *J. Assoc. Off. Anal. Chem.* 1973, 56, 41-43). See also M. Ottvad et al. (*Anal. Methods Pestic. Plant Growth Regul.* 1978, 10, 568-573). Details from Schering.

Mode of action: Soil fumigant.

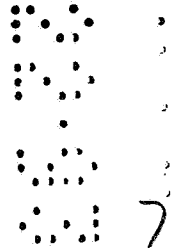
Uses: Multi-purpose soil fumigant for control of nematodes, soil fungi, soil insects, and weed seeds. Often used in combination with D-D (1,2-dichloropropane + 1,3-dichloropropene).

Phytotoxicity: Phytotoxic to all green plants.

Formulation types: Emulsifiable concentrate.

Mixed formulations: (methyl isothiocyanate +) D-D; D-D + chloropicrin. . . .

Toxicity to mammals: Acute oral LD50 for male rats 175, male mice 90 mg/kg. Acute percutaneous LD50 for rats 2780, male mice 1870 mg/kg. Strong irritant of skin and eyes. Rats receiving 30 mg/kg/day for 6 months showed no ill-effects.



methyl isothiocyanate

Toxicity to birds: Acute oral LD50 for mallard ducks 136 mg/kg.

Toxicity to fish: LC50 (96 hours) for bluegill sunfish 0.13, rainbow trout 0.37, carp 0.37 mg/l.

Toxicity to bees: Not dangerous to bees when used as directed.

Degradation and metabolism:

Environmental: In damp soil, degradation and evaporation of the bulk of the substance occurs within 3 weeks at 18-20°C soil temperature, 4 weeks at 6-12°C, and 8 weeks at 0-6°C.

Special precautions: Wear respirator and polyethylene gloves and footwear, as methyl isothiocyanate can penetrate rubber.

Antidotes and medical treatment: No specific antidote known. Symptomatic treatment. If in eyes, flush immediately with water or, preferably, with 5% sodium bicarbonate solution, and obtain medical treatment (hydrocortisone eyedrops at half-hour intervals).

Additional information: Methyl isothiocyanate reacts with ammonia and amines; therefore manure and fresh dung reduce its activity.

