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DP Barcodes : D156064, D165455, D165620, D166880, D166878
PC Code No : 013803 MSMA, 013802 DSMA
EEB Out :

To: BARBARA BRISCOE PM 51
Product Manager
Special Review and Reregistration Division (H7508W)

From: Douglas J. Urban, Acting Chief
Ecological Effects Branch/EFED (H7507C)

Attached, please find the EEB review of...

Reg./File # : _____
Chemical Name : MONOSODIUM ACID METHANEARSONATE
DISODIUM METHANEARSONATE
Type Product : HERBICIDE
Product Name : _____
Company Name : LUSEMBOURG-PAMOL, INC
Purpose : REVIEW DATA, INDICATE STATUS OF DATA
REQUIREMENTS FOR REREGISTRATION, (DATA FOR DSMA SUFFICES FOR
MSMA AND VICE VERSA, EXCEPT FOR TERRESTRIAL PLANT TESTS)
Action Code : 627 Date Due : _____
Reviewer : RICK PETRIE Date In EEB: VARIED

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)	41610002 MSMA*	Y	72-2(A) INV	41940605 MSMA	Y	72-7(A)		
71-1(B)			72-2(A) INV	41940604 DSMA	Y	72-7(B)		
71-2(A)	41610003 MSMA*	Y	72-3(A)			122-1(A)		
71-2(B)	41610004 MSMA*	Y	72-3(B)			122-1(B)		
71-3			72-3(C)			122-2		
71-4(A)			72-3(D)			123-1(A)	41905603 DSMA	P
71-4(B)			72-3(E)			123-1(B)	41905604 DSMA	P
71-5(A)			72-3(F)			123-2	41940601 SEL	Y
71-5(B)			72-4(A)			123-2	41940602 SKE	N
72 1(A) BG	41610005 MSMA*	Y	72-4(B)			123-2	41940603 LEM	Y
72-1(A) BG	41748001 MSMA* 41905601 DSMA		72-5			141-1	41935401 BEE	Y
72-1(C) RT	41610006 MSMA*	Y	72-6			141-2		
72-1(C) RT	41747301 MSMA* 41905602 DSMA					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



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

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

D156064, D165455, D165620, D166880, D166878,

MEMORANDUM

SUBJECT: Phase 5 Reviews For MSMA (monosodium acid methanearsonate)
and DSMA (disodium methanearsonate)

FROM: Douglas J. Urban, Acting Chief
Ecological Effects Branch
Environmental Fate And Effects Division (H7507C) *Douglas J. Urban* 9/2/92

TO: Barbara Briscoe, PM-51
Reregistration Branch
Special Review And Reregistration Division (H7508W)

The following Phase 5 reviews for MSMA and DSMA have been completed:

MSMA - D156064

- 1.) MRID 416100-02, Campbell, S., K.A. Hoxter, and G.J. Smith. 1990, MSMA: An acute oral toxicity study with the Northern Bobwhite. Study performed by Wildlife International LTD., Easton, MD. Lab. Study No. 296-104. Submitted by the MSMA/DSMA Research Task Force Three, Luxembourg Industries (Pamol) Ltd., Tel Aviv, Israel.

834 This study is classified as CORE. The avian oral LD50 value is ~~425.2~~ mg ai/Kg (nominal), the NOEL was not determined. In this study, MSMA (51% liquid) is moderately toxic to the Bobwhite Quail.

- 2.) MRID 416100-03, Long, R.D., J. Foster, K.A. Hoxter, and G. J. Smith. 1990. MSMA: A dietary LC50 study with the Northern Bobwhite. Study performed by Wildlife International Ltd., Easton, MD. Lab. study No. 296-102. Submitted by the MSMA/DSMA Research Task Force Three, Luxembourg Industries (Pamol) Ltd., Tel Aviv, Israel.

This study is classified as CORE. The avian dietary LC50 nominal value is 1667 ppm a.i. (3269 ppm formulated test material) the NOEC was not determined due to reduced body weight gains at all tested concentrations. In this study, MSMA (51%) is slightly toxic to the Bobwhite Quail.

- 3.) MRID 416100-04, Long, R.D., J. Foster, K.A. Hoxter, and G. J. Smith. 1990. MSMA: A dietary LC50 study with the Mallard. Study performed by Wildlife International Ltd. Easton, MD. Lab. Study No. 296-103. Submitted by MSMA DSMA Research Task Force Three, Luxembourg Industries (Pamol) Ltd., Tel Aviv, Israel.

This study is classified as CORE. The avian dietary LC50 nominal value is > 2866 ppm a.i. (5620 ppm formulated test material), the NOEC is 2866 ppm a.i. In this study, MSMA (51%) is slightly to practically non-toxic to the Mallard.

- 4.) MRID 416100-05, Graves, W.C. and G.T. Peters. 1990. MSMA: A 96-Hour Flow-through Acute Toxicity Test with the Bluegill (Lepomis macrochirus). Laboratory Project No. 296A-102. Prepared by Wildlife International Ltd., Easton, MD. Submitted by MAA (MSMA/DSMA) Research Task Force Three. Luxembourg Industries (Pamol), Ltd., Tel Aviv, Israel.

This study is classified as CORE. The 96 hour acute Bluegill Sunfish nominal toxicity LC50 value is > 51 mg ai/L (> 100 mg/L formulated test material), the NOEC is 100 mg/L. In this study, MSMA (51%) is practically non-toxic to the Bluegill Sunfish.

- 5.) MRID 416100-06, Graves, W.C. and G.T. Peters. 1990. MSMA: A 96-Hour Flow-through Acute Toxicity Test with the Rainbow Trout (Oncorhynchus mykiss). Laboratory Project No. 296A-101A. Prepared by Wildlife International Ltd., Easton, MD. Submitted by Luxembourg Industries (Pamol), Ltd., Tel Aviv, Israel.

This study is classified as CORE. The 96-hour acute Rainbow Trout nominal toxicity LC50 value is > 51 mg ai/L (> 100 mg/L formulated test material), the NOEC is 100 mg/L. In this study, MSMA (51%) is practically non-toxic to the Rainbow Trout.

MSMA - 165455

- 1.) MRID 417473-01, Graves, W.C. and G.T. Peters. 1991. MSMA: A 96-hour Flow-through Acute Toxicity Test With The Rainbow Trout (Oncorhynchus mykiss). Laboratory Study No. 296A-104A. Prepared by Wildlife International Ltd., Easton, MD. Submitted by MAA (MSMA/DSMA) Research Task Force Three, Luxembourg Industries, Ltd., Tel Aviv, Israel.

This study is classified as CORE. The 96-hour acute Rainbow Trout toxicity LC50 value is > 85 mg ai/L mean measured concentration (> 167 mg/L formulated test material), the NOEC is 167 mg/L. In this study, MSMA (51%) is practically non-toxic to the Rainbow Trout.

- 2.) MRID 417480-01, Graves, W.C. and G.T. Peters. 1991. A 96-hour Flow-through Acute Toxicity Test With The Bluegill (Lepomis macrochirus). Laboratory Project No. 296A-102. Prepared by Wildlife International Ltd., Easton, MD. Submitted by MAA (MSMA/DSMA) Research Task Force Three, Luxembourg Industries (Pamol), Ltd., Tel Aviv, Israel.

This study is classified as CORE. The 96-hour acute Bluegill toxicity LC50 value is > 47.9 mg ai/L (93.2 mg/L, formulated) mean measured concentration, the NOEC is 93.2 mg ai/L (no mortalities occurred at levels up to 93.2 ppm nominal concentration). In this study, MSMA is practically non-toxic to the Bluegill Sunfish.

MSMA - D166880

- 1.) MRID 419406-05, Hughes, J.S. and M.M. Alexander. 1991. The Toxicity Of MSMA 51% Aqueous Solution To Daphnia pulex. Study No. B648-03-7. Prepared by Malcolm Pirnie, Inc., Tarrytown, NY. Submitted by MAA Research Task Force Three, Luxembourg Industries (Pamol), Ltd., Tel Aviv, Israel.

This study is classified as CORE. The 48-hour acute Daphnia pulex toxicity LC50 value is 39.5 mg ai/L (77.5 mg/L formulated) based on mean measured concentrations. The NOEC value is 12.3 mg/L. In this study, MSMA is slightly toxic to Daphnia pulex.

DSMA - D165620

- 1.) MRID 419056-01, Murphy, D. and G.T. Peters. 1991. DSMA 81P (Disodium Methanearsonate): A 96-Hour Flow-through Acute Toxicity with the Bluegill (Lepomis macrochirus). Wildlife International Ltd. Project No. 286A-106. Performed by Wildlife International, Ltd., Easton, MD. Submitted by MAA Research Task Force Three, Tel Aviv, Israel.

This study is classified as CORE. The 96-hour acute toxicity LC50 value for the Bluegill is > 112 mg ai/L (82.7% TGAI mean measured concentration). The NOEC value is 112 mg ai/L. In this study, DSMA is practically non-toxic to the Bluegill.

- 2.) MRID 419056-02, Murphy, D. and G.T. Peters. 1991. DSMA 81P (Disodium Methanearsonate): A 96-Hour Flow-Through Acute Toxicity with the Rainbow Trout (Onchyrhynchus mykiss). Wildlife International Ltd. Project No. 286A-107. Performed by Wildlife International Ltd., Easton, MD. Submitted by MAA Research Task Force Three, Tel Aviv, Israel.

This study is classified as CORE. The 96-hour acute toxicity LC50 value for the Rainbow Trout is > 114 mg ai/L (82.7% TGAI mean measured concentration). The NOEC value is 114 mg ai./L. In this study, DSMA is practically non-toxic to the Rainbow.

- 3.) MRID 419056-03, Canez, V.M. 1991. Tier 2 Seed Germination/Seedling Emergence Nontarget Phytotoxicity Study Using DSMA. Laboratory Project No. BL91-446. Conducted by Pan-Agricultural Laboratories, Inc., Madera, CA. Submitted by MAA (MSMA/DSMA) Research Task Force Three, Luxembourg Industries (Pamol) Ltd., Memphis, TN.

This study is classified as SUPPLEMENTAL. DSMA did not cause a significant adverse effect on the germination of tested plant species. In the seedling emergence test, the most sensitive species tested was cabbage. The radicle length EC25 value is 0.52# ai/Acre (82.7% TGAI), the NOEC is < 0.30# ai/Acre. The rates of DSMA were not low enough to determine NOEC values for cabbage, ryegrass, and oat. These species must be retested with lower rates of DSMA.

- 4.) MRID 419056-04, White, T.L. 1991. Tier 2 Vegetative Vigor Nontarget Phytotoxicity Study Using DSMA. Laboratory Project No. BL91-447. Conducted by Pan-Agricultural Laboratories, Inc., Madera, CA. Submitted by MAA (MSMA/DSMA) Research Task Force Three, Luxembourg Industries (Pamol) Ltd., Memphis, TN.

This study is classified as SUPPLEMENTAL. Cabbage was the most sensitive species tested with an EC25 value of 0.583# ai/Acre (82.7% TGAI), the NOEC of 0.30# ai/Acre (plant height). NOEC values for corn dry weight and cabbage phytotoxicity and dry weight could not be established. Corn and cabbage must be retested at lower rates of DSMA to establish these NOEC values.

DSMA - D166878

- 1.) MRID 419406-01, Hughes, J.S., and M.M. Alexander. 1991. The Toxicity of DSMA 81P to Selenastrum capricornutum. Laboratory Project No. B648-03-1. Conducted by Malcolm Pirnie, Inc., Tarrytown, N.Y. Submitted by MAA Research Task Force Three, c/o Luxembourg Industries (Pamol), Ltd., Tel Aviv, Israel.

This study is classified as CORE. The 5-day EC50 value for Selenastrum capricornutum is 366 mg ai/L (mean measured concentration 82.7% TGAI), the NOEC is 90.8 mg ai/L.

- 2.) MRID 419406-02, Hughes, J.S. and M.M. Alexander. 1991. The Toxicity of DSMA 81P to Skeletonema costatum. Laboratory Project No. B648-03-4. Conducted by Malcolm Pirnie, Inc., Tarrytown, N.Y. Submitted by MAA Research Task Force Three, c/o Luxembourg Industries (Pamol), Ltd., Tel Aviv, Israel.

This study is classified as INVALID. The control vessels were contaminated with 3.9 mg/L (mean measured concentrations) of test material (82.7% TGAI). This study must be repeated.

- 3.) MRID 419406-03, Hughes, J.S. and M.M. Alexander. 1991. The Toxicity of DSMA 81P to Lemna gibba G3 (Duckweed). Laboratory Project No. B648-03-5. Conducted by Malcolm Pirnie, Inc., Tarrytown, N.Y. Submitted by MAA Research Task Force Three, c/o Luxembourg Industries (Pamol), Ltd., Tel Aviv, Israel.

This study is classified as CORE. The 14-day EC50 value for Lemna gibba is 72.7 mg ai/L (mean measured concentrations of 82.7% TGAI), the NOEC value is 20.5 mg ai/L.

- 4.) MRID 419406-04, Hughes, J.S. and M.M. Alexander. 1991. The Toxicity of DSMA 81P to Daphnia pulex. Study ID: B648-03-6. Prepared by Malcolm Pirnie, Inc., Tarrytown, N.Y. Submitted by MAA Research Task Force Three, c/o Luxembourg Industries (Pamol), Ltd., Tel Aviv, Israel.

This study is classified as CORE. The 48-hour LC50 value for Daphnia pulex is 153 mg ai/L (mean measured concentrations of 82.7% TGAI), the NOEC was not determined. In this study, DSMA is practically non-toxic to the Daphnia pulex.

- 5.) MRID 419354-01, Hoxter, K.A. and S.P. Lynn. 1991. DSMA 81P (Disodium Methanearsonate): An Acute Contact Toxicity Study with the Honey Bee. Laboratory Project No. 296-108D. Conducted by Wildlife International Ltd., Easton, MD. Submitted by MAA Research Task Force Three, c/o Luxembourg Industries (Pamol), Ltd., Tel Aviv, Israel.

This study is classified as CORE. The 48-hour LD50 value for the Honey Bee is > 20.7 ug ai/bee, the no-effect dose is 20.7 ug ai/bee (by visual observation due to lack of mortality at the highest dose tested). In this study, DSMA is relatively nontoxic to the Honey Bee.

SUMMARY OF DATA IN EEB FILES AS OF 08/05/92

As of this memorandum, the following DSMA studies have been reviewed by the EEB:*

<u>MRID</u>	<u>DATA REQUIREMENT</u>	<u>STATUS</u>	<u>LC/LD/EC50</u>
418920-01,	71-1-Acute Avian Oral	C	627 mg/Kg
418920-02,	71-2-Acute Dietary, Quail	C	4695 ppm
418920-03,	71-2-Acute Dietary, Mallard	C	>5620 ppm
	71-4-Avian Reproduction	R	
419056-01,	72-1-Acute fish, Bluegill	C	>112 mg ai/L
419056-02,	72-1-Acute fish, Rainbow	C	>114 mg ai/L
419406-04,	72-2-Aquatic Inverteb., D.p.	C	153 mg ai/L
	72-3-Estuarine/Marine Tox.		
	Fish	O	
	Shrimp	O	
	Mollusc	O	
419056-03,	123-1-Seed Germination	S**	
419056-03,	123-1-Seedling Emergence	S**	
419056-04,	123-1-Vegetative Vigor	S**	
419406-01,	123-2- <u>Selenastrum capricorn</u>	C	366 mg ai/L
419406-02,	123-2- <u>Skeletonema costatum</u>	I	
419406-03,	123-2- <u>Lemna gibba</u>	C	73 mg ai/L
	123-2- <u>Anabaena flos-aquae</u>	O	
	123-2-Freshwater diatom	O	
	124-1-Terrestrial Tier III	R	
	124-2-Aquatic Plant Tier III	R	
416100-07,	141-1-Acute Honey Bee Contact	C	>21 ug ai/bee
	201-1-Drift (Droplet Deposit)	O	
	202-1-Drift (Field)	O	

* All studies with 82.7% TGAI unless otherwise specified.

** SG - cabbage and ryegrass must be retested at lower doses.
SE - cabbage, ryegrass, and oat must be retested at lower doses.

VV - corn and cabbage must be retested at lower doses.

C = CORE, S = SUPPLEMENTAL, I = INVALID, O = OUTSTANDING,
R = RESERVED.

SUMMARY OF DATA IN EEB FILES AS OF 08/05/92

As of this memorandum, the following MSMA studies have been reviewed by the EEB:*

<u>MRID</u>	<u>DATA REQUIREMENT</u>	<u>STATUS</u>	<u>LC/LD/EC50</u>
416100-02,	71-1-Acute Avian Oral	C	425.2 mg ai/Kg
416100-03,	71-2-Acute Dietary, Quail	C	1667.0 ppm ai
416100-04,	71-2-Acute Dietary, Mallard	C	>2866.0 ppm ai
	71-4-Avian Reproduction	R	
416100-05,	72-1-Acute 96-hour Bluegill	C	>51.0 mg/ai/L
417473-01,	72-1-Acute 96-hour Bluegill	C	>47.5 mg ai/L
416100-06,	72-1-Acute 96-hour Rainbow	C	>51.0 mg ai/L
417473-01,	72-1-Acute 96-hour Rainbow	C	>85.0 mg ai/L
419406-05,	72-2-Aquatic invert. D.p.	C	39.5 mg ai/L
	72-3-Estuarine/Marine Tox.		
	Fish	O	
	Shrimp	O	
	Mollusc	O	
417055-01,	123-1-Seed Germination	C	
417055-01,	123-1-Seedling Emergence	S**	
417055-02,	123-1-Vegetative Vigor	C	
417482-01,	123-2- <u>Selenastrum capricor..</u>	C	
417482-02,	123-2- <u>Lemna gibba</u>	C	
	123-2- <u>Anabaena flos-aquae</u>	O	
	123-2- <u>Skeletonema costatum</u>	O	
	123-2-Freshwater diatom	O	
	124-1-Terrestrial Plant	R	
	124-2-Aquatic Plant Tier III	R	
416100-07,	141-1-Acute Honey Bee	C	34.7 ug ai/bee
	201-1-Drift (Droplet Deposit)	O	
	202-1-Drift (Field)	O	

* All studies with 51% TGAI liquid unless otherwise specified (formulation). ISK Biotech, Inc. registrations include: Bueno 6 - 48.3% MSMA (Reg. No. 50534-6), Daconate 6 - 48.3% MSMA (Reg. No. 50534-5), Ansar 6.6 - 51.0% MSMA (Reg. No. 50534-16), Super Arsonate - 58.2% MSMA (Reg. No. 50534-31, 50534-TX-01).

** SE - cabbage must be retested at lower doses.

C = CORE, S = SUPPLEMENTAL, I = INVALID, O = OUTSTANDING,
R = RESERVED.

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CONCLUSIONS:

Based on a previous EFED policy decision (04/04/91), MSMA ecotoxicity data suffices for DSMA and visa versa; with the exception of 123-1 non-target terrestrial plant phytotoxicity data. Therefore, based on the above listed summaries for MSMA and DSMA, the following EEB data requirements are still outstanding:

TESTING WITH MSMA OR DSMA

- 72-3 Estuarine/Marine Toxicity Tests Using:
Fish
Shrimp
Mollusc
- 123-2 Aquatic Plant Growth Studies Using:
Anabaena flos-aquae
Skeletonema costatum
Freshwater diatom
- 201-1 Drift Study (Droplet Size Determination); To Be Submitted To EFGWB/EFED
- 202-1 Drift Study (Field Study); To Be Submitted To EFGWB/EFED

TESTING WITH MSMA

- 123-1 Seedling Emergence Study Using:
cabbage

TESTING WITH DSMA

- 123-1 Seed Germination Study Using:
cabbage
ryegrass
- 123-1 Seedling Emergence Study Using:
cabbage
ryegrass
oat
- 123-1 Vegetative Vigor Study Using:
cabbage
corn

If you have any questions regarding this memorandum, please contact Richard Petrie @ 305-7358 (CM-2, RM 1030L).