

Shaughnessy No.:128901

Date Out of EAB: ~~MAR 11~~ 1986

To: R. Taylor
Product Manager 25
Registration Division (TS-767)

From: Samuel M. Creeger, Chief *SM*
Review Section #1
Exposure Assessment Branch
Hazard Evaluation Division (TS-769)

Attached, please find the EAB review of...

Reg./File # : 352-UGA
Chemical Name: DPX-F6025
Type Product : Herbicide
Product Name : CLASSIC
Company Name : Du Pont
Purpose : Registration, soybeans

Date Received: 12/19/85

Action Code(s): 111

Date Completed: MAR 11 1986

EAB #(s) : 6192

Days: 8

Deferrals to: _____ Ecological Effects Branch
_____ Residue Chemistry Branch
_____ Toxicology Branch

Monitoring study requested by EAB:

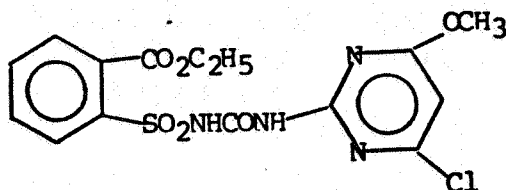
Monitoring study voluntarily conducted by registrant:

1.a CHEMICAL:

Ethyl 2-[[[(4-chloro-6-methoxypyrimidin-2-yl)amino]carbonyl]amino]sulfonyl]benzoate.

Benzoic acid, 2-[[[(4-chloro-6-methoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-, ethyl ester

DPX-F6025



C.b Physical Properties:

Molecular Weight: 414.8

Melting Point: 181°C

Solubility in Water: 1200 ppm at 25°C at pH 7

Vapor Pressure at 25°C: 1.5x10⁻⁵ mm Hg

Octanol/Water Partition Coefficient: 1.3

2. TEST MATERIAL:

33.3 micro Ci/mg and 96.6-98.0% radiochemical purity ¹⁴C-(2-Pyrimidine)-DPX-F6025

58.5 micro Ci/mg and 97.6-99.9% radiochemical purity ¹⁴C-(Phenyl(U))-DPX-F6025

3. STUDY/ACTION TYPE:

Additional data in support of registration of DPX-F6025 for use in Soybeans as an Herbicide (du Pont Classic™ Herbicide).

4. STUDY IDENTIFICATION: Accession No. 260554

- o Photodegradation of [Phenyl-¹⁴C(U)] DPX-F6025 and [Pyrimidine-2-¹⁴C] DPX-F6025 in Water.
- o Photodegradation of [Phenyl-¹⁴C(U)] DPX-F6025 and [Pyrimidine-2-¹⁴C] DPX-F6025 on Soil.
- o Soil Column Leaching Behavior of [Phenyl-¹⁴C(U)] DPX-F6025.
- o Terrestrial Dissipation of ¹⁴C-Labeled DPX-F6025.
- o Aerobic Soil Metabolism of ¹⁴C-DPX-F6025.
- o Crop Rotation Study with ¹⁴C-DPX-F6025 in the Greenhouse.
- o Computer Modeling of DPX-F6025 (PR2M).

5. REVIEWED BY:

Akiva D. Abramovitch, Ph.D.
Chemist
Environmental Chemistry Review Section 1/EAB/HED/OPP

Akiva D. Abramovitch
Date: MAR 11 1986

6. APPROVED BY:

Samuel M. Creeger, Chief
Supervisory Chemist
Environmental Chemistry Review Section 1/EAB/HED/OPP

Samuel M. Creeger
Date: MAR 11 1986

7. CONCLUSIONS:

Studies Discussed In This Review:

Soil Column Leaching Behavior:

EAB is satisfied with the soil column leaching data in fulfillment of the data requirement. The primary degradates in the aged Flanagan silt loam were identified as saccharin, 2-(aminosulfonyl)-benzoate [sulfonamide], ethyl 2-(aminosulfonyl)benzoic acid. Unknowns account for only 1% of the applied radioactivity (also see EAB review of 9/9/85). DPX-F6025 and the above degradates are present in the eluate (see table in 10.2).

Terrestrial Dissipation:

EAB is presently satisfied with the data submitted by du Pont in fulfillment of the data requirement. DPX-F6025 degraded with a half life of 1-6 weeks (7.5 weeks in the aerobic soil study) to hydrolysis products and demethylated DPX-F6025. Due to the low application rate, DPX-F6025 and its degradates (see also aged soil column leaching data, above), are not likely to leach below 32 cm at levels higher than 10 ppb.

Aqueous Photolysis:

The study satisfied the EAB data requirement for registration with the identification of the major photoproduct in the letter of Feb. 24, 1986 as a similar product to DPX-F6025 in which the chlorine was replaced by an hydroxyl group (see attachment). Photodegradation of DPX-F6025 in sterilized buffers of pH's 5, 7 and 9 is not a major degradation pathway but degradation of DPX-F6025 proceeded at almost twice the rate in exposed samples than in non-exposed samples. Hydrolysis products (see hydrolysis study), were the major degradation products but photoproducts were also observed.

Photodegradation on Soil:

The photodegradation on soil study satisfied the EAB data requirement. Soil photolysis will not be a major route of degradation in the environment. As reported, degradation proceeded on soils exposed to sunlight radiation at twice the rate observed on non-exposed soil but no photoproducts were formed. Other uses of DPX-F6025 may have to be supported with a new soil photolysis study to address the issues in 10.5 E with respect to the rate of degradation of exposed samples.

Aerobic Soil Metabolism:

The aerobic soil metabolism study satisfied the data requirements for registration. DPX-F6025 underwent initial degradation to ethyl 2-aminosulfonylbenzoate and 4-chloro-6-methoxy-2-pyrimidine amine with a half-life of 7.5 weeks in Flanagan silt loam and Woodstown sandy loam. The initial degradates did not undergo significant degradation in the following 52 weeks and identical behavior was observed in sterile and non-sterile soils. Demethylated DPX-F6025 was reported in only 4.4-13.2% between 24 and 52 weeks.

Crop Rotation:

Du Pont was able to convince EAB that the results obtained in the study are valid (see section 10.1 E). The study indicated that accumulation of residues in rotational crops would not exceed 0.01 ppm.

Conclusions of reported studies from previous submissions:

Hydrolysis:

The hydrolysis study was reviewed and found satisfactory in the EAB report of January 10, 1984. DPX-F6025 did not undergo any noticeable hydrolysis at pH 7 and 9 at 25°C. At pH 5 at 25°C, DPX-F6025 hydrolyzed with half lives ranging from 15.6 to 20.6 days. The two hydrolysis products at pH 5 were ethyl 2-(aminosulfonyl)benzoate and 4-chloro-6-methoxy-2-pyrimidinamine.

Temperature (°C)	pH	Half Life (day)		
		5	7	9
25		15.6-20.6	(a)	(a)

(a) no noticeable hydrolysis

Fish Accumulation:

Not submitted and a waiver was requested based on the reported octanol/water partition coefficient of 1.3 and information showing the hydrolysis products of DPX-F6025 to have even lower $K_{O/W}$. Since correlation between octanol/water partitioning and fish accumulation is only accurate within a factor of 100, our position will be that DPX-F6025 and its degradation products have potential to accumulate in fish to levels 130 times higher than levels in water. In light of this position, the registrant may want to conduct a fish accumulation study if they feel an actual study will show a lower accumulation factor.

Water/Octanol Partitioning Coefficient:

The study appeared to produce valid results determining the octanol/water partition coefficient for DPX-F6025 as 1.3. The degradation products of DPX-F6025 from hydrolysis were found to have even lower solubility in octanol than the parent compound.

Anaerobic Aquatic Metabolism:

The anaerobic aquatic metabolism study appeared to provide good scientific data to satisfy the requirement for either anaerobic soil or anaerobic

aquatic data. DPX-F6025 underwent anaerobic soil degradation by hydrolysis and microbial degradation with half lives of 2-6 weeks in the Florida and the Pennsylvania studies. Hydrolysis resulted in sulfonamide and pyrimidine amine and microbial degradation in demethylated DPX-F6025. Surprisingly, the anaerobic degradation resulted in more microbial degradation and less hydrolytic degradation than observed in the soil degradation study.

8. RECOMMENDATIONS:

All the data requirements to support use of DPX-F6025 on soybeans as proposed have been satisfied and the fate of DPX-F6025 in the environment is known. The available data indicates that DPX-F6025 and its degradates have the potential to leach and enter ground water in some soils. DPX-F6025 has relatively long half life in soil (half life of 7.5 weeks) and does not undergo fast decomposition in water and under sunlight. EAB understands the registrant's claim that not more than 10 ppb of DPX-F6025 are likely to leach below 32 cm when applied at a rate of 1.5 oz/acre (the maximum label rate is 1.0 oz/acre) and that DPX-F6025 and its degradates are relatively safe (not toxic). However, EAB is not in a position to judge whether small quantities of DPX-F6025 and its degradates (even below the detection limits) would provide risk should they enter ground water. This decision is left for other branches in HED which may trigger EAB to require additional information.

9. BACKGROUND:

A. Introduction: An experimental use permit (352-EUP-113) and a temporary tolerance on soybeans (PP3G2959) were approved by EPA on May 9, 1984. Du Pont is seeking to register DPX-F6025 as an Herbicide for use in or on Soybeans. They would like to market du Pont Classic™ Herbicide nationwide. Additional data was submitted with this report (see two previous 9/9/85 reviews).

B. Directions for Use: "Classic" Herbicide contains 25% of DPX-F6025 as the active ingredient (75% inert ingredients). It should be thoroughly mixed with water in a spray tank before adding any other material and used within 24 hours of mixing. Applications of 0.5-1.0 oz of the herbicide product, dissolved in about 10 gallons of water, was recommended per acre (a maximum use of 1.0 oz product per acre per season).

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

10.1 A. Study Identification: Crop Rotation Study with ¹⁴C-DPX-F6025 in the Greenhouse.

DuPont's response to questions raised in the EAB review of 9/9/85 with regard to a crop rotation study that was conducted by M. K. Koeppe and B. C. Rhodes (document No. AMR-268-84).

B. Material and Methods:

See EAB review of 9/9/85

C. Reported Results (from EAB review of 9/9/85):

At final harvest, barley straw and peanut and cotton foliage, contained total ^{14}C residues of 0.025, 0.016 and 0.016 ppm, respectively, but contained very low concentrations (<0.005 ppm) of DPX-F6025 and its major metabolites. Total ^{14}C -residue concentration in each of the other mature crop fractions were insignificant (<0.01). ^{14}C residue levels in the soil samples declined from 0.019 ppm at treatment to 0.0022 ppm at the final crop harvest. Benzoic acid, 2-[[4-chloro-6-hydroxypyrimidine-2-yl) aminocarbonyl] aminosulfonyl]-, ethyl ester represented about 45% of the total applied radioactivity in soils collected at final harvest. Intact DPX-F6025 accounted for 5-8% of the total radioactivity in these soils while unextracted (bound) material accounted for 32-34%.

D. Study Author's Conclusions:

Total ^{14}C residue concentration in each of the mature crop fractions were insignificant (<0.01 ppm).

The following additional explanations were enclosed in response to the EAB review of 9/9/85:

Differences in degradation patterns with respect to levels of demethylated DPX-F6025 in soils used in the crop rotation and the aerobic metabolism studies are attributed to differences in experimental conditions:

Crop Rotation

Soil exposed to light
Temp. 25-38°C
Variable moisture condition
large volume of soil-aerobic
Crop growth

Aerobic Soil Metabolism

Soils maintained in darkness
Temp. at 25°C
70% moisture capacity
50g in oxygenated biometer
No crop grown

In response to the reviewer's concerns with regard to the extraction procedures used in the crop rotation study, the author responded that it is not uncommon to use different extraction procedures for plants and soil since plants usually require strong solvent systems for efficient extractions.

In response to the reviewer's concerns that decomposition might have taken place during extractions, arguments are submitted of why such decomposition are not likely to occur.

E. Reviewer's Discussion and Interpretation of Study Results:

The reviewer is satisfied with the explanation provided by du Pont with regard to differences observed in levels of demethylated DPX-F6025 in the crop rotation and the soil metabolism studies. These differences concerned the reviewer in view of the extreme conditions used for the plant extractions (as the author states) and since these procedures were not examined by the study author in a control experiment to establish the stability of DPX-F6025 and its degradates under the extraction procedures. Although rationalization provided by the study author that DPX-F6025 and its degradates will be stable and good recoveries of these chemicals should be obtained with the applied extraction procedures appear reasonable, an experimental support for such claims would be much more convincing.

The reviewer's concerns about the extraction procedures were triggered by the observed product differences mentioned above. However, since the registrant is taking responsibility for the validity of the results and since the low residues in rotational crops observed (<0.01) appear reasonable in view of the low application rate of DPX-F6025, the reviewer finds the crop rotation data requirement satisfied for this proposed use pattern only.

10.2 A. Study Identification: Soil Column Leaching Behavior of [Phenyl-¹⁴C(U)] DPX-F6025.

The study was conducted by A. C. Barefoot of the Agricultural Chemicals Department, Research Division Experimental Station of DuPont (Document No. AMR-306-84).

B. Materials and Methods:

See EAB review of 9/9/85.

C. Reported Results:

See EAB review of 9/9/85 and additional clarifications are provided in D, below

D. Study Author's Conclusions:

According to the author some of the data reviewed in the EAB review of 9/9/85 was misinterpreted by the reviewer and thus the following clarifications are provided:

The results in table 3 (original text) have been recalculated as % of the total radioactivity applied and are presented below:

Soil Type	Eluate Composite	Percentage of Total Activity in Eluate	Percentage of Total Applied Activity As:			
			Saccharin	Sulfonamide	DPX-F6025	Others
Cecil	5.3-13.6	95.6	3.8	1.9	88.0	1.9
Flanagan	7.3-15.2	86.2	3.4	1.7	79.3	1.7
Flanagan (aged)	6.7-11.8	12.2	3.4	0.5	1.3	7.2
	11.8-19.6	20.5	2.5	0.9	14.2	13.1
Keyport	6.1-18.4	4.5	*	*(<0.1)	<0.15	4.8
Woodstown	4.6	97.4	3.9	2.9	95.5	0.0

* included in "others"
cal

Since the initial submission, the study author also studied the "other" components in the aged soil using other chromatographic systems and has identified all of the components in the aged Flanagan silt loam as saccharin, 2-(aminosulfonyl)-benzoate [sulfonamide], ethyl 2-(aminosulfonyl)benzoic acid and DPX-F6025. Unknowns account for only 1% of the applied radioactivity.

E. Reviewer's Discussion and Interpretation of Results:

The reviewer is satisfied with the above information. The leaching and aged leaching data requirement is satisfied. DPX-F6025 is considered a leacher but due to the very low application rate, detectable levels of parent compound and degradates are not expected to be found in ground water.

10.3 A. Study Identification: Terrestrial Dissipation of ¹⁴C Labeled DPX-F6025

The study was conducted by E. M. Venzon and P. T. Hardesty at the Agricultural Chemical Department, Research Division Experimental Station of Du Pont (document No. AMR-352-85).

B. Material and Methods:

See EAB review of 9/9/85 and additional information in D, below.

C. Reported Results:

See EAB review of 9/9/85.

D. Study Author's Conclusions:

The author disagrees with the reviewer's conclusions that DPX-F6025 and its degradates might leach to depths larger than 32 cm. Du Pont argues that even in assuming absurdly worst case assumptions, toxicologically significant levels could not occur. This conclusions are based upon:

An application of 1.5 oz of DPX-F6025 per acre (the maximum rate of application) is equivalent to 68 ppb in a 3" soil sample (assuming 125 lb/cu. ft of soil). Even assuming a long life, it cannot be expected that significant amounts (i.e., 10 ppb) would be found in the soil after several weeks).

No detectable residues were found 8" into the soil in a field study after 28 days (with the possible exception of saccharin), even comes close to the level of DPX-F6025.

Worst case assumptions were used using EPA's PRZM model (see attached review of the study) to asses the likelihood of significant amounts (<10 ppb) of DPX-F6025 moving below 32 cm.

The toxicity of DPX-F6025 is reasonably low and the toxicity of its degradates is not of major concern. The most significant residue that can be expected is saccharin which is an approved food additive. Therefore, Du Pont claims that the level of potential risk from toxicologically significant levels of DPX-F6025 residues in ground water is so low that it cannot be reasonably estimated.

E. Reviewer's Discussion and Interpretation of Study Results:

EAB found no reason to retract from its initial conclusion that DPX-F6025 has the potential to leach in some soils such as Cecil, Flanagan and Woodstown soils (see leaching data) due to the the low Kd values and the half life of 7.5-16 weeks for the initial degradation and even longer half life for the degradates (see also EAB review of the PRZM study). However, EAB understands the argument provided by du Pont that due to the low application rate of DPX-F6025, less than 10 ppb of DPX-F6025 and its degradates are likely to be present below 32 cm in a worse case situation. Although the argument provided by du Pont with regard to the low toxicity of DPX-F6025 is also well understood, EAB is not in a position to evaluate risks associated with low levels of DPX-F6025 and its degradates. Hopefully, other branches in HED would accept du Pont's argument with regard to low toxicity of these chemicals. Unless concerns are raised by other branches in HED, EAB considers the information provided in the leaching study, above, with regard to the identity of the degradates in the aged soil leaching study along with the information provided by this study, as sufficient to satisfy the EAB data requirement.

10.4 A. Study Identification: Photodegradation of [Phenyl-¹⁴C(U)] DPX-F6025 and [Pyrimidine-2-¹⁴C] DPX-F6025 in Water.

The study was conducted at the Agricultural Chemical Department, Research Division Experimental Station of du Pont at Wilmington, Delaware by R.F. Dietrich (Document No. AMR-456-85).

B. Materials and Methods:

A stock solution of 1000 ppm DPX-F6025 was prepared by dissolving 2.0 mg of the [phenyl-¹⁴C (U)]-DPX-F6025 in 2 ml of 10 mmole sodium borate buffer, pH 9 and dissolving 6.0 mg of [(2-pyrimidine)-¹⁴C]-DPX-F6025 in 6 ml of the same buffer. Test solutions of 5 ppm were prepared by diluting 1.5 ml aliquots of the stock solution to 300 ml with sterilized buffer solutions. Buffer solutions of pH 5, 7 and 9 were sterilized in an autoclave for 1 hr at 15 psi steam pressure. All glassware were sterilized by the same procedure. The test solutions were placed 9 inches from the photolysis lamp in separate 400 ml beakers covered with flat quartz lids to retard evaporation while permitting transmission of UV light. The solutions were stirred continuously by magnetic stirrers and kept at 25°C by a thermostated bath. The exposure of DPX-F6025 to artificial light was carried out in a "Suntest" apparatus shown in fig. 2. The radiation source was a xenon lamp equipped with a filter to eliminate wavelengths less than 290 nm and gave an energy spectrum shown in the attachment in comparison to that of natural sunlight. The light intensity (300-800 nm) measured by a spectroradiometer was 860 watts/m² at a distance of 9 inches averaged 139% of the energy emitted from natural sunlight as measured by the same instrument (see attached energy spectra). The lamp operated continuously during the 15 day study period. Identical dark control solutions were maintained for analysis Aliquots (5 ml) of both exposed and non-exposed samples were withdrawn and the total radioactivity was determined by LSC. Further analysis was conducted by two dimensional TLC.

C. Reported Results:

The parent compound degraded in both exposed and non-exposed solutions but degraded faster under exposed conditions (about two fold). The increase in degradation rate appeared to be independent of the pH in the range of 5-9. At pH 5, dark samples degraded with half lives of 29 days and photolyzed samples with a half life of 12 days. At pH 7 and 9 where DPX-F6025 is hydrolytically more stable half lives were determined at 27 and 31-43 days for pH 7 and 9, respectively for exposed samples. At either pH, approximately 70-75% of the original radioactivity remained as intact DPX-F6025. At pH 9 (where DPX-F6025 was hydrolytically most stable), at least four unidentified photoproducts of which one accounts for 12% of the initially applied radioactivity after 15 days of continuous exposure and was present in both phenyl- and pyrimidine labeled DPX-F6025 studies. The experiment provided a complete account for the total ¹⁴C radiolabeled material that was present in the DPX-F6025 solutions throughout the study.

D. Study Author's Conclusions:

The study author concluded that photodegradation rates of DPX-F6025 under the study conditions are low due to lack of significant overlap between the absorbance spectrum of DPX-F6025 and the energy spectrum of the light source used in this study (see attachment). Since the integrated intensity in the 300-384 nm region is approximately twice that of natural sunlight, the author expects that photodegradation of DPX-F6025 would be substantially lower under sunlight exposure conditions. The author estimates that the half life observed in this study can be 4-5 times shorter than an actual half life observed under sunlight. A half life of 120-150 days can be expected under sunlight conditions. According to the author's estimates, At the end of a 30 day exposure period (12 hours per day), the minimum level of DPX-F6025 remaining can be estimated to be 90% of the initial amount present (assuming a 120-150 day half life) and no single photoproduct would be expected to be present at a level greater than 3% of the total. Therefore, the author concluded that photolytic degradation is not a significant environmental dissipation pathway for DPX-F6025.

E. Reviewer's Discussions and Interpretation of Study Results:

The reviewer is satisfied with the way the photolysis study was conducted to simulate sunlight conditions and as can be expected from the absorption spectra of DPX-F6025 in the sunlight range (see attachment to this report), photodegradation is not a significant environmental dissipation pathway. In reviewing the study the reviewer was surprised that in spite of difficulties encountered by the study author in conducting the analysis and in obtaining quantitative and qualitative information about the degradation process, analysis was conducted only by TLC and was not confirmed by HPLC which was found to be a useful tool in previous studies. The reviewer was also disappointed that no attempt was made to identify the photodegradation product (no mention of its identity) in spite of the fact that photodegradation products were identified in a previous photolysis study. According to a statement made by the author on p. 8 of the study, the major photoproduct after 15 days of continuous

exposure at pH 9 can account for 12% of the total radioactivity and is present in both phenyl- and pyrimidine labeled DPX-F6025 studies. This product should be identified (or at least an attempt should be made), since it accumulates to a level of 12% of the initially applied material after 15 days of continuous exposure (whenever a product constitutes 12% of the initially applied radioactivity it should be identified-it is not clear to the reviewer how a value of 3% was reached in the "note to the reviewer"-the product might accumulate with time). The study will be accepted when the requested information will be made available. Addendum to 10.4-a letter from du Pont dated Feb. 24, 1986 (attached), identified the photoproduct as ethyl [[[4-hydroxy-6-methoxy-2-pyrimidine-2-yl) amino] carbonyl]amino]sulfonyl]benzoate. This study now satisfies the aqueous photolysis study.

10.5 A. Study Identification: Photodegradation of [Phenyl-¹⁴C(U)] DPX-F6025 and [Pyrimidine-2-¹⁴C] DPX-F6025 on Soil.

The study was conducted at the Agricultural Chemical Department, Research Division Experimental Station of du Pont at Wilmington, Delaware by R.F. Dietrich (Document No. AMR-449-85).

B. Materials and Methods:

Flanagan silt loam soil (see attachment), such as used in the soil metabolism study, was air dried, screened and spread on glass microscope slides as an aqueous slurry. The resulting slides were air dried for several days at room temperature. A syringe was used to evenly apply the ¹⁴C-labeled DPX-F6025 listed in section 2 to the soil coated slides. This treatment is equivalent to an application rate of 1.44 a.i. oz/acre (101 g a.i./ha). Water tight boxes of 7"x7"x2" containing 5"x5"x0.75" heat exchangers were used as containers and were thermostated by a flowing 25°C water thorough the heat exchanger. Irradiated samples were covered with quartz lids. Four photolysis box units, for each non-exposed and exposed samples were placed on a roof under identical conditions described above. The incident light from 285-2800 nm and weather conditions were continuously monitored and recorded. Samples were taken by removing the soil from exposed and non-exposed plates at 0, 7, 14, 21 and 32 days after the study was initiated. The removed soils were extracted with MMF (methylene chloride/methanol/formic acid 75/25/1 by volume-also used in the soil metabolism study). The soil residues were then extracted with methanol/2M ammonium hydroxide (MA, 3/1 by volume), the two extracts were combined and the methanol was removed by rotary evaporation at 40°C. The residue was then diluted to 80-100 ml of water and the pH was adjusted to 2 with 85% phosphoric acid and extracted with methylene chloride. The methylene chloride was concentrated and co-chromatographed with authentic samples on TLC and quantitation was accomplished with a Berthold Automatic TLC Linear analyzer. The amount of unextracted radioactive soil residue was determined by combustion and measuring the evolved ¹⁴CO₂.

C. Reported Results:

The total radioactivity extracted plus that remaining in the soil averaged 94% and 107% for pyrimidine- and phenyl labeled DPX-F6025, respectively. The parent compound degraded on both photolytically exposed and non-exposed soils to identical degradates formed via hydrolysis and/or soil metabolism

(see EAB reviews of 9/9/85) and no photoproducts were detected. The half life determined for the exposed soil sample was 20 days and for the non-exposed soil, 43-46 days.

D. Study Author's Conclusions:

The study author concluded that degradation of DPX-F6025 occurred approximately twice as fast in the presence of sunlight than under darkness to products obtained via hydrolysis and/or soil degradation.

E. Reviewer's Discussions and Interpretation of Study Results:

The reviewer is satisfied with the way the study was conducted. The reported degradation rate (twice faster under sunlight than in the dark) appear in contradiction with results previously obtained on soil with a lamp which also irradiated in the UV range (and yet no degradation was attributed to photolysis), but in line with the aqueous photolysis study. However, the reviewer also noted that shorter half lives were reported in that study for both exposed and non-exposed samples and that degradation was slightly higher on exposed soil (and was attributed to higher temperatures on the exposed sample 38°C versus 25°C). No photoproducts were observed on soil and although the rates doubled under sunlight they were still relatively slow, indicating that photolysis will not be an important route of degradation in the environment as might be expected from the absorption spectra of DPX-F6025. From a practical point of view the reported rates appear reasonable.

10.6 Study Identification: Computer Modeling of DPX-F6025 (PRZM).

Please see attachment.

11. COMPLETION OF ONE LINER:

Not completed.

12. CBI APPENDIX:

attachment.

EVALUATION OF PRZM MODELING STUDY OF DPX-F6025

Whereas this is a credible PRZM simulation exercise, it is definitely not a "reasonable worst case" as is stated by R.A. Jackson of Dupont in a description of the study. The main reason for this is the choice of soil type to be modeled, which is a "Dundee silt loam". As listed in Table 3, which is the PRZM input parameters, this soil type has 8% sand and 18% clay. As noted on Figures 10 and 11 of the PRZM manual (p. 82 & 83), the field capacity and wilting point for this soil is approximately 31% and 13%, respectively. Leaching soils typically have under 15% field capacity, and a total water holding capacity (field capacity minus wilting point) of 10% or less. Dupont has chosen curve numbers which will minimize runoff, but with such a high water holding capacity (31-13 = 18%), very little of this incoming water will leach through the profile, but instead will remain and be available for evapotranspiration.

A second bit of information not listed, but which is important in order for the simulation to be characterized as "reasonable worst case" is information on rainfall. The authors stated that they used an actual record of rainfall from Stoneville, Mississippi for 1983 and 1984. They made only one application of DPX-F6025 in 1983. However, they do not describe the 1983 weather year at all - was it wet, normal, or drier than normal? In order to accurately depict reasonable worst cases, it is suggested for the future that Dupont simulate several years of continuous application, and then briefly characterize the weather record, perhaps by comparing annual average precipitation for the years of simulation with an historical average from the same area.

Otherwise, the simulation was credible. The parameters chosen to describe the environmental fate of DPX-F6025 were reasonable. The 16-week half-life and K_d of 0.259 certainly qualify DPX-F6025 as a leacher. For future simulations, Dupont might consider the fact that organic matter is typically high only in the top 6-12 inches of soil. Therefore, the chosen K_d of 0.259, based on a organic matter content of 1.4%, would only be relevant for the top 45 cm layer, and not for the 160 cm layer below it. The conclusion drawn, that DPX-F6025 would not leach below 40 inches, is correct given the simulation set-up. Except for a description of weather, the description of the simulation including Table 3 with parameters, is complete.

In summary, it is suggested that Dupont redo these simulations with the following changes:

- 1) describe a soil with 15% or less field capacity and 10% or less total water holding capacity. This can be done by either

providing percent sand and silt percentages as was done in this case (consulting p. 82 and 83 of the PRZM manual for appropriate choices), or directly inputting field capacity and wilting point,

2) assign curve numbers appropriate for the soil to be modeled. The strength of a model is the ability to simulate reality. Therefore, a choice of curve numbers which does not describe a soil, but rather forces lower runoff than can be reasonably expected, is not appropriate. If a sandy soil is chosen (rather than the silt loam chosen in this exercise), than an appropriate choice of curve will, by definition, result in low runoff and high infiltration.

3) simulate several years of continuous application, and then make some qualitative statements about the weather record.

Matthew Lorber, Agricultural Engineer
Environmental Process and Guidelines Section/EAB/HED

THE NEXT

8

PAGE(S) WERE DELETED

BECAUSE:

_____ INERT INGREDIENT

_____ MANUFACTURING PROCESS

_____ QUALITY CONTROL PROCEDURES

_____ COMMERCIAL / FINANCIAL INFORMATION

_____ DRAFT LABEL

X

_____ The pages were taken directly from the registrant's
submission