

DATA EVALUATION RECORD

5/31/94

STUDY 2

CHEM 090501

Alachlor

§162-1,-2; 163-1

FORMULATION--00--ACTIVE INGREDIENT and 09--MICROENCAPSULATED (MCap)

STUDY ID 00101531

Banduhn, M.C., and C.L. Livingston 1981. Comparative environmental fate and crop uptake studies of encapsulated and unencapsulated alachlor. Report No. MSL-2070. Project No. 7824. Unpublished study performed and submitted by Monsanto Agricultural Products Company, St. Louis, MO.

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CONCLUSIONS:

Metabolism - Aerobic Soil

1. This portion of the study cannot be used to fulfill data requirements.
2. Alachlor (2-chloro-2',6'-diethyl-N-methoxymethylacetanilide) degraded with half-lives of 6-12 days in silt, loamy sand, and silt loam soils that were incubated in the dark at 25°C and 75% of field moisture capacity for 62 days. Encapsulation of [¹⁴C]alachlor in a polyurea polymer appeared to have no significant effect on the rate of degradation (half-lives of 8-11 days). The degradates identified were 2',6'-diethyl-2-sulfoacetanilide (Compound IV); 2',6'-diethyl-oxoanilic acid (Compound V); 2',6'-diethyl-N-

methoxymethyloxoanilic acid (Compound VII); (N-methoxymethyl-N-(2,6-diethylphenyl)-2-amino-2-oxoethyl)sulfinylacetic acid (Compound VIII); and 2',6'-diethyl-N-methoxymethyl-2-sulfoacetanilide (Compound IX).

3. This portion of the study is scientifically sound, but does not meet Subdivision N guidelines for the following reasons:

four aqueous-soluble [¹⁴C]degradates (Compounds I, II, III, and VI) were isolated at maximums of 0.7-1.6% of the applied (0.01-0.03 ppm), but were not identified; and

radioactivity present in the soil extracts (both methylene chloride and ammonium hydroxide fractions) at up to 22.3% of the applied (0.45 ppm) was not characterized.

4. Since this portion of the study was conducted approximately 13 years ago (1981), it is unlikely that the extracts are available for further analysis. Therefore, a new study must be submitted.

Metabolism - Anaerobic Soil

1. This portion of the study cannot be used to fulfill data requirements.
2. Alachlor (2-chloro-2',6'-diethyl-N-methoxymethylacetanilide) slowly degraded in silt soil that was treated with active ingredient or microencapsulated alachlor, at 2.0 ppm, and incubated under anaerobic conditions (flooding plus nitrogen atmosphere) for 60 days following 30 days of aerobic incubation. The degradates identified were 2',6'-diethyl-2-sulfoacetanilide (Compound IV); 2',6'-diethyloxoanilic acid (Compound V); 2',6'-diethyl-N-methoxymethyloxoanilic acid (Compound VII); (N-methoxymethyl-N-(2,6-diethylphenyl)-2-amino-2-oxoethyl)sulfinylacetic acid (Compound VIII); and 2',6'-diethyl-N-methoxymethyl-2-sulfoacetanilide (Compound IX).
3. This portion of the study unacceptable for the following reason:

at the start of anaerobic incubation (30 days posttreatment), only 3.6-6.6% of the applied radioactivity was undegraded [¹⁴C]alachlor, which was an insufficient quantity to accurately assess the dissipation of alachlor under anaerobic conditions.

In addition, this portion of the study does not meet Subdivision N guidelines for the following reasons:

four aqueous-soluble [¹⁴C]degradates (Compounds I, II, III, and VI) were isolated at maximums of 0.5-1.9% of the applied (0.01-0.04 ppm), but were not identified; and

radioactivity present in the soil extracts (both methylene chloride and ammonium hydroxide fractions) at up to 10.4% of the applied (0.208 ppm) was not characterized.

4. Since insufficient alachlor remained undegraded in the soil at the start of the anaerobic incubation, the problems with this portion of the study cannot be resolved with the submission of additional data.

Mobility - Leaching and Adsorption/Desorption

1. This study cannot be used towards the fulfillment of data requirements.
2. These data are of uncertain value and should not be used to predict the behavior of alachlor (2-chloro-2',6'-diethyl-N-methoxymethylacetanilide) in the environment.
3. This study is unacceptable for the following reason:

the soil was too finely sieved (500 um or 1 mm), so that a significant portion of the sand fraction (0.05-2.00 mm) may have been removed.
4. Since the soil was oversieved and a significant portion of the soil sand fraction may have been removed, the problems with this study cannot be resolved by the submission of additional information. Therefore, a new study must be submitted.

METHODOLOGY:

Metabolism - Aerobic Soil

Air-dried, sieved (2 mm) "Ray" silt, "Spinks" loamy sand, and "Drummer" silt loam soils (Table A) were weighed (50 g dry weight) into 250-mL Erlenmeyer flasks and treated at 2 ppm with phenyl ring-labeled [U-¹⁴C]alachlor (2-chloro-2',6'-diethyl-N-methoxymethylacetanilide; radiochemical purity >98%, specific activity 2.16 mCi/mMol, synthesized by R.C. Freeman) dissolved in water. Additional flasks of soil were treated at 2 ppm with phenyl ring-labeled [U-¹⁴C]alachlor (radiochemical purity >98%, specific activity 2.16 mCi/mMol, synthesized by R.C. Freeman) that had been encapsulated in a polyurea polymer (8.6% of the [¹⁴C]alachlor in the preparation was not encapsulated). The soil was then moistened to 75% of field capacity. The flasks were sealed with a polyurethane foam plug and a trapping tower containing alternating layers of Drierite and Ascarite; the layers were separated by foam plugs. The flasks were incubated in the dark at 25 C; water was added to the flasks as necessary to maintain the soil moisture content. Duplicate flasks of each soil type were collected immediately posttreatment; single flasks were collected at 10, 20, 30, 40 ("Ray" silt only), and 52 days posttreatment; multiple flasks were collected at 62 days

posttreatment (Table B). The trapping towers were replaced at each sampling interval.

The soil was sequentially extracted four times with 30% acetonitrile in water, once with 0.1 N ammonium hydroxide, and twice with water by stirring for 1 hour/extraction; after each extraction, the samples were centrifuged and the extracts decanted. Aliquots of each extract were analyzed by LSC. The acetonitrile:water extracts were combined, and the ammonium hydroxide and water extracts were combined; aliquots of the combined extracts were analyzed by LSC. The combined acetonitrile:water extract was partitioned twice with methylene chloride; aliquots of both phases were analyzed by LSC. The methylene chloride fraction was evaporated to dryness, and the resulting residues were redissolved in methanol and analyzed by GLC/RAD. The aqueous extract was lyophilized, and the resulting [^{14}C]residues were dissolved in water and filtered through a Millipore filter (pore size not reported). Aliquots of the filtered aqueous extract were analyzed by HPLC using a uBondapak C-18 column eluted with a gradient of methanol, 0.001 M KH_2PO_4 buffer, and 0.001 M $(\text{NH}_4)_2\text{HPO}_4$ buffer. The column was equipped with UV detection; eluate fractions were collected and analyzed by LSC. The extracted soil was lyophilized, and subsamples of the soil were analyzed by LSC following combustion.

The Ascarite from the trapping tower was acidified, and the $^{14}\text{CO}_2$ released upon acidification was trapped in a phenylamine trapping solution; the trapping solution was analyzed by LSC. The two lower polyurethane foam plugs were extracted with methylene chloride, and aliquots of the extract were analyzed by LSC.

Metabolism - Anaerobic Soil

"Ray" silt soil (4.6% sand, 84.2% silt, 10.0% clay, 1.2% organic matter, pH 8.1, CEC 10.4 meq/100 g) was weighed (50 g dry weight) into flasks and treated at 2 ppm with phenyl ring-labeled [^{14}C]alachlor either dissolved in water or encapsulated in a polyurea polymer (test substances previously described). Two flasks of soil were treated for each formulation type. The soils were incubated aerobically for 30 days, then were transferred into 250-mL flasks and flooded with deionized water. The flasks were flushed with nitrogen for 1 hour, then sealed with rubber septa and incubated in the dark at 25 C. Single flasks of each treatment were removed for analysis after 30 and 60 days of anaerobic incubation (60 and 90 days posttreatment). Just prior to each sampling, the flasks were flushed with nitrogen, which was vented through a syringe containing one layer of Ascarite and two layers of Drierite.

The samples were centrifuged, and the floodwater was decanted. The floodwater was partitioned with methylene chloride, and aliquots of both phases were analyzed by LSC. The soil was sequentially extracted four times with 30% acetonitrile in water, once with 0.1 N ammonium hydroxide, and twice with water by stirring for 1

hour/extraction; after each extraction, the samples were centrifuged and the extracts decanted. Aliquots of each extract were analyzed by LSC. The acetonitrile:water extracts were combined, and the ammonium hydroxide and water extracts were combined; aliquots of the combined extracts were analyzed by LSC. The combined acetonitrile:water extract was partitioned twice with methylene chloride; aliquots of both phases were analyzed by LSC. The methylene chloride fraction was evaporated to dryness, and the resulting residues were redissolved in methanol and analyzed by GLC/RAD. The aqueous extract was lyophilized, and the resulting [^{14}C]residues were dissolved in water and filtered through a Millipore filter (pore size not reported). Aliquots of the filtered aqueous extract were analyzed by HPLC using a uBondapak C-18 column eluted with a gradient of methanol, 0.001 M KH_2PO_4 buffer, and 0.001 M $(\text{NH}_4)_2\text{HPO}_4$ buffer. The column was equipped with UV detection; eluate fractions were collected and analyzed by LSC. The extracted soil was lyophilized, and subsamples of the soil were analyzed by LSC following combustion.

The Ascarite from the trapping tower was acidified, and the $^{14}\text{CO}_2$ released upon acidification was trapped in a phenylamine trapping solution; the trapping solution was analyzed by LSC.

Mobility - Leaching and Adsorption/Desorption

Unaged [^{14}C]alachlor (batch equilibrium): Air-dried, sieved (500 μm) "Ray" silt soil (4.6% sand, 84.2% silt, 10.0% clay, 1.2% organic matter, pH 8.1, CEC meq/100 g) was weighed (2.5 g) into glass tubes and mixed with 10 mL of 0.01 N calcium sulfate solutions containing phenyl ring-labeled [^{14}C]alachlor either dissolved in water (radiochemical purity >98%, specific activity 1.91 mCi/mMol, synthesized by R.C. Freeman) or encapsulated in a polyurea polymer (previously described) at 0.1, 1.0, 5.0, or 10 ppm. The tubes were sealed with Teflon-lined screw caps, and the soil:solution slurries (2.5 g:10 mL) were vortexed, then incubated on a mechanical shaker overnight at room temperature. After the equilibration period, the slurries were centrifuged and the supernatants decanted. Aliquots of the supernatants were analyzed by LSC.

To study desorption, the supernatants were replaced with an equal volume of pesticide-free calcium sulfate solution. The soil:solution slurries were equilibrated as described for 4 hours, then centrifuged; the supernatants were decanted, and aliquots were analyzed by LSC. The desorption procedure was repeated five times. Following the final desorption, the soils were air-dried, and subsamples were analyzed by LSC following combustion.

Unaged [^{14}C]alachlor (column leaching): "Spinks" loamy sand soil (75.1% sand, 17.8% silt, 4.8% clay, 2.4% organic matter, pH 4.7, CEC 11.3 meq/100 g) was air-dried and sieved (1 mm).

Four columns (1.5-inch id x 40-cm length) were constructed by taping together one 10-cm and fifteen 2-cm long glass cylinders; the 10-cm

cylinder was the uppermost segment. The columns were packed with soil to a depth of 30 cm using a wooden dowel, then the soil was moistened to "75% of its water holding capacity" [page 29]. The soil surface of two columns was treated with phenyl ring-labeled [U-¹⁴C]alachlor either dissolved in ethanol (radiochemical purity >98%, specific activity 1.91 mCi/mMol, synthesized by R.C. Freeman) at a rate equivalent to 3.5 lb ai/A; the remaining two columns were treated with phenyl ring-labeled [U-¹⁴C]alachlor encapsulated in a polyurea polymer (previously described) at a rate equivalent to 5.8 lb ai/A. The treated columns were leached with approximately 580 ml of water (approximately 20 inches) over a 22-hour period. The leachate was collected continually. After leaching was completed, the column was divided into fifteen 2-cm segments, which were then frozen until analysis.

Aliquots of the leachates were analyzed for total radioactivity by LSC. Additional aliquots of the leachates were partitioned with methylene chloride, and aliquots of both phases were analyzed by LSC. The methylene chloride fraction was concentrated, and aliquots were analyzed by GLC/RAD.

The frozen soil was lyophilized, and subsamples of each segment were analyzed by LSC following combustion.

DATA SUMMARY:

Metabolism - Aerobic Soil

Phenyl ring-labeled [U-¹⁴C]alachlor (2-chloro-2',6'-diethyl-N-methoxymethylacetanilide; radiochemical purity >98%), at 2 ppm, degraded with registrant-calculated half-lives of 6-12 days in "Ray" silt, "Spinks" loamy sand, and "Drummer" silt loam soils that were incubated in the dark at 25°C and 75% of field moisture capacity for 62 days. Encapsulation of [¹⁴C]alachlor in a polyurea polymer appeared to have no significant effect on the rate of degradation (half-lives of 8-11 days). In the soils treated with non-encapsulated [¹⁴C]alachlor, [¹⁴C]alachlor was 79.3-86.3% of the applied radioactivity immediately posttreatment, 27.4-55.3% at 10 days, 10.3-28.9% at 20 days, and 2.2-10.3% at 40-62 days (Tables 1 and 2). In the soils treated with the encapsulated [¹⁴C]alachlor, [¹⁴C]alachlor was 79.5-95.4% of the applied radioactivity immediately posttreatment, 35.7-53.1% at 10 days, 12.1-32.8% at 20 days, and 4.0-9.1% at 62 days. Five [¹⁴C]degradates were identified in the soil:

2',6'-diethyl-2-sulfoacetanilide (Compound IV);

2',6'-diethyl-oxoanilic acid (Compound V);

2',6'-diethyl-N-methoxymethyl-oxoanilic acid (Compound VII);

(N-methoxymethyl-N-(2,6-diethylphenyl)-2-amino-2-oxoethyl)sulfinylacetic acid (Compound VIII); and

2'6'-diethyl-N-methoxymethyl-2-sulfoacetanilide (Compound IX).

In the silt soil ("Ray") treated with non-encapsulated [¹⁴C]alachlor, [¹⁴C]alachlor was 86.3% of the applied radioactivity at 0 days posttreatment, 27.4% at 10 days, 10.3% at 20 days, and 3.2% at 40 days (Table 2). In the silt soil treated with encapsulated [¹⁴C]alachlor, [¹⁴C]alachlor was 83.8% of the applied radioactivity at 0 days, 40.9% at 10 days, 12.1% at 20 days, 8.4% at 40 days, and 4.0% at 62 days (Table 2). In the non-encapsulated and encapsulated [¹⁴C]alachlor treatments at 40 days posttreatment (final comparable sampling interval), Compound IV comprised 1.6-1.9% of the applied radioactivity, Compound V comprised 10.2-11.5%, Compound VII comprised 5.1-8.0%, Compound VIII comprised 7.8-13.7%, and Compound IX comprised 5.4-5.5% (Table 4). Four additional aqueous-soluble [¹⁴C]degradates (Compounds I, II, III, and VI) were isolated at maximums of 0.9-1.3% of the applied (0.02-0.03 ppm), but were not identified. In both treatments, uncharacterized [¹⁴C]residues totaled a maximum of 19.9-22.3% of the applied in the organic extracts and 6.0-6.2% in the ammonium hydroxide extracts (reviewer-calculated from Table 2). At 40 days posttreatment, ¹⁴CO₂ totaled 4.2-4.6% of the applied, other [¹⁴C]volatiles totaled 2.0-2.6%, and unextracted [¹⁴C]residues were 22.3-23.65% (Tables 2 and 3). Material balances were 100.2-101.1% of the applied immediately posttreatment and 83.6-99.3% at 10 through 62 days with no clear pattern of decline (Table 2).

In the silt loam soil ("Drummer") treated with non-encapsulated or encapsulated [¹⁴C]alachlor, [¹⁴C]alachlor was 79.5-82.9% of the applied radioactivity at 0 days posttreatment, 35.7-40.1% at 10 days, 15.1-20.8% at 20 days, and 2.2-6.0% at 62 days (Table 1). In the non-encapsulated and encapsulated [¹⁴C]alachlor treatments at 62 days posttreatment (only interval reported), Compound IV comprised 1.2-1.4% of the applied radioactivity, Compound V comprised 2.9-3.4%, Compound VII comprised 7.9-8.8%, Compound VIII comprised 15.9-16.2%, and Compound IX comprised 3.9-4.2% (Table 4). Four additional aqueous-soluble [¹⁴C]degradates (Compounds I, II, III, and VI) were isolated at maximums of 0.2-0.7% of the applied (0.004-0.014 ppm), but were not identified. In both treatments, uncharacterized [¹⁴C]residues totaled a maximum of 13.1-22.3% of the applied in the organic extracts and 8.3-9.0% in the ammonium hydroxide extracts (reviewer-calculated from Table 1). At 62 days posttreatment, ¹⁴CO₂ totaled 5.4-5.5% of the applied, other [¹⁴C]volatiles totaled ≤4.84%, and unextracted [¹⁴C]residues were 25.6-26.3% (Tables 1 and 3). Material balances were 96.5-105.7% of the applied through 20 days posttreatment and 82.7-91.8% at 30 through 62 days (Table 1).

In the loamy sand soil ("Spinks") treated with non-encapsulated or encapsulated [¹⁴C]alachlor, [¹⁴C]alachlor was 79.3-95.4% of the applied radioactivity at 0 days posttreatment, 53.1-55.3% at 10 days,

28.9-32.8% at 20 days, and 5.6-9.1% at 62 days (Table 1). In the non-encapsulated and encapsulated [¹⁴C]alachlor treatments at 62 days posttreatment (only interval reported), Compound IV comprised 1.0-1.5% of the applied radioactivity, Compound V comprised 5.5-7.3%, Compound VII comprised 6.2-6.4%, Compound VIII comprised 4.3-5.5%, and Compound IX comprised 2.7-3.5% (Table 4). Four additional aqueous-soluble [¹⁴C]degradates (Compounds I, II, III, and VI) were isolated at maximums of 0.3-1.6% of the applied (0.006-0.03 ppm), but were not identified. In both treatments, uncharacterized [¹⁴C]residues totaled a maximum of 18.1-18.3% of the applied in the organic extracts and 16.0-17.1% in the ammonium hydroxide extracts (reviewer-calculated from Table 1). At 62 days posttreatment, ¹⁴CO₂ totaled 5.5-5.7% of the applied, other [¹⁴C]volatiles totaled ≤4.5%, and unextracted [¹⁴C]residues were 20.2-21.1% (Tables 1 and 3). Material balances in the soil treated with non-encapsulated [¹⁴C]alachlor were 97.9-98.7% of the applied through 10 days posttreatment, 92.3% at 20 days, and 82.9% at 62 days (Table 1). Material balances in the soil treated with encapsulated [¹⁴C]alachlor were 97.6-111.0% of the applied through 30 days posttreatment, and were 91.2-92.4% at 52 and 62 days.

Metabolism - Anaerobic soil

Phenyl ring-labeled [U-¹⁴C]alachlor (2-chloro-2',6'-diethyl-N-methoxymethylacetanilide; radiochemical purity ≥98%) either dissolved in water or encapsulated in a polyurea polymer (8.6% not encapsulated) was applied to silt loam soil at 2 ppm and incubated under aerobic conditions for 30 days; during the aerobic incubation, [¹⁴C]alachlor declined from 83.8-86.3 to 3.6-6.6% of the applied (Table 2). At 30 days posttreatment, the soils were flooded with deionized water and flushed with nitrogen, then incubated in the dark at 25°C for an additional 60 days. [¹⁴C]Alachlor was 1.7-5.5% of the applied after 30 days of anaerobic incubation (60 days posttreatment) and 1.2-4.2% after 60 days of anaerobic incubation (90 days posttreatment). Encapsulation of [¹⁴C]alachlor in a polyurea polymer appeared to have no significant effect on the rate of degradation. Five [¹⁴C]degradates were identified in the flooded soil:

2',6'-diethyl-2-sulfoacetanilide (Compound IV);

2',6'-diethyloxoanilic acid (Compound V);

2',6'-diethyl-N-methoxymethyloxoanilic acid (Compound VII);

(N-methoxymethyl-N-(2,6-diethylphenyl)-2-amino-2-oxoethyl)sulfinylacetic acid (Compound VIII); and

2',6'-diethyl-N-methoxymethyl-2-sulfoacetanilide (Compound IX).

At 30 and 60 days of anaerobic incubation, Compound IV was 1.7-2.3% of the applied, Compound V was 9.0-13.2%, Compound VII was 6.5-7.8%, Compound VIII was 9.2-12.0%, and Compound IX was 5.3-6.5%. Four

additional aqueous-soluble [^{14}C]degradates (Compounds I, II, III, and VI) were isolated at maximums of 0.5-1.9% of the applied (0.01-0.04 ppm), but were not identified. Uncharacterized [^{14}C]residues totaled a maximum of 7.3-10.4% of the applied in the organic extracts and 5.0-6.0% in the ammonium hydroxide extracts (reviewer-calculated from Table 2). After 60 days of anaerobic incubation (90 days posttreatment), $^{14}\text{CO}_2$ totaled 4.0-4.6% of the applied, other [^{14}C]volatiles totaled $\leq 1.58\%$, and unextracted [^{14}C]residues were 21.9-24.2% (Tables 2 and 3). During the anaerobic incubation period (30, 60, and 90 days posttreatment), the material balances were 81.3-92.2% of the applied (Table 2).

Mobility - Leaching and Adsorption/Desorption

Unaged [^{14}C]alachlor (batch equilibrium): [^{14}C]Alachlor was very mobile in silt soil:0.01 N calcium ion solution slurries (2.5 g:10 mL) containing 0.1, 1.0, 5.0, or 10 ppm of non-encapsulated phenyl ring-labeled [U- ^{14}C]alachlor (2-chloro-2',6'-diethyl-N-methoxymethylacetanilide; radiochemical purity 98%) that were equilibrated overnight at room temperature. The Freundlich K_{ads} value was 1.3 [page 13]. After six desorptions with the calcium ion solution, 62-82% of the radioactivity adsorbed to the silt soil was desorbed. The material balances were not determined.

In contrast, polyurea polymer-encapsulated phenyl ring-labeled [U- ^{14}C]alachlor (radiochemical purity >98%; 8.6% not encapsulated) had an average Freundlich K_{ads} value of 36.6 in silt soil:solution slurries equilibrated under similar conditions. The study authors noted that this value was of uncertain significance because "the polymeric capsules would be precipitated with the soil and would be artificially determined to be soil bound while actually polymer contained [page 13]." After six desorptions with the calcium ion solution, 18-25% of the radioactivity adsorbed to the silt soil appeared to have been desorbed. The material balances were not determined.

Unaged [^{14}C]alachlor (soil column leaching): [^{14}C]Alachlor was very mobile in columns (30-cm length) of loamy sand soil that were treated at 3.5 lb ai/A with non-encapsulated phenyl ring-labeled [U- ^{14}C]alachlor (2-chloro-2',6'-diethyl-N-methoxymethylacetanilide; radiochemical purity >98%) and leached with 20 inches of water (Table 9). Individual 2-cm segments from throughout the soil columns contained 1.43-6.97% of the applied, with the highest concentrations in the upmost and lowest 2-cm segments, and the leachate contained 45.4-46.1%. The material balances following leaching were 91.9-98.3% of the applied.

In contrast, [^{14}C]alachlor was only slightly mobile in columns (30-cm length) of loamy sand soil that were treated at 5.8 lb ai/A with polyurea polymer-encapsulated phenyl ring-labeled [U- ^{14}C]alachlor (2-chloro-2',6'-diethyl-N-methoxymethylacetanilide; radiochemical purity >98%) and leached with 20 inches of water (Table 9). The upper 2-cm

segment of the soil columns contained 66.5-72.4% of the applied, 2-cm segments between 2- and 30-cm each contained 0.59-1.00%, and the leachate contained 4.70%. The material balances following leaching were 82.0-88.6% of the applied.

COMMENTS:

General

1. The reproduction of the document was poor, and the numbers in many of the data tables were very difficult to read.
2. The soils used in these studies were consistently misclassified. The study authors had incorrectly included the organic fraction with the mineral fractions to obtain the "100%" textural analyses of the soils. Based on the USDA soil classification system and the soil analyses provided in the document, the soil described as a "Ray silt loam soil" was a silt soil, the soil described as a "Drummer clay loam soil" was a silt loam soil, the soil described as a "Lintonia loamy sand soil" was a sand soil, the soil described as a "Spinks sandy loam soil" was a loamy sand soil, and the sediment was a sandy clay loam. The names of the soils were retained in the review to ease the interpretation of the registrant document; however, since the soil types are specific to texture, the soil types reported by the study author are incorrect.
3. This document also included a study on the accumulation of residues in a primary crop (soybeans). This study was not reviewed since it is not pertinent to the Subdivision N guidelines.
4. In MRID 00134327 (Study 1 of this submission), the solubility of alachlor in water at 24°C was reported to be 240 ug/mL. The volatility of alachlor from moist soil was calculated from the vapor pressure (92.2×10^{-5} MM Hg at 24°C) and was 1.1×10^6 ; the volatility from water was 751,500 (units not identified).
5. The typical agricultural application rate for alachlor was reported to be 2 lb ai/A.

Metabolism- Aerobic soil

1. Uncharacterized radioactivity was present in the methylene chloride extracts and ammonium hydroxide extracts at up to 18.3-22.3% (0.37-0.45 ppm) and 6.2-17.1% of the applied (0.12-0.34 ppm), respectively. Uncharacterized volatiles were present at up to 2.6-4.84% of the applied (0.05-0.10 ppm). According to Subdivision N guidelines, degradates present at ≥ 0.01 ppm must be identified. However, according to the Environmental Fate Reregistration Rejection Rate Analysis document (9/93), the Agency now requires identification only of all residues equal to or greater than 10% of the dose rate.

2. Only the silt loam soil samples were analyzed for degradates at all sampling intervals. Only data for the 62-day sampling interval were provided for the other soils.

Metabolism - Anaerobic soil

1. The treated soil was aged under aerobic conditions for longer than one half-life of the parent material, so that insufficient alachlor (3.6-6.6% of the applied) remained to establish a pattern of decline under anaerobic conditions. Subdivision N Guidelines require that treated soil samples be aged aerobically for one half-life or 30 days, whichever is shortest. In the aerobic metabolism study, the half-life of alachlor was determined to be 6-12 days.
2. Radioactivity present in the methylene chloride extracts, the ammonium hydroxide extracts, and volatiles other than CO₂ that were present at up to 7.3-10.4% of the applied radioactivity (0.15-0.21 ppm), 5.0-6.0% (0.10-0.12 ppm), and 0.91-1.58% of the applied (0.02-0.03 ppm), respectively, were not characterized. Subdivision N guidelines state that degradates present at ≥ 0.01 ppm must be identified.
3. Although it was not stated that the anaerobic samples were treated and incubated simultaneously with the aerobic metabolism samples, the 0-day anaerobic sample appeared identical to the 30-day aerobic sample ("Ray" soil) in the aerobic metabolism study (Table 2).

Batch equilibrium

1. The soil was sieved through a 500-um mesh sieve, removing a significant portion of the soil sand fraction. The removal of the sand fraction can possibly reduce the mobility of alachlor.
2. The equilibration temperature was defined only as "room temperature".
3. It was not reported if the equilibration was conducted in the dark.

Column leaching

1. The soil was sieved through a 1-mm mesh sieve, removing a significant portion of the soil sand fraction. The removal of the sand fraction can possibly reduce the mobility of alachlor.
2. The light and temperature conditions during leaching were not reported.

RIN 2858-00

Alachlor EFED Review

Page is not included in this copy.

Pages 12 through 31 are not included.

The material not included contains the following type of information:

- Identity of product inert ingredients.
- Identity of product impurities.
- Description of the product manufacturing process.
- Description of quality control procedures.
- Identity of the source of product ingredients.
- Sales or other commercial/financial information.
- A draft product label.
- The product confidential statement of formula.
- Information about a pending registration action.
- FIFRA registration data.
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