Data Evaluation Report on the adsorption-desorption of indoxacarb and IN-JT333, a transformation product of indoxacarb, in soil

PMRA Submission Number {.....} EPA MRID Number 45795809

Data Requirement: PMRA Data Code:
EPA DP Barcode: D260161
OECD Data Point:
EPA Guideline: 163-1

Test material:
Common name: Indoxacarb.
Chemical name
IUPAC: Methyl (S)-N-[7-chloro-2,3,4a,5-tetrahydro-4a-(methoxycarbonyl)indeno[1,2-e][1,3,4]oxadiazin-2-ylcarbonyl]-4'-(trifluoromethoxy)carbanilate. Methyl (S)-7-chloro-2,3,4a,5-tetrahydro-2-[methoxycarbonyl(4-trifluoromethoxyphenyl)carbamoyl]indeno[1,2-e][1,3,4]oxadiazine-4a-carboxylate.
CAS name: Methyl (4aS)-7-chloro-2,5-dihydro-2-[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate.
CAS No: 173584-44-6 (S enantiomer); 144171-61-9 (racemic mixture).
Synonyms: DPX-KN128 (active ingredient; S enantiomer); DPX-MP062 (3:1 mixture of S and R enantiomers); Steward; Avaunt.
SMILES string: O=C(C12C(=NN(C(=O)N(c3ccc(cc3)OC(F)(F)F)C(=O)OC)CO2)c2ccc(cc2C1)Cl)OC.

Test material:
Common name: IN-JT333 (a transformation product of indoxacarb).
Chemical name
IUPAC: 7-Chloro-2-(4-trifluoromethoxy-phenylcarbamoyl)-2,5,dihydro-indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylic acid methyl ester.
CAS name: Methyl 7-chloro-2,5-dihydro-2-[[[4-(trifluoromethoxy)phenyl]amino]-carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate.
CAS No: 144171-39-1.
Synonyms: Not reported.
SMILES string:

Primary Reviewer: Kindra Bozicevich
Dynamac Corporation
Signature: Kindra Bzicevich
Date: 2/25/04

QC Reviewer: Joan Harlin
Dynamac Corporation
Signature: Joan Harlin
Date: 2/25/04

Secondary Reviewer: Patricia Jennings
EPA
Signature:
Date:

Data Evaluation Report on the adsorption-desorption of indoxacarb and IN-JT333, a transformation product of indoxacarb, in soil

PMRA Submission Number {.....} EPA MRID Number 45795809

Company Code:
Active Code:
Use Site Category:
EPA PC Code: 067710

Test material:
Common name: Indoxacarb.
Chemical name

IUPAC:	Methyl (S)-N-[7-chloro-2,3,4a,5-tetrahydro-4a-(methoxycarbonyl)indeno[1,2-e][1,3,4]oxadiazin-2-ylcarbonyl]-4'-(trifluoromethoxy)carbanilate. Methyl (S)-7-chloro-2,3,4a,5-tetrahydro-2-[methoxycarbonyl(4-trifluoromethoxyphenyl)carbamoyl]indeno[1,2-e][1,3,4]oxadiazine-4a-carboxylate.
CAS name:	Methyl (4aS)-7-chloro-2,5-dihydro-2-[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate.
CAS No:	173584-44-6 (S enantiomer); 144171-61-9 (racemic mixture).
Synonyms:	DPX-KN128 (active ingredient; S enantiomer); DPX-MP062 (3:1 mixture of S and R enantiomers); Steward; Avaunt.
SMILES string:	O=C(C12C(=NN(C(=O)N(c3ccc(cc3)OC(F)(F)F)C(=O)OC)CO2)c2ccc(cc2C1)Cl)OC.

Test material:

Common name:	IN-JT333 (a transformation product of indoxacarb).
Chemical name	
IUPAC:	7-Chloro-2-(4-trifluoromethoxy-phenylcarbamoyl)-2,5,dihydro-indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylic acid methyl ester.
CAS name:	Methyl 7-chloro-2,5-dihydro-2-[[[4-(trifluoromethoxy)phenyl]amino]-carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate.
CAS No:	144171-39-1.
Synonyms:	Not reported.
SMILES string:	

Primary Reviewer: Kindra Bozicevich
Dynamac Corporation
Signature:
Date:

QC Reviewer: Joan Harlin
Dynamac Corporation
Signature:
Date:

Secondary Reviewer: James Hetrick
EPA
Signature: James A. Hetrick
Date: 2/3/05

Data Evaluation Report on the adsorption-desorption of indoxacarb and IN-JT333, a transformation product of indoxacarb, in soil

PMRA Submission Number {.....} EPA MRID Number 45795809

CITATION: Priester, T.M., T.K.S. Djanegara, and P.A. Cooper. 1996. Batch equilibrium study of DPX-JW062 (a racemic mixture of DPX-KN128 and IN-KN127) and IN-JT333. Unpublished study performed by Critical Path Services, LLC, Newport, DE and E. I. du Pont de Nemours and Company, Wilmington, DE; sponsored and submitted by E. I. du Pont de Nemours and Company, Wilmington, DE. DuPont Study Number: AMR 3489-95. Critical Path Services Number: 02-CPS-008. **The study initiation June 12, 1995, and completed November 15, 1996 (p. 5). Revision No. 1 report (B. Smyser) was issued October 2, 2002.**

Priester, T.M., T.K.S. Djanegara, and P.A. Cooper. 1996. Batch equilibrium study of DPX-JW062 (a racemic mixture of DPX-KN128 and IN-KN127) and IN-JT333. Unpublished study performed by E. I. du Pont de Nemours and Company, Wilmington, DE; sponsored and submitted by E. I. du Pont de Nemours and Company, Wilmington, DE. **Original report** (MRID 44477308)

EXECUTIVE SUMMARY:

The adsorption/desorption characteristics of [**indanone-1-^{14}C**]-labeled methyl (S)-N-[7-chloro-2,3,4a,5-tetrahydro-4a-(methoxycarbonyl)indeno[1,2-e][1,3,4]oxadiazin-2-ylcarbonyl]-4'-(trifluoromethoxy)carbanilate (indoxacarb; DPX-JW062), [**trifluoromethoxyphenyl-U-^{14}C**]-labeled indoxacarb, and [**methylene-^{14}C**]-labeled 7-chloro-2-(4-trifluoromethoxy-phenylcarbamoyl)-2,5,dihydro-indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylic acid methyl ester (IN-JT333) were studied in a sand soil [pH 6.2, organic carbon 0.58%] from Florida, a sandy clay loam soil [pH 7.8, organic carbon 0.812%] from Texas, a loam soil [pH 7.6, organic carbon 0.986%] from California, and a silt loam soil [pH 6.2, organic carbon 1.392%] from Illinois in a batch equilibrium experiment. The experiment was conducted in accordance with the USEPA Pesticide Assessment Guidelines, Subdivision N, Section §163-1, and in compliance with the USEPA GPA Title 40, Part 160. The adsorption phase of the study was carried out by equilibrating air-dried soil with [**indanone-1-^{14}C**]**indoxacarb** at nominal concentrations of 0.060, 0.075, 0.100, 0.150, and 0.300 mg a.i/kg soil for the Myaka sand, Donna sandy clay loam, and Chino loam soils and at nominal concentrations of 0.067, 0.120, 0.257, 0.600, 0.901, and 1.402 mg a.i./kg soil for the Tama silt loam soil. Nominal concentrations for air-dried soils treated with [**trifluoromethoxyphenyl-U-^{14}C**]**indoxacarb** were 0.060, 0.075, 0.100, 0.150, and 0.300 mg a.i/kg soil for the Myaka sand, Donna sandy clay loam, and Chino loam soils and 0.067, 0.257, 0.600, 0.901, and 1.402 mg a.i./kg soil for the Tama silt loam soil. Air-dried soils equilibrated with [**methylene-^{14}C**]**IN-JT333** were treated at nominal concentrations of 0.060 and 0.300 mg a.i./kg soil for all test soils. The soils were equilibrated at 24-26°C in the dark for 1 hour. The equilibrating solution used was 0.01M $CaCl_2$, with soil:solution ratios ranging from 0.2 g:25 mL to 5 g:25 mL (w:v) for all test soils. A desorption phase was not conducted using the test substances due to their instability.

The supernatant solution after adsorption was separated by centrifugation and triplicate aliquots were analyzed for total radioactivity using LSC. Following adsorption, the soils were extracted with acetonitrile:water (90:10, v:v), and the samples were centrifuged, concentrated, and aliquots were analyzed for total radioactivity using LSC. The soils were air-dried and triplicate aliquots of the soils were combusted prior to LSC analysis. The adsorption supernatant samples and concentrated extracts were analyzed using HPLC.

HPLC analysis of the aqueous phases of the four test soils treated with **[trifluoromethoxy-phenyl-U-^{14}C]indoxacarb** showed that indoxacarb comprised 30.46-59.88% of the total dpm, and the transformation product IN-ML438 was 9.37-28.22% of the total dpm. HPLC radiochromatograms of the soil phases showed that indoxacarb comprised 80.05-92.88% of the total dpm; IN-ML438 was 2.95-3.45% of the total dpm for the Donna sandy clay loam and Chino loam soils only. HPLC radiochromatograms of aqueous and soil phases of the four test soils treated with **[methylene-^{14}C]IN-JT333-treated soils** showed that IN-JT333 comprised 36.38-60.05% of the total dpm in the aqueous phase and 78.60-86.42% of the total dpm in the soil phase.

The mass balance for **[indanone-1-^{14}C]indoxacarb-treated soils** at the end of the adsorption phase was 86-110%, 88-102%, 97-107%, and 72-116% of the applied for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively. For **[trifluoromethoxy-phenyl-U-^{14}C]indoxacarb-treated soils**, the mass balance at the end of the adsorption phase was 95-112%, 89-115%, 96-106%, and 97-110% of the applied for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively. For **[methylene-^{14}C]IN-JT333-treated soils**, the mass balance at the end of the adsorption phase was 82-113%, 106-115%, 82-102%, and 112-130% of the applied for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively.

After 1 hour of equilibration 43.8-93.1%, 41.2-81.9%, 80.3-98.5%, and 19.6-75.7% of the applied **[indanone-1-^{14}C]indoxacarb** was adsorbed to the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively. Adsorption K_d values (reviewer-calculated) were 29.1, 25.3, 110.9, and 47.5 for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively. Adsorption K_d values (registrant-calculated) were 29, 23, 113, and 38 for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively; corresponding adsorption K_{oc} values were not reported.

The reviewer-calculated r^2 value for the relationship of Kd vs. % organic carbon is 0.0913, for Kd vs. pH is 0.1219, and for Kd vs. % clay is 0.0008.

After 1 hour of equilibration 47.5-87.0%, 52.5-70.1%, 64.0-88.0%, and 23.4-72.4% of the applied **[trifluoromethoxyphenyl-U-^{14}C]indoxacarb** was adsorbed to the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively. Adsorption K_d values (reviewer calculated) were 29.3, 34.5, 86.1, and 32.0 for the Myaka sand, Donna sandy clay

loam, Chino loam, and Tama silt loam soils, respectively. Adsorption K_d values (registrant-calculated) were 29, 28, 77, and 31 for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively; corresponding adsorption K_{oc} values were not reported.

The reviewer-calculated r^2 value for the relationship of Kd vs. % organic carbon is 0.0116, for Kd vs. pH is 0.3075, and for Kd vs. % clay is 0.003.

ean adsorption K_d values (registrant calculated) for **[indanone-1-^{14}C]indoxacarb** and **[trifluoromethoxyphenyl-U-^{14}C]indoxacarb** were 29, 26, 95, and 35 for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively; corresponding adsorption K_{oc} values were 5100, 3300, 9600, and 2500.

After 1 hour of equilibration, 53.4-56.5%, 62.3-81.9%, 63.2-72.5%, and 66.7-73.1% of the applied **[methylene-^{14}C]IN-JT333** was adsorbed to the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively. Adsorption K_d values (reviewer-calculated) were 251.3, 115.4, 308.5, and 147.6 for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively. Adsorption K_d values (registrant-calculated) were 147, 96, 241, and 114 for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively; corresponding adsorption K_{oc} values were 25000, 12000, 24000, and 8200.

The reviewer-calculated r^2 value for the relationship of Kd vs. % organic carbon is 0.0817, for Kd vs. pH is 0.000006, and for Kd vs. % clay is 0.4344.

Results Synopsis: The reviewer calculated adsorption K_d values using the following equation:

$$Kd = \frac{\left[\frac{(C_0 V_0 - C_{eq} V_0)}{m}\right]}{C_{eq}}$$

[Indanone-1-14C]indoxacarb:

Soil type: Myaka sand
Average Adsorption K_d: 29.1

Soil type: Donna sandy clay loam
Average Adsorption K_d: 25.3

Soil type: Chino loam
Average Adsorption K_d: 110.9

Soil type: Tama silt loam
Average Adsorption K_d: 47.5

[Trifluoromethoxyphenyl-U-^{14}C]indoxacarb:

Soil type: Myaka sand
Average Adsorption K_d: 29.3

Soil type: Donna sandy clay loam
Average Adsorption K_d: 34.5

Soil type: Chino loam
Average Adsorption K_d: 86.1

Soil type: Tama silt loam
Average Adsorption K_d: 32.0

[Methylene-^{14}C]IN-JT333:
Soil type: Myaka sand
Average Adsorption K_d: 251.3

Soil type: Donna sandy clay loam
Average Adsorption K_d: 115.4

Soil type: Chino loam
Average Adsorption K_d: 308.5

Soil type: Tama silt loam
Average Adsorption K_d: 147.6

Results Synopsis: The registrant calculated adsorption K values using the following equation: $K_d = C_s \div C_w$.

[Indanone-1-^{14}C]indoxacarb:
Soil type: Myaka sand
Amount adsorbed: 43.8-93.1% of the applied
Average Adsorption K_d: 29
Average Adsorption K_{oc}: Not reported
Amount desorbed: Not determined
Desorption K_d: Not determined

Desorption K_{oc}: Not determined

Soil type: Donna sandy clay loam
Amount adsorbed: 41.2-81.9% of the applied
Average Adsorption K_d: 23
Average Adsorption K_{oc}: Not reported
Amount desorbed: Not determined
Desorption K_d: Not determined
Desorption K_{oc}: Not determined

Soil type: Chino loam
Amount adsorbed: 80.3-98.5% of the applied
Average Adsorption K_d: 113
Average Adsorption K_{oc}: Not reported
Amount desorbed: Not determined
Desorption K_d: Not determined
Desorption K_{oc}: Not determined

Soil type: Tama silt loam
Amount adsorbed: 19.6-75.7% of the applied
Average Adsorption K_d: 38
Average Adsorption K_{oc}: Not reported
Amount desorbed: Not determined
Desorption K_d: Not determined
Desorption K_{oc}: Not determined

[Trifluoromethoxyphenyl-U-^{14}C]indoxacarb:
Soil type: Myaka sand
Amount adsorbed: 47.5-87.0% of the applied
Average Adsorption K_d: 29
Average Adsorption K_{oc}: Not reported
Amount desorbed: Not determined
Desorption K_d: Not determined
Desorption K_{oc}: Not determined

Soil type: Donna sandy clay loam
Amount adsorbed: 52.5-70.1% of the applied
Average Adsorption K_d: 28
Average Adsorption K_{oc}: Not reported
Amount desorbed: Not determined
Desorption K_d: Not determined
Desorption K_{oc}: Not determined

Soil type: Chino loam
Amount adsorbed: 64.0-88.0% of the applied
Average Adsorption K_d: 77
Average Adsorption K_{oc}: Not reported
Amount desorbed: Not determined
Desorption K_d: Not determined
Desorption K_{oc}: Not determined

Soil type: Tama silt loam
Amount adsorbed: 23.4-72.4% of the applied
Average Adsorption K_d: 31
Average Adsorption K_{oc}: Not reported
Amount desorbed: Not determined
Desorption K_d: Not determined
Desorption K_{oc}: Not determined

[Methylene-^{14}C]IN-JT333:
Soil type: Myaka sand
Amount adsorbed: 53.4-56.5% of the applied
Average Adsorption K_d: 147
Average Adsorption K_{oc}: 25000
Amount desorbed: Not determined
Desorption K_d: Not determined
Desorption K_{oc}: Not determined

Soil type: Tama silt loam
Amount adsorbed: 62.3-81.9% of the applied
Average Adsorption K_d: 96
Average Adsorption K_{oc}: 12000
Amount desorbed: Not determined
Desorption K_d: Not determined
Desorption K_{oc}: Not determined

Soil type: Tama silt loam
Amount adsorbed: 63.2-72.5% of the applied
Average Adsorption K_d: 241
Average Adsorption K_{oc}: 24000
Amount desorbed: Not determined
Desorption K_d: Not determined
Desorption K_{oc}: Not determined

Soil type: Tama silt loam
Amount adsorbed: 66.7-73.1% of the applied
Average Adsorption K_d: 114
Average Adsorption K_{oc}: 8200
Amount desorbed: Not determined
Desorption K_d: Not determined
Desorption K_{oc}: Not determined

Study Acceptability:

General: This study (MRID 45795809) addresses review issues and comments cited in the Data Evaluation Record for MRID 44477308.

This study in conjuction with the batch equilibrium study (MRID 44477308) provides supplemental data because only one test concentration was used in the adsorption study rather than the required minimum of four test concentrations, desorption coefficients were not submitted, and the test substances were unstable during the adsorption experiment. Although these deficiencies limit a complete analysis of soil:water partitioning of DPX-JW062 and JT333, the submission of additional batch equilibrium data are not expected to alter interpretation of mobility. No additional data are needed at this time to address the mobility of DPX-JW062 and JT333 at this time.

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: The study was conducted in accordance with the USEPA Pesticide Assessment Guidelines, Subdivision N, Section §163-1 (p. 1). Significant deviations from Subdivision N guidelines are:

> The adsorption experiment was conducted using only one test concentration. This does not affect the validity of the study.

Desorption was not studied. This does not affect the validity of the study.

The test substances were unstable during the adsorption experiment, so that equilibrium could not be established between the aqueous and soil phases. This not affect the validity of the study, but does affect the interpretation of the study results.

COMPLIANCE: The study was conducted in compliance with USEPA GLP Title 40, Part 160 (p. 3). Signed and dated Data Confidentiality, GLP, Quality Assurance, and Certificate of Authenticity statements were provided (pp. 2-5).

A. MATERIALS:

1. Test Material

[Indanone-1-^{14}C]indoxacarb (p. 14).
[Trifluoromethoxyphenyl-U-^{14}C]indoxacarb (p. 14).
[Methylene-^{14}C]IN-JT333 (p. 15).

Chemical Structure: See DER Attachment 2.
Description: Not reported.
Purity:
Radiolabeled:

[Indanone-1-^{14}C]indoxacarb

Analytical purity: Not reported.
Radiochemical purity: 95% (p. 15).
File Number: 0428.
Specific activity: 45.118 µCi/mg.
Locations of the label: Carbon 1 of the indanone ring.

[Trifluoromethoxyphenyl-U-^{14}C]indoxacarb

Analytical purity: Not reported.
Radiochemical purity: 93% (p. 15).
File Number: 0423.
Specific activity: 54.03 µCi/mg.
Locations of the label: Uniformly labeled on the trifluoromethoxy-phenyl ring.

[Methylene-^{14}C]IN-JT333	Analytical purity: Not reported. Radiochemical purity: 90% (p. 165). File Number: 464. Specific activity: 42.64 µCi/mg. Locations of the label: Not specified on the structure provided in the study report (p. 15).
Non-radiolabeled:	
Indoxacarb	Analytical purity: 98.6% (p. 15). Batch Number: DPX-JW062-33.
IN-JT333	Analytical purity: >98.3% (p. 15). Batch Number: IN-JT333-17.
IN-ML438	Analytical purity: Not reported. Batch Number: IN-ML438-0 (p. 15).
Storage conditions of test chemicals:	The storage conditions of the test chemicals were not reported.

Physico-chemical properties of indoxacarb:

Parameter	Values	Comments
Molecular formula	$C_{22}H_{17}ClF_3N_3O_7$	
Molecular weight	527.84 g/mole	
Water solubility	Not reported	
Vapour pressure	Not reported	
UV absorption	Not reported	
Melting point	Not reported	
Bulk density	Not reported	
pK_a	Not reported	
K_{ow}	Not reported	
Stability of Compound at room temperature	Not reported	

Data were obtained from p. 14 and Appendix 1, p. 56 of the study report.

Physico-chemical properties of IN-JT333:

Parameter	Values	Comments
Molecular formula	$C_{20}H_{15}ClF_3N_3O_5$	
Molecular weight	469.81 g/mole	
Water solubility	Not reported	
Vapour pressure	Not reported	
UV absorption	Not reported	
Melting point	Not reported	
Bulk density	Not reported	
pK_a	Not reported	
K_{ow}	Not reported	
Stability of Compound at room temperature	Not reported	

Data were obtained from p. 14 and Appendix 1, p. 57 of the study report.

2. Soil Characteristics

Table 1: Description of soil collection and storage.

Description	Myaka Sand	Donna Sandy clay loam	Chino Loam	Tama Silt loam
Geographic location	Bradenton, Florida	Donna, Texas	Madera, California	Greenfield, Illinois
Pesticide use history at the collection site	Not reported	Not reported	Not reported	Not reported
Collection procedures	Not reported	Not reported	Not reported	Not reported
Sampling depth (cm)	Not reported	Not reported	Not reported	Not reported
Storage conditions	Not reported	Not reported	Not reported	Not reported
Storage length	Not reported	Not reported	Not reported	Not reported
Soil preparation	Air-dried; sieved, 2 mm.	Air-dried; sieved, 2 mm.	Air-dried; sieved, 2 mm.	Air-dried; sieved, 2 mm.

Data were obtained from pp. 15-16 and Table 1, p. 24 of the study report.

Table 2: Properties of the soils.

Property	Myaka	Donna	Chino	Tama
Soil Texture	Sand	Sandy clay loam	Loam	Silt loam
% sand	91.6	47.2	40.8	9.6
% silt	4.0	24.0	40.4	66.0
% clay	4.4	28.8	18.8	24.4
pH	6.2	7.8	7.6	6.2
Organic carbon (%)	0.58	0.812	0.986	1.392
Organic matter (%)	1.0	1.4	1.7	2.4
CEC (meq/100 g)	3.8	18.1	17.3	16.7
Moisture at 1/3 atm (%)	Not reported	Not reported	Not reported	Not reported
Bulk density (lb/ft^3)	82	78	72	68
Biomass (mg microbial C/100 g or CFU or other)	Not reported	Not reported	Not reported	Not reported
Soil taxonomic classification	Sandy, siliceous, hyperthermic, aeric haplaquods.	Abrubtic aridic durixerolls, very fine, montmorillonitic, frigid.	Unclassified.	Typic argiudolls, fine-silty, mixed, mesic.
Soil mapping unit (for EPA)	Not reported	Not reported	Not reported	Not reported

Data were obtained from pp. 15-16 and Table 1, p. 24 of the study report.

C. STUDY DESIGN:

1. Preliminary study: Preliminary tests were conducted to determine the appropriate equilibration time to be used in the definitive study and to determine the potential for each of the test substances to adsorb to the test vessels. A preliminary test to establish the soil:solution ratio to be used in the definitive study was not conducted.

To determine the adsorption of each test substance to the test vessels, aliquots of [^{14}C]indoxacarb and [^{14}C]IN-JT333 in 0.01M $CaCl_2$ solution were added to 35-mL glass centrifuge tubes (pp. 16-17). The tubes were shaken in a water-bath at 24-26°C in the dark for 1, 2, 4, 6, and 24 hours. Aliquots were analyzed for total radioactivity using LSC. To determine the stability of indoxacarb and IN-JT333 in the test systems, the supernatant samples were further analyzed using HPLC. Recovery of radioactivity in the aqueous solutions treated with [^{14}C]indoxacarb was 72-107% after 1 hour of shaking, 66-73% after 2-6 hours, and 76% after 24 hours (p. 20; Table 2, p. 25). [^{14}C]Indoxacarb comprised 64-96% of the applied radioactivity after 1 hour of shaking, 56-65% after 2-6 hours, and 54% after 24 hours. Recovery of radioactivity in the aqueous solutions treated with [^{14}C]IN-JT333 was 65-96% after 1 hour of shaking, 73-79% after 2-6 hours, and 69% after 24 hours. [^{14}C]IN-JT333 comprised 45-72% of the applied radioactivity after 1 hour of shaking, 54-61% after 2-4 hours, and 35% after 24 hours.

To determine the equilibration time to be used in the definitive study, 1-g aliquots (dry weight equivalent) of the Tama silt loam soil were added to two 35-mL glass centrifuge tubes (p. 17). The Tamara soil was used because it has the highest organic carbon content of the four test soils, thereby representing the worst case example. A 25-mL aliquot of [^{14}C]indoxacarb, dissolved in 0.01M $CaCl_2$, was added to one test vessel and a 25-mL aliquot of [^{14}C]IN-JT333, dissolved in 0.01M $CaCl_2$, was added to the second test vessel. The test samples were shaken at 24-26°C in the dark for 1, 2, 4, 6, and 24 hours. Single tubes were removed at each sampling interval, and the samples were centrifuged to separate the soil and supernatant. Aliquots of the supernatants were analyzed for total radioactivity using LSC, and additional aliquots were analyzed using HPLC. The proportion of [^{14}C]indoxacarb in the aqueous solutions ranged from 76 to 82% during the first 6 hours of shaking, and declined to 57% after 24 hours (p. 21; Table 3, p. 26). The proportion of [^{14}C]IN-JT333 in the aqueous solutions ranged from 48-56% during the first 6 hours of shaking, and declined to 34% after 24 hours (p. 21; Table 3, p. 26).

Based on the results of the preliminary studies, it was determined that an equilibrium time of 1 hour for adsorption would be used for the definitive study (p. 21). The 1-hour equilibration time for adsorption was selected in order to minimize instability of the test substances (p. 17). The study authors noted that given the short half-lives of indoxacarb and IN-JT333, a 1-hour adsorption equilibration time was appropriate for the definitive study. It was also determined that indoxacarb and IN-JT333 did not adsorb to the glass centrifuge tubes.

2. Definitive study experimental conditions:

Table 3: Study design for the adsorption phase.[1]

Parameters		Myaka sand	Donna sandy clay loam	Chino loam	Tama silt loam
Condition of soil (air dried/fresh)		Air-dried	Air-dried	Air-dried	Air-dried
Have these soils been used for other laboratory studies ? (specify which)		No	No	No	No
Soil (g/replicate)	[Indanone-1-^{14}C]-indoxacarb	1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5	0.214, 0.353, 0.500, 1.167, 2.500, 4.500
	[Trifluoromethoxy-phenyl-U-^{14}C]-indoxacarb	1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5	0.214, 0.333, 0.500, 1.167, 4.500
	[Methylene-^{14}C]-IN-JT333	1.0, 5.0	1.0, 5.0	1.0, 5.0	1.0, 5.0
Equilibrium solution used (name and concentration; eg: 0.01N $CaCl_2$)		0.01M $CaCl_2$	0.01M $CaCl_2$	0.01M $CaCl_2$	0.01M $CaCl_2$
Control used (with salt solution only) (Yes/No)		Yes	Yes	Yes	Yes
Test material concentrations[1]	Nominal application rates (mg a.i./kg soil) [Indanone-1-^{14}C]-indoxacarb	0.060, 0.075, 0.100, 0.15, 0.300	0.060, 0.075, 0.100, 0.15, 0.300	0.060, 0.075, 0.100, 0.15, 0.300	0.067, 0.120, 0.257, 0.600, 0.901, 1.402
	Nominal application rates (mg a.i./kg soil) [Trifluoromethoxy-phenyl-U-^{14}C]-indoxacarb	0.060, 0.075, 0.100, 0.15, 0.300	0.060, 0.075, 0.100, 0.15, 0.300	0.060, 0.075, 0.100, 0.15, 0.300	0.067, 0.257, 0.600, 0.901, 1.402
	Nominal application rates (mg a.i./kg soil) [Methylene-^{14}C]-IN-JT333	0.060, 0.300	0.060, 0.300	0.060, 0.300	0.060, 0.300
	Analytically measured concentrations (mg a.i./kg soil)	Not reported for any of the test substances.	Not reported for any of the test substances.	Not reported for any of the test substances.	Not reported for any of the test substances.

Parameters		Myaka sand	Donna sandy clay loam	Chino loam	Tama silt loam
Identity and concentration of co-solvent, if any)		Acetonitrile, concentration not reported.	Acetonitrile, concentration not reported.	Acetonitrile, concentration not reported.	Acetonitrile, concentration not reported.
Soil:solution ratio	[Indanone-1-^{14}C]-indoxacarb	1:25, 2:25, 3:25, 4:25, 5:25	1:25, 2:25, 3:25, 4:25, 5:25	1:25, 2:25, 3:25, 4:25, 5:25	0.214:25, 0.333:25, 0.5:25, 1.167:25, 2.5:25, 4.5:25
	[Trifluoromethoxy-phenyl-U-^{14}C]-indoxacarb	1:25, 2:25, 3:25, 4:25, 5:25	1:25, 2:25, 3:25, 4:25, 5:25	1:25, 2:25, 3:25, 4:25, 5:25	0.214:25, 0.333:25, 0.5:25, 1.167:25, 4.5:25
	[Methylene-^{14}C]-IN-JT333	1:5, 1:25	1:5, 1:25	1:5, 1:25	1:5, 1:25
Initial pH of the equilibration solution, if provided		Not reported	Not reported	Not reported	Not reported
No. of replications	Controls	2	2	2	2
	[Indanone-1-^{14}C]-indoxacarb	1	1	1	1; 3 for the 0.120 mg a.i./kg test concentration.
	[Trifluoromethoxy-phenyl-U-^{14}C]-indoxacarb	1	1	1	1
	[Methylene-^{14}C]-IN-JT333	2	2	2	2
Equilibration	Time (hours)	1	1	1	1
	Temperature (°C)	24-26	24-26	24-26	24-26
	Darkness	Yes	Yes	Yes	Yes
	Shaking method	Shaking water-bath	Shaking water-bath	Shaking water-bath	Shaking water-bath

Parameters		Myaka sand	Donna sandy clay loam	Chino loam	Tama silt loam
	Shaking time (hours)	1	1	1	1
Method of separation of supernatant (eg., centrifugation)		Centri-fugation	Centri-fugation	Centri-fugation	Centri-fugation
Centrifugation	Speed (rpm)	2,000	2,000	2,000	2,000
	Duration (min)	15	15	15	15
	Method of separation of soil and solution	Centri-fugation	Centri-fugation	Centri-fugation	Centri-fugation

Data were obtained from pp. 16-17; Tables 4-8, pp. 27-31; Appendix 4, pp. 62-65 of the study report.
[1] Test material concentrations were calculated by the reviewer by converting ppb to mg/L as follows: 12 ppb × 0.001 ppm = 0.012 ppm (equivalent to 0.012 mg/L). The reviewer converted mg/L to mg a.i./kg using the following equation: test concentration (mg/L) x total volume of test material solution (mL)] ÷ amount of soil (g); eg. (0.012 mg/L x 25 mL) ÷ 1 g = 0.3 mg a.i./kg soil.

Table 4: Study design for the desorption phase.[1]

Parameters		Myaka sand	Donna sandy clay loam	Chino loam	Tama silt loam
Were the soil residues from the adsorption phase used? If not, describe the method for adsorption using a separate adsorption Table					
Amount of test material present in the adsorbed state/adsorbed amount (mg a.i./kg soil)					
No. of desorption cycles					
Equilibration solution and quantity used per treatment for desorption (eg., 0.01M $CaCl_2$)					
Soil:solution ratio					
Replications	Controls				
	Treatments				
Desorption equilibrium	Time (hours)				
	Temperature (°C)				
	Darkness				
	Shaking method				
	Shaking time (hours)				
Centrifugation	Speed (g)				
	Duration (min)				
	Method of separation of soil and solution				

[1] Desorption was not studied.

3. Description of analytical procedures:

Extraction/clean up/concentration methods: Following adsorption, the soils were extracted by shaking with 25 mL of acetonitrile:water (90:10, v:v) on a wrist-action shaker for one hour (p. 18). The samples were centrifuged, and aliquots (3-5 mL) of the extracts were concentrated, then adjusted to *ca.* 2 mL by the addition of 0.01M $CaCl_2$ solution. In addition, the aqueous phase

samples of the Chino loam soil samples treated with [indanone-1-^{14}C]indoxacarb were combined and extracted with methylene chloride (not further described) prior to LC-MS analysis (p. 22).

Total ^{14}C measurement: Following adsorption, triplicate 0.5-1.0 mL aliquots of the supernatants were analyzed for total radioactivity using LSC (pp. 17-18). Aliquots of the soil extracts were analyzed for total radioactivity using LSC. The soils were air-dried and triplicate *ca.* 0.5-g aliquots of the soils were combusted prior to LSC analysis. Combustion efficiency was not reported.

Non-extractable residues, if any: Not applicable.

Derivatization method, if used: A derivatization method was not employed in the study.

Identification and quantification of parent compound: Following adsorption, aliquots of the supernatant samples (0.5-1 mL) and concentrated extracts (*ca.* 2 mL) from each soil were analyzed for [indanone-1-^{14}C]indoxacarb, [trifluoromethoxyphenyl-U-^{14}C]indoxacarb, and [methylene-^{14}C]IN-JT333 by HPLC using the following conditions: DuPont Zorbax®, RX-C8 column (4.6 × 250 mm; particle size not reported), mobile phase combining (A) 0.025% (v:v) trifluoroacetic acid in water and (B) acetonitrile [%A:B at 0-5 min. 95:5; 30-40 min. 35:65, 41-45 min. 0:100, 46-50 min. 95:5], and flow rate 1.5 mL/min, with UV detection (254 nm; pp. 18-19). One-minute fractions of the column eluate were collected over 50 minutes and radioassayed. HPLC column recoveries were not reported. The identities of [indanone-1-^{14}C]indoxacarb, [trifluoromethoxyphenyl-U-^{14}C]indoxacarb, and [methylene-^{14}C]IN-JT333 were confirmed by HPLC-MS using a Finnigan SSQ710 with TSP2 thermospray interface with a Varian Vista 5500 LC. In aqueous phase samples of the Chino loam soil samples treated with [indanone-1-^{14}C]indoxacarb, the presence of [^{14}C]indoxacarb was confirmed using LC-MS after the samples were combined and extracted with methylene chloride (p. 22).

Identification and quantification of transformation products, if appropriate: Samples were not analyzed for transformation products of indoxacarb or IN-JT333.

Detection limits (LOD, LOQ) for parent compound: For LSC analyses, the LOD was twice the background or 0.13 ppb, and the LOQ was 10 times the background (Table 8, p. 31). For HPLC analyses, the LOD and LOQ were not reported.

Detection limits (LOD, LOQ) for the transformation products: Samples were not analyzed for transformation products of indoxacarb or IN-JT333.

II. RESULTS AND DISCUSSION

A. TEST CONDITIONS: It was stated that the definitive tests were conducted at temperatures of 24-26°C; however, temperature records were not provided (p. 16). The pH of the test solutions during the study were not reported.

HPLC radiochromatograms of aqueous phases of the four test soils treated with **[trifluoromethoxyphenyl-U-^{14}C]indoxacarb** showed that indoxacarb comprised 30.46-59.88% of the total dpm, and the transformation product IN-ML438 comprised 9.37-28.22% of the total dpm (p. 21; Figures 1-8, pp. 35-42). HPLC radiochromatograms of the soil phases of the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils showed that indoxacarb comprised 80.05-92.88% of the total dpm; IN-ML438 was 2.95-3.45% of the total dpm in the Donna sandy clay loam and Chino loam soils only.

HPLC radiochromatograms of aqueous and soil phases of the four test soils treated with **[methylene-^{14}C]IN-JT333-treated soils** showed that IN-JT333 comprised 36.38-60.05% of the total dpm in the aqueous phase and 78.60-86.42% of the total dpm in the soil phase (Figures 9-16, pp. 43-50).

LC-MS analysis of aqueous phase samples of Chino loam soil samples treated with **[indanone-1-^{14}C]indoxacarb** that were combined and extracted with methylene chloride prior to analysis confirmed the presence of [^{14}C]indoxacarb as a major compound; trace amounts of IN-JT333 were detected (p. 22). Quantitative data were not provided.

B. MASS BALANCE: For **[indanone-1-^{14}C]indoxacarb-treated soils**, the mass balance at the end of the adsorption phase was 86-110%, 88-102%, 97-107%, and 72-116% of the applied for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively (p. 22; Table 10, p. 33).

For **[trifluoromethoxyphenyl-U-^{14}C]indoxacarb-treated soils**, the mass balance at the end of the adsorption phase was 95-112%, 89-115%, 96-106%, and 97-110% of the applied for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively (p. 22; Table 10, p. 33).

For **[methylene-^{14}C]IN-JT333-treated soils**, the mass balance at the end of the adsorption phase was 82-113%, 106-115%, 82-102%, and 112-130% of the applied for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively (p. 22; Table 11, p. 34).

Table 5a: Recovery of [indanone-1-^{14}C]indoxacarb, expressed as percentage of applied radioactivity, in soil after adsorption/desorption (mean ± s.d.).

Matrices	Myaka sand	Donna sandy clay loam	Chino loam	Tama silt loam
At the end of the adsorption phase				
Supernatant solution	30.2 ± 13.7	33.2 ± 10.2	16.6 ± 7.0	41.4 ± 20.9
Solid phase (extracted)[1]	66.0 ± 15.3	59.8 ± 11.9	80.8 ± 6.2	48.3 ± 23.5
Non-extractable residues in soil, if measured	2.3 ± 1.0	5.0 ± 1.8	6.8 ± 2.2	5.8 ± 0.5
Total recovery	98.2 ± 9.5	97.0 ± 5.8	102.4 ± 3.9	92.3 ± 15.0
At the end of the desorption phase[2]				
Supernatant solution				
Solid phase (total ^{14}C)				
Non-extractable residues in soil, if measured				
Total recovery				

Data were obtained from Table 10, p. 33 of the study report.

[1] All soils were extracted prior to combustion.

[2] A desorption phase was not conducted.

Table 5b: Recovery of [trifluoromethoxyphenyl-U-^{14}C]indoxacarb, expressed as percentage of applied radioactivity, in high-dose soil after adsorption/desorption (mean ± s.d.).

Matrices	Myaka sand	Donna sandy clay loam	Chino loam	Tama silt loam
At the end of the adsorption phase				
Supernatant solution	32.0 ± 11.9	33.0 ± 15.9	21.0 ± 9.7	56.8 ± 25.4
Solid phase (extracted)[1]	71.6 ± 15.5	62.0 ± 7.3	75.0 ± 9.0	46.4 ± 21.8
Non-extractable residues in soil, if measured	3.3 ± 1.3	5.0 ± 1.2	6.3 ± 1.7	7.0*
Total recovery	106.0 ± 6.8	98.8 ± 12.3	101.6 ± 4.0	105.0 ± 5.6
At the end of the desorption phase[2]				
Supernatant solution				
Solid phase (total ^{14}C)				
Non-extractable residues in soil, if measured				
Total recovery				

Data were obtained from Table 10, p. 33 of the study report.

[1] All soils were extracted prior to combustion.

[2] A desorption phase was not conducted.

* Single replicate value.

Table 5c: Recovery of [methylene-^{14}C]IN-JT333, expressed as percentage of applied radioactivity, in high-dose soil after adsorption/desorption (mean ± s.d.).

Matrices	Myaka sand	Donna sandy clay loam	Chino loam	Tama silt loam
At the end of the adsorption phase				
Supernatant solution	21.9 ± 15.5	24.0 ± 15.1	12.8 ± 8.4	23.1 ± 15.9
Solid phase (extracted)[1]	72.5 ± 5.8	81.0 ± 12.3	78.3 ± 6.2	89.3 ± 9.6
Non-extractable residues in soil, if measured	4.1 ± 0.3	9.0 ± 0.0	9.0 ± 1.4	9.3 ± 0.5
Total recovery	96.3 ± 13.0	109.5 ± 3.9	95.3 ± 9.1	117.3 ± 8.6
At the end of the desorption phase[2]				
Supernatant solution				
Solid phase (total ^{14}C)				
Non-extractable residues in soil, if measured				
Total recovery				

Data were obtained from Table 11, p. 34 of the study report.
[1] All soils were extracted prior to combustion.
[2] A desorption phase was not conducted.

Table 6a: Concentration of [indanone-1-^{14}C]indoxacarb in the solid and liquid phases at the end of adsorption equilibration period (mean ± s.d.).

Concentration (mg a.i./kg soil)	Myaka sand			Donna sandy clay loam		
	on soil [1] (mg a.i./kg)	in solution[2] (µg a.i./mL)	% adsorbed[3]	on soil [1] (mg a.i./kg)	in solution[2] (µg a.i./mL)	% adsorbed[3]
0.060	0.0525	0.0016	87.5	0.0467	0.0023	77.8
0.075	0.0698	0.0020	93.1	0.0614	0.0025	81.9
0.100	0.0713	0.0025	71.3	0.0707	0.0029	70.7
0.150	0.1118	0.0040	74.5	0.1017	0.0042	67.8
0.300	0.1313	0.0060	43.8	0.1235	0.0052	41.2

Concentration (mg a.i./kg soil)	Chino loam			Tama silt loam		
	on soil [1] (mg a.i./kg)	in solution[2] (µg a.i./mL)	% adsorbed[3]	on soil [1] (mg a.i./kg)	in solution[2] (µg a.i./mL)	% adsorbed[3]
0.060/0.067	0.0568	0.0005	94.7	0.0425	0.0010	63.4
0.075/0.120	0.0739	0.0007	98.5	0.0908 ± 0.0*	0.0018 ± 0.0*	75.7 ± 10.0*
0.100/0.257	0.0920	0.0007	92.0	0.1237	0.0048	48.1
0.150/0.600	0.1426	0.0013	95.1	0.1577	0.0057	26.3
0.300/0.901	0.2408	0.0027	80.3	0.2461	0.0095	27.3
1.402	Not determined	Not determined	Not determined	0.2746	0.0087	19.6

Data were obtained from Tables 4-7, pp. 27-30 of the study report.

[1] Data were reported in units of ppb and were converted by the reviewer as follows: concentration on soil after equilibrium (ppb) ÷ 1000; e.g. 131.3 ppb ÷ 1000 = 0.1313 ppm (equivalent to 0.1313 mg/kg).

[2] Data were reported in units of ppb and were converted by the reviewer as follows: concentration in solution after equilibrium (ppb) ÷ 1000; e.g. 5.99 ppb ÷ 1000 = 0.0060 ppm (equivalent to 0.0060 µg/mL).

[3] Percent adsorbed was calculated by the reviewer as follows: [concentration on soil (mg a.i./kg) ÷ nominal test concentration (mg a.i./kg)] × 100; e.g. [0.0525 mg a.i./kg ÷ 0.060 mg a.i./kg] × 100 = 87.5%.

* Reviewer-calculated means and standard deviations of three replicates.

Table 6b: Concentration of [trifluoromethoxyphenyl-U-^{14}C]indoxacarb in the solid and liquid phases at the end of adsorption equilibration period (mean ± s.d.).

Concentration (mg a.i./kg soil)	Myaka sand			Donna sandy clay loam		
	on soil [1] (mg a.i./kg)	in solution[2] (µg a.i./mL)	% adsorbed[3]	on soil [1] (mg a.i./kg)	in solution[2] (µg a.i./mL)	% adsorbed[3]
0.060	0.0522	0.0014	87.0	0.0389	0.0013	64.8
0.075	0.0632	0.0021	84.3	0.0484	0.0017	64.5
0.100	0.0859	0.0028	85.9	0.0556	0.0023	55.6
0.150	0.1027	0.0042	68.5	0.1051	0.0035	70.1
0.300	0.1426	0.0054	47.5	0.1574	0.0055	52.5

Concentration (mg a.i./kg soil)	Chino loam			Tama silt loam		
	on soil [1] (mg a.i./kg)	in solution[2] (µg a.i./mL)	% adsorbed[3]	on soil [1] (mg a.i./kg)	in solution[2] (µg a.i./mL)	% adsorbed[3]
0.060/0.067	0.0488	0.0005	81.3	0.0485	0.0015	72.4
0.075/0.257	0.0660	0.0009	88.0	0.1604	0.0053	62.4
0.100/0.600	0.0853	0.0011	85.3	0.2038	0.0067	34.0
0.150/0.901	0.1178	0.0017	78.5	0.2553	0.0091	28.3
0.300/1.402	0.1919	0.0029	64.0	0.3284	0.0095	23.4

Data were obtained from Tables 4-7, pp. 27-30 of the study report.

[1] Data were reported in units of ppb and were converted by the reviewer as follows: concentration on soil after equilibrium (ppb) ÷ 1000; e.g. 142.6 ppb ÷ 1000 = 0.1426 ppm (equivalent to 0.1426 mg/kg).

[2] Data were reported in units of ppb and were converted by the reviewer as follows: concentration in solution after equilibrium (ppb) ÷ 1000; e.g. 5.42 ppb ÷ 1000 = 0.0054 ppm (equivalent to 0.0054 µg/mL).

[3] Percent adsorbed was calculated by the reviewer as follows: [concentration on soil (mg a.i./kg) ÷ nominal test concentration (mg a.i./kg)] × 100; e.g. [0.0522 mg a.i./kg ÷ 0.060 mg a.i./kg] × 100 = 87%.

Table 6c: Concentration of [methylene-^{14}C]IN-JT333 in the solid and liquid phases at the end of adsorption equilibration period (mean ± s.d.).

Concentration (mg a.i./kg soil)	Myaka sand			Donna sandy clay loam		
	on soil[1] (mg a.i./kg)	in solution[2] (µg a.i./mL)	% adsorbed[3]	on soil[1] (mg a.i./kg)	in solution[2] (µg a.i./mL)	% adsorbed[3]
0.060	0.0339 ± 0.0	0.0002 ± 0.0	56.5 ± 7.8	0.0491 ± 0.0	0.0004 ± 0.0	81.9 ± 0.5
0.300	0.1600 ± 0.0	0.0020 ± 0.0	53.4 ± 3.5	0.1870 ± 0.0	0.0027 ± 0.0	62.3 ± 2.1

Concentration (mg a.i./kg soil)	Chino loam			Tama silt loam		
	on soil[1] (mg a.i./kg)	in solution[2] (µg a.i./mL)	% adsorbed[3]	on soil[1] (mg a.i./kg)	in solution[2] (µg a.i./mL)	% adsorbed[3]
0.060	0.0379 ± 0.0	0.0001 ± 0.0	63.2 ± 9.0	0.0439 ± 0.0	0.0003 ± 0.0	73.1 ± 0.6
0.300	0.2175 ± 0.0	0.0009 ± 0.0	72.5 ± 4.0	0.2002 ± 0.0	0.0023 ± 0.0	66.7 ± 9.1

Data were obtained from Table 8, p. 31 of the study report.

[1] Data were reported in units of ppb and were converted by the reviewer as follows: concentration on soil after equilibrium (ppb) ÷ 1000; e.g. 167.4 ppb ÷ 1000 = 0.1674 ppm (equivalent to 0.1674 mg/kg).

[2] Data were reported in units of ppb and were converted by the reviewer as follows: concentration in solution after equilibrium (ppb) ÷ 1000; e.g. 2.21 ppb ÷ 1000 = 0.0022 ppm (equivalent to 0.0022 µg/mL).

[3] Percent adsorbed was calculated by the reviewer as follows: [concentration on soil (mg a.i./kg) ÷ nominal test concentration (mg a.i./kg)] × 100; e.g. [0.1674 mg a.i./kg ÷ 0.300 mg a.i./kg] × 100 = 55.8%.

Table 7: Concentration of [indanone-1-^{14}C]indoxacarb, [trifluoromethoxyphenyl-U-^{14}C]indoxacarb, and [methylene-^{14}C]IN-JT333 in the solid and liquid phases at the end of desorption (n = 0).[1]

Concentration (mg a.i./kg soil)			
	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% desorbed as % of the adsorbed[2]

[1] A desorption phase was not conducted using any of the test substances.

Table 8a: Reviewer-calculated adsorption constants of [indanone-1-^{14}C]indoxacarb, [trifluoromethoxyphenyl-U-^{14}C]indoxacarb, and [methylene-^{14}C]IN-JT333 in the soils.

Soil	[Indanone-1-^{14}C]indoxacarb Kd	[Trifluoromethoxyphenyl-U-^{14}C]indoxacarb Kd	[Methylene-^{14}C]IN-JT333 Kd
Myaka sand	29.1	29.3	251.3
Donna sandy clay loam	25.3	34.5	115.4
Chino loam	110.9	86.1	308.5
Tama silt loam	47.5	32	147.6

Adsorption K_d values were reviewer-calculated using data obtained from Tables 4-8, pp. 27-31 of the study report and the following equation:

$$Kd = \frac{\left[\frac{(C_0 V_0 - C_{eq} V_0)}{m}\right]}{C_{eq}}$$

where
S = the sorbed phase concentration with units of mass of sorbate per solid sorbent mass;
C_0 = the concentration in the water before sorption;
V_0 = the total water volume in the batch system;
C_{eq} = the aqueous-phase equilibrium concentration; and
m = the dry mass of sorbent.

Table 8b: Adsorption and desorption constants of [indanone-1-^{14}C]indoxacarb in the soils.

Soil	Adsorption[1]				Desorption			
	K_d	1/N	R^2	K_{oc}	K	1/N	R^2	K_{oc}
Myaka sand	29	Not reported	Not reported	Not reported	Not determined			
Donna sandy clay loam	23	Not reported	Not reported	Not reported	Not determined			
Chino loam	113	Not reported	Not reported	Not reported	Not determined			
Tama silt loam	38	Not reported	Not reported	Not reported	Not determined			

[1] Reviewer-calculated means using data from Tables 4-7, pp. 27-30 of the study report. Adsorption K values were calculated for each test concentration and test soil (pp. 19-20 of the study report). The registrant calculated adsorption K values using the following equation:
$K_d = C_s \div C_w$
where
C_s = the concentration of the test substance in the soil phase at adsorption equilibrium, and
C_w = concentration of the test substance in the water phase at adsorption equilibrium.
K_d -Adsorption and desorption coefficients; K_F - Freundlich adsorption and desorption coefficients; 1/N -Slope of Freundlich adsorption/desorption isotherms.
K_{oc} - Coefficient adsorption per organic carbon (K_d or K x 100/% organic carbon).
R^2 - Regression coefficient of Freundlich equation.

Table 8c: Adsorption and desorption constants of [trifluoromethoxyphenyl-U-^{14}C]indoxacarb in the soils.

Soil	Adsorption[1]				Desorption			
	K_d	1/N	R^2	K_{oc}	K	1/N	R^2	K_{oc}
Myaka sand	29	Not reported	Not reported	Not reported	Not determined			
Donna sandy clay loam	28	Not reported	Not reported	Not reported	Not determined			
Chino loam	77	Not reported	Not reported	Not reported	Not determined			
Tama silt loam	31	Not reported	Not reported	Not reported	Not determined			

[1] Reviewer-calculated means using data from Tables 4-7, pp. 27-30 of the study report. Adsorption K values were calculated for each test concentration and test soil (pp. 19-20 of the study report). The registrant calculated adsorption K values using the following equation: $K_d = C_s \div C_w$ (pp. 19-20 of the study report).
where
C_s = the concentration of the test substance in the soil phase at adsorption equilibrium, and
C_w = concentration of the test substance in the water phase at adsorption equilibrium.
K_d -Adsorption and desorption coefficients; K_F - Freundlich adsorption and desorption coefficients; 1/N -Slope of Freundlich adsorption/desorption isotherms.
K_{oc} - Coefficient adsorption per organic carbon (K_d or K x 100/% organic carbon).
R^2 - Regression coefficient of Freundlich equation.

Table 8d: Mean adsorption and desorption constants of [indanone-1-^{14}C]indoxacarb and [trifluoromethoxyphenyl-U-^{14}C]indoxacarb in the soils.

Soil	Adsorption				Desorption			
	K_d	1/N	R^2	K_{oc}	K	1/N	R^2	K_{oc}
Myaka sand	29	Not reported	0.8313	5100	Not determined			
Donna sandy clay loam	26	Not reported	0.9368	3300	Not determined			
Chino loam	95	Not reported	0.8235	9600	Not determined			
Tama silt loam	35	Not reported	0.8303	2500	Not determined			

Data were obtained from p. 22; Tables 4-7, pp. 27-30; Table 9, p. 32; Figure 17, pp. 51-52 of the study report.
Adsorption K values are based on a single test concentration.
K_d -Adsorption and desorption coefficients; K_F - Freundlich adsorption and desorption coefficients; 1/N -Slope of Freundlich adsorption/desorption isotherms.
K_{oc} - Coefficient adsorption per organic carbon (K_d or K x 100/% organic carbon).
R^2 - Regression coefficient of Freundlich equation.

Table 8e: Adsorption and desorption constants of [methylene-^{14}C]IN-JT333 in the soils.

Soil	Adsorption				Desorption			
	K_d	1/N	R^2	K_{oc}	K	1/N	R^2	K_{oc}
Myaka sand	147	Not reported	0.9331	25000	Not determined			

Soil	Adsorption				Desorption			
	K_d	1/N	R^2	K_{oc}	K	1/N	R^2	K_{oc}
Donna sandy clay loam	96	Not reported	0.9538	12000	Not determined			
Chino loam	241	Not reported	0.8591	24000	Not determined			
Tama silt loam	114	Not reported	0.9718	8200	Not determined			

Data were obtained from p. 22; Table 8, p. 31; Table 9, p. 32; Figure 18, pp. 53-54 of the study report. Adsorption K values are based on a single test concentration.
K_d -Adsorption and desorption coefficients; K_F - Freundlich adsorption and desorption coefficients; 1/N -Slope of Freundlich adsorption/desorption isotherms.
K_{oc} - Coefficient adsorption per organic carbon (K_d or K x 100/% organic carbon).
R^2 - Regression coefficient of Freundlich equation.

C. ADSORPTION: After 1 hour of equilibration, 43.8-93.1%, 41.2-81.9%, 80.3-98.5%, and 19.6-75.7% of the applied **[indanone-1-^{14}C]indoxacarb** was adsorbed to the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively (Tables 4-7, pp. 27-30). Adsorption K_d values (reviewer-calculated) were 29.1, 25.3, 110.9, and 47.5 for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively. Adsorption K_d values (registrant-calculated) were 29, 23, 113, and 38 for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively; corresponding adsorption K_{oc} values were not reported.

After 1 hour of equilibration, 47.5-87.0%, 52.5-70.1%, 64.0-88.0%, and 23.4-72.4% of the applied **[trifluoromethoxyphenyl-U-^{14}C]indoxacarb** was adsorbed to the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively (Tables 4-7, pp. 27-30). Adsorption K_d values (reviewer-calculated) were 29.3, 34.5, 86.1, and 32.0 for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively. Adsorption K_d values (registrant-calculated) were 29, 28, 77, and 31 for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively; corresponding adsorption K_{oc} values were not reported.

Mean adsorption K_d values (registrant-calculated) for **[indanone-1-^{14}C]indoxacarb** and **[trifluoromethoxyphenyl-U-^{14}C]indoxacarb** combined 29, 26, 95, and 35 for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively; corresponding adsorption K_{oc} values were 5100, 3300, 9600, and 2500 (Table 9, p. 32).

After 1 hour of equilibration, 53.4-56.5%, 62.3-81.9%, 63.2-72.5%, and 66.7-73.1% of the applied **[methylene-^{14}C]IN-JT333** was adsorbed to the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively (Table 8, p. 31). Adsorption K_d values (reviewer-calculated) were 251.3, 115.4, 308.5, and 147.6 for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively. Adsorption K_d values (registrant-

calculated) were 147, 96, 241, and 114 for the Myaka sand, Donna sandy clay loam, Chino loam, and Tama silt loam soils, respectively; corresponding adsorption K_{oc} values were 25000, 12000, 24000, and 8200 (Table 9, p. 32).

D. DESORPTION: A desorption phase was not conducted using any of the test substances.

III. STUDY DEFICIENCIES: This study is classified as supplemental because only one test concentration was used in the adsorption study rather than the required minimum of four test concentrations, desorption coefficients were not submitted, and the test substances were unstable during the adsorption experiment. Although these deficiencies limit a complete analysis of soil:water partitioning of DPX-JW062 and JT333, the submission of additional batch equilibrium data are not expected to alter interpretation of mobility. No additional data are needed at this time to address the mobility of DPX-JW062 and JT333 at this time.

IV. REVIEWER'S COMMENTS:

1. Desorption was not studied. Subdivision N guidelines specify that desorption be studied in a batch equilibrium study. The study authors stated that desorption experiments were not conducted due to potential degradation issues in the test systems (p. 17).

2. The definitive study was conducted using one test concentration for all three test substances. Subdivision N guidelines specify that a minimum of four test concentrations be studied in order to determine whether adsorption is concentration-dependent. Since only one test concentration was studied, Freundlich K values could not be calculated. Four test concentrations are necessary to accurately establish a Freundlich K.

3. A standard batch equilibrium test conducted in accordance with Subdivision N guidelines could not be conducted due to the poor water solubility and instability of both indoxacarb and IN-JT333. Instead, a modified adsorption batch equilibration method was used as the definitive study (p. 12).

4. The test substances (indoxacarb and IN-JT333) were unstable during the adsorption experiment, so that equilibrium could not be established between the aqueous and soil phases of the test samples. Although this does not affect the validity of the study, it does affect the interpretation of the study results.

5. Material balances were unacceptable (<90% and >110% of the applied) for a number of individual samples of the Makaya sand, Donna sandy clay loam, and Tama silt loam soils treated with [indanone-1-^{14}C]indoxacarb, [trifluoromethoxyphenyl-U-^{14}C]indoxacarb or [^{14}C]IN-JT-333. Of the single soil samples treated with [indanone-1-^{14}C]indoxacarb at

soil:solution ratios of 1, 2, 3, 4 or 5 g:25 mL, recoveries were unacceptable (72-116% of the applied) for one Myaka sand soil sample (3 g:25 mL), one Donna sandy clay loam soil sample (1 g:25 mL), and five Tama silt loam soil samples (0.2-4.5 g:25 mL; Table 10, p. 33). Of the single samples treated [trifluoromethoxyphenyl-U-^{14}C]indoxacarb at soil:solution ratios of 1, 2, 3, 4 or 5 g:25 mL, recoveries were unacceptable (89-115% of the applied) for two Myaka sand samples (3 and 4 g:25 mL) and three Donna sandy clay loam soil samples (2, 3, and 5 g:25 mL). Of the duplicate soil samples treated [methylene-^{14}C]IN-JT333 at 1 g:25 mL or 5 g:25 mL, recoveries were unacceptable (82-130% of the applied) for two Myaka sand samples (1 and 5 g:25 mL), one Donna sandy clay loam soil sample (5 g:25 mL), one Chino loam sample (5 g:25 mL), and all four Tama silt loam samples (1 and 5 g:25 mL; Table 11, p. 34.) Subdivision N guidelines define acceptable material balances as >90% and <110% of the applied radioactivity.

6. A preliminary test to establish the soil:solution ratio to be used in the definitive study was not conducted. The rationale for selecting the soil:solution ratios used in the definitive study, which ranged from 0.2 g: 25 mL to 5 g: 25 mL, was not reported. Subdivision N guidelines specify that a preliminary test be conducted to establish the soil:solution ratio to be used in the definitive study.

7. The tests using [indanone-1-^{14}C]indoxacarb and [trifluoromethoxyphenyl-U-^{14}C]indoxacarb were conducted using one sample each for each soil:solution ratio studied. It is preferred that replicate samples be used in order to allow for between-sample comparisons.

8. The physico-chemical properties of the test substances were incomplete; water solubility, vapour pressure, UV adsorption, melting point, bulk density, pK_a, K_{ow}, and the stability of the test substances were not reported. In addition, a description (form, color) of each of the test substances was not provided.

9. The location of the methylene radiolabel in the [^{14}C]IN-JT333 test substance was not reported in the text or designated in the structure provided in the study report (p. 15).

10. Soil moisture at 1/3 atm and soil biomass were not reported for any of the test soils.

11. A complete description of the test soil collection and storage was not provided; pesticide use history at the collection site, collection procedures, sampling depth, storage conditions, and storage length were not reported.

12. It was stated whether the test samples were stored prior to analysis. Storage stability was not addressed, and the length of storage for collected samples was not reported.

13. The study authors calculated adsorption Koc values using the combined data for [indanone-1-^{14}C]indoxacarb and [trifluoromethoxyphenyl-U-^{14}C]indoxacarb, rather than the data specific to the radiolabeled test substance.

14. No data were provided for the [indanone-1-^{14}C]indoxacarb supernatant and extract samples analyzed for parent compound using HPLC. Reconstructed HPLC radiochromatograms of aqueous and extract samples from the [trifluoromethoxyphenyl-U-^{14}C]indoxacarb-treated soil samples and the [methylene-^{14}C]IN-JT333-treated samples were provided in Figures 1-8, pages 35-40 and Figures 9-16, pages 41-50, respectively, of the study report. Since it was stated that soil samples treated with [indanone-1-^{14}C]indoxacarb were analyzed for parent compound, quantitative data for these samples should have been included in the study report.

15. Complete details of the LSC and HPLC methodology were not reported. The limit of detection (LOD) for HPLC analysis was not reported. The limit of quantification (LOQ) for LSC and HPLC analyses were not reported. It is necessary that both limits of detection and quantification be reported to allow the reviewer to evaluate the adequacy of the test method for the determination of the parent compound and its transformation products.

16. The analytically measured concentrations of the test substances used in the definitive study were not reported.

17. The concentration of the co-solvent, acetonitrile, was not reported (p. 16). Insufficient information was provided in the study report for the reviewer to determine the concentration of acetonitrile in the test solutions.

18. Based on the mean K_{oc} values for [indanone-1-^{14}C]indoxacarb and [trifluoromethoxyphenyl-U-^{14}C]indoxacarb, the study author concluded that indoxacarb was slightly mobile to immobile, and [methylene-^{14}C]-labeled IN-JT333 was immobile in the four test soils (p. 21; Appendix 2, p. 59).

19. IN-JT333, the transformation product of indoxacarb that was tested in this study, is the major transformation product in an aerobic soil metabolism study (p. 13; MRID 45795803; reviewed in this submission).

20. Indoxacarb is poorly soluble and degrades rapidly in aqueous solution under simulated sunlight (p. 13). The maximum solubility of indoxacarb in pH 5 buffer at 20°C is 15 ppb. Indoxacarb undergoes hydrolysis with the rate of hydrolysis increasing as the pH increases.

21. The maximum proposed field application rate for indoxacarb was not reported in the study report. Subdivision N guidelines specify that one test concentration should be roughly equivalent to the maximum proposed or registered field application rate of the parent compound.

22. Linear sorption equations for indoxacarb and IN-JT333 on the four test soils are presented as Figure 17 and 18, respectively, of the study report (pp. 51-54).

23. The study authors concluded that the adsorption K_d values for indoxacarb and IN-JT333 do not appear to correlate well with the % sand, % silt, % clay, pH, cation exchange capacity or % organic carbon of the test soils, indicating that the mobility of both compounds lacked a significant relationship with any soil characteristic (pp. 21-22). The lack of correlation between the mean adsorption K_d values for indoxacarb and IN-JT333 versus the percent organic carbon content of the test soils is depicted in Figure 19 of the study report (p. 55).

24. In aqueous phase samples of [indanone-1-^{14}C]indoxacarb-treated Chino loam soil samples that were combined and extracted with methylene chloride prior to LC-MS analysis, the presence of [^{14}C]indoxacarb as a major compound was confirmed, and trace amounts of IN-JT333 were detected (p. 22). The transformation product IN-ML438 was also identified in the samples, and although it was not present in high enough concentrations to be confirmed, a standard of IN-ML438 confirmed the retention time and fragmentation pattern.

25. Raw data for the [indanone-1-^{14}C]indoxacarb and [trifluoromethoxyphenyl-U-^{14}C]indoxacarb treated Myaka sand soil study results are presented in Appendix 4 of the study report (pp. 62-65).

26. Various revisions made to the text and tables of the original study report for clarification purposes are listed on pages 11-12 of this study report.

27. The study author did not discuss the stereochemistry of indoxacarb and JT333 and its impact on adsorption-desorption in soil. Chemical methods employed in the study were not capable of differentiating enantiomers of indoxacarb and JT333.

V. REFERENCES:

1. U.S. Environmental Protection Agency. 1982. Pesticide Assessment Guidelines, Subdivision N, Chemistry: Environmental Fate, Section 163-1. Mobility studies. Office of Pesticide and Toxic Substances, Washington, DC. EPA 540/9-82-021.

2. U.S. Environmental Protection Agency. 1989. FIFRA Accelerated Reregistration, Phase 3 Technical Guidance. Office of the Prevention, Pesticides, and Toxic Substances, Washington, DC. EPA 540/09-90-078.

3. U.S. Environmental Protection Agency. 1993. Pesticide Registration Rejection Rate Analysis - Environmental Fate. Office of the Prevention, Pesticides, and Toxic Substances, Washington, DC. EPA 738.

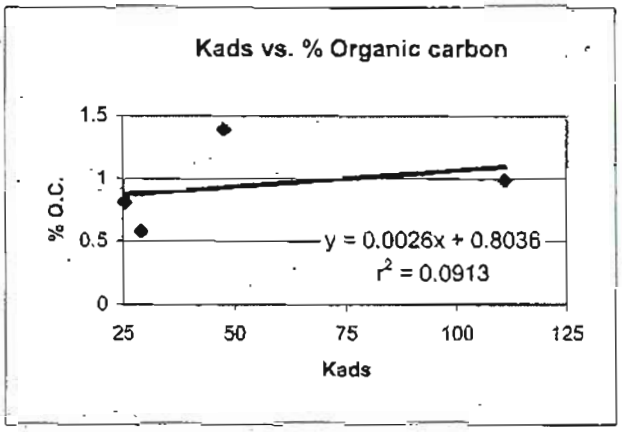
4. U.S. Environmental Protection Agency. 2003. Guidance for Calculating Sorption Coefficients in Batch Equilibrium Studies.

Attachment 1

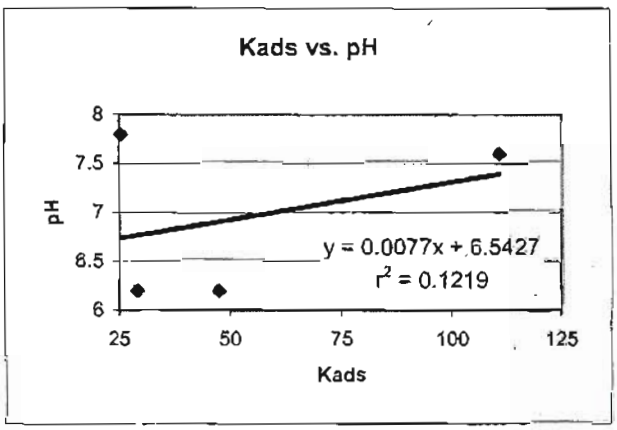
Excel Spreadsheets

Chemical: [Indanone-1-^{14}C]indoxacarb
PC Code: 067710
MRID: 45795809
Guideline No: 163-1

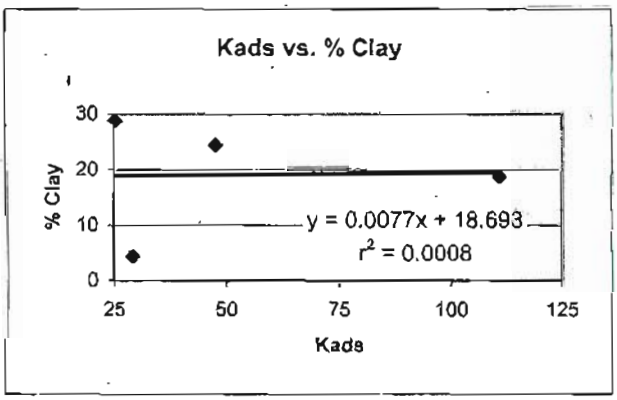
Soil	Kads	% organic carbon
Sand	29.1	0.58
Sandy clay loam	25.3	0.812
Loam	110.9	0.986
Silt loam	47.5	1.392



Soil	Kads	pH
Sand	29.1	6.2
Sandy clay loam	25.3	7.8
Loam	110.9	7.6
Silt loam	47.5	6.2



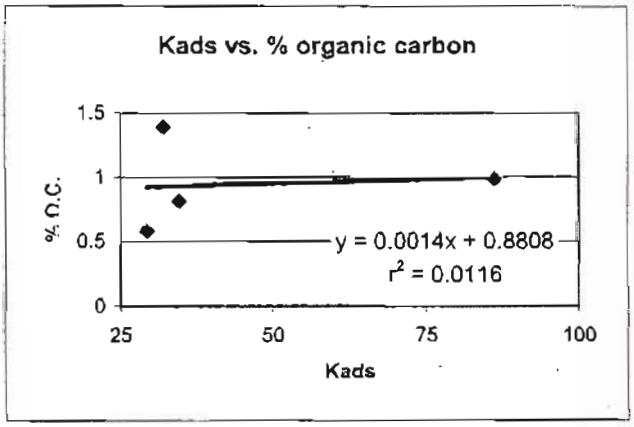
Soil	Kads	% clay
Sand	29.1	4.4
Sandy clay loam	25.3	28.8
Loam	110.9	18.8
Silt loam	47.5	24.4



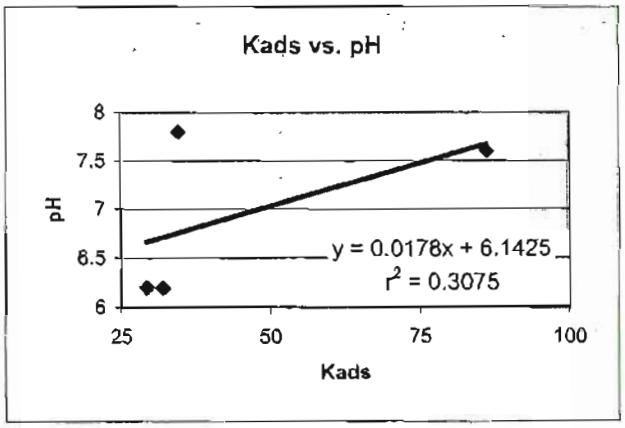
Data were obtained from Table 1, p. 24 and Tables 4-7, pp. 27-30 of the study report.

Chemical: [Trifluoromethoxyphenyl-U-^{14}C]indoxacarb
PC Code: 067710
MRID: 45795809
Guideline No: 163-1

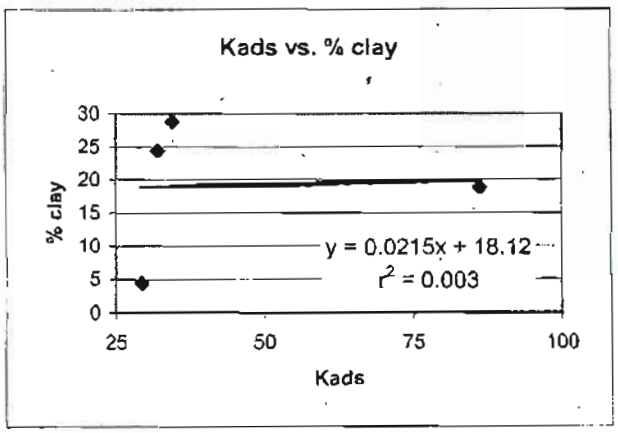
Soil	Kads	% organic carbon
Sand	29.3	0.58
Sandy clay loam	34.5	0.812
Loam	86.1	0.986
Silt loam	32	1.392



Soil	Kads	pH
Sand	29.3	6.2
Sandy clay loam	34.5	7.8
Loam	86.1	7.6
Silt loam	32	6.2



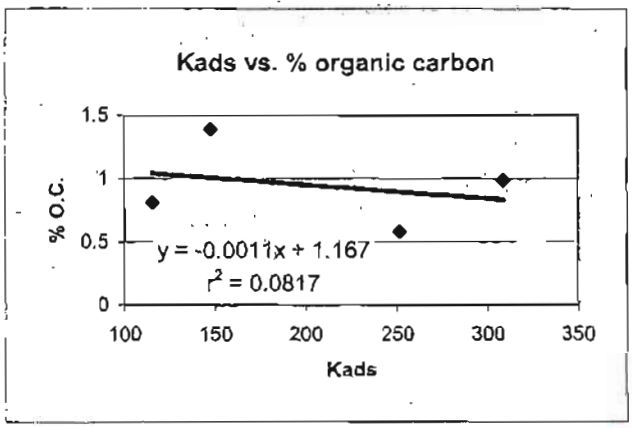
Soil	Kads	% clay
Sand	29.3	4.4
Sandy clay loam	34.5	28.8
Loam	86.1	18.8
Silt loam	32	24.4



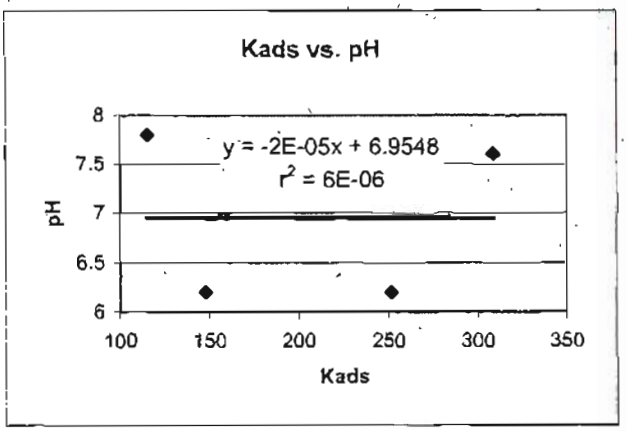
Data were obtained from Table 1, p. 24 and Tables 4-7, pp. 27-30 of the study report.

Chemical: [Methylene-^{14}C]IN-JT333
PC Code: 067710
MRID: 45795809
Guideline No: 163-1

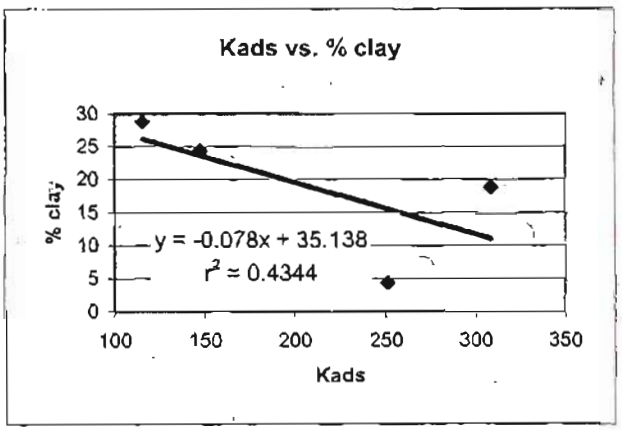
Soil	Kads	% organic carbon
Sand	251.3	0.58
Sandy clay loam	115.4	0.812
Loam	308.5	0.986
Silt loam	147.6	1.392



Soil	Kads	pH
Sand	251.3	6.2
Sandy clay loam	115.4	7.8
Loam	308.5	7.6
Silt loam	147.6	6.2



Soil	Kads	% clay
Sand	251.3	4.4
Sandy clay loam	115.4	28.8
Loam	308.5	18.8
Silt loam	147.6	24.4



Data were obtained from Table 1, p. 24 and Table 8, p. 31 of the study report.

Chemical: [Indanone-1-^{14}C]indoxacarb
PC Code: 067710
MRID: 45795809
Guideline No: 163-1

Table 4/6 Adsorption soil

	Silt loam
0.12	0.0788
0.12	0.1029
0.12	0.0907
AVG	0.0908
STDEV	0.01

Data were obtained from Table 7, p. 30 of the study report.

Table 5 Adsorption supernatant

	Sand	Sandy clay loam	Loam
0.06	18	23	10
0.075	21	26	13
0.1	23	30	14
0.15	39	39	18
0.3	50	48	28
AVG	30.2	33.2	16.6
STDEV	13.74	10.23	6.99

Table 5 Adsorption supernatant

	Silt loam
0.067	12
0.12	31
0.12	29
0.12	31
0.257	39
0.6	47
0.90	74
1.40	68
AVG	41.38
STDEV	20.85

Table 5 Extracted

	Sand	Sandy clay loam	Loam
0.06	77	68	82
0.075	80	70	86
0.1	61	61	83
0.15	70	60	83
0.3	42	40	70
AVG	66	59.8	80.8
STDEV	15.28	11.88	6.22

Table 5 Extracted

	Silt loam
0.067	61
0.12	69
0.12	80
0.12	64
0.257	44
0.6	26
0.90	24
1.40	18
AVG	48.25
STDEV	23.50

Data were obtained from Table 10, p. 33 of the study report.

Chemical: [Indanone-1-^{14}C]indoxacarb
PC Code: 067710
MRID: 45795809
Guideline No: 163-1

Table 5 Combusted

	Sand	Sandy clay loam	Loam
0.06	3	7	9
0.075	3	6	8
0.1	2	4	6
0.15	1	3	4
0.3	-	-	-
AVG	2.25	5	6.75
STDEV	0.96	1.83	2.22

Table 5 Combusted

	Silt loam
0.067	5
0.12	6
0.12	6
0.12	6
0.257	-
0.6	-
0.90	-
1.40	-
AVG	5.75
STDEV	0.50

Table 5 Recovery

	Sand	Sandy clay loam	Loam
0.06	99	98	101
0.075	104	102	107
0.1	86	95	102
0.15	110	102	105
0.3	92	88	97
AVG	98.2	97	102.4
STDEV	9.50	5.83	3.65

Table 5 Recovery

	Silt loam
0.067	78
0.12	105
0.12	116
0.12	100
0.257	83
0.6	72
0.90	99
1.40	85
AVG	92.25
STDEV	15.04

Data were obtained from Table 10, p. 33 of the study report.

Table 4/6 Adsorption supernatant

	Silt loam
0.12	0.00175
0.12	0.00187
0.12	0.00186
AVG	0.00182667
STDEV	0.00

Data were obtained from Table 7, p. 30 of the study report.

Chemical: [Indanone-1-^{14}C]indoxacarb
PC Code: 067710
MRID: 45795809
Guideline No: 163-1

Table 6 % Adsorption

	Silt loam
0.12	75.58
0.12	85.75
0.12	65.67
AVG	75.67
STDEV	10.04

Data were obtained from Table 7, p. 30 of the study report.

Table 8a Kd

	Sand	Sandy clay loam	Loam		Silt loam
	22	24	90		32
	28	24	109		26
	29	24	133		28
	34	25	110		26
	33	20	122		45
AVG	29.2	23.4	112.8		55
					49
					43
				AVG	38

Data were obtained from Tables 4-7, pp. 27-30 of the study report.

Chemical: [Indanone-1-^{14}C]indoxacarb
PC Code: 067710
MRID: 45795809
Guideline No: 163-1

Myaka Sand- Adsorption

Initial soln concen (C_o) (ug/mL)	Volume of soln (V_o) (mL)	Concen in soln after equil (C_{eq}) (ug/mL)	Volume of soln (V_o) (mL)	Dry mass of sorbent (m) (g)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd	
0.012	25	0.00599	25	1	0.1503	25.08	
0.012	25	0.00401	25	2	0.0999	24.91	
0.012	25	0.00245	25	3	0.0796	32.48	
0.012	25	0.00204	25	4	0.0623	30.51	
0.012	25	0.00161	25	5	0.0520	32.27	
						29.05	AVG

Donna Sandy clay loam- Adsorption

Initial soln concen (C_o) (ug/mL)	Volume of soln (V_o) (mL)	Concen in soln after equil (C_{eq}) (ug/mL)	Volume of soln (V_o) (mL)	Dry mass of sorbent (m) (g)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd	
0.012	25	0.00523	25	1	0.1693	32.36	
0.012	25	0.00423	25	2	0.0971	22.96	
0.012	25	0.00293	25	3	0.0756	25.80	
0.012	25	0.00248	25	4	0.0595	23.99	
0.012	25	0.00229	25	5	0.0486	21.20	
						25.26	AVG

Chino Loam- Adsorption

Initial soln concen (C_o) (ug/mL)	Volume of soln (V_o) (mL)	Concen in soln after equil (C_{eq}) (ug/mL)	Volume of soln (V_o) (mL)	Dry mass of sorbent (m) (g)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd	
0.012	25	0.00269	25	1	0.2328	86.52	
0.012	25	0.0013	25	2	0.1338	102.88	
0.012	25	0.00069	25	3	0.0943	136.59	
0.012	25	0.00067	25	4	0.0708	105.69	
0.012	25	0.00047	25	5	0.0577	122.66	
						110.87	AVG

Tama Silt loam- Adsorption

Initial soln concen (C_o) (ug/mL)	Volume of soln (V_o) (mL)	Concen in soln after equil (C_{eq}) (ug/mL)	Volume of soln (V_o) (mL)	Dry mass of sorbent (m) (g)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd	
0.012	25	0.0087	25	0.214	0.3855	44.31	
0.012	25	0.00954	25	0.333	0.1847	19.36	
0.012	25	0.00568	25	0.5	0.3160	55.63	
0.012	25	0.00482	25	1.167	0.1538	31.91	
0.012	25	0.00175	25	2.5	0.1025	58.57	
0.012	25	0.00187	25	2.5	0.1013	54.17	
0.012	25	0.00186	25	2.5	0.1014	54.52	
0.012	25	0.00099	25	4.5	0.0612	61.78	
						47.53	AVG

Data were obtained from Tables 4-7, pp. 27-30 of the study report.

Chemical: [Trifluoromethoxyphenyl-U-^{14}C]indoxacarb
PC Code: 067710
MRID: 45795809
Guideline No: 163-1

Myaka Sand- Adsorption

Initial soln concen (C_o) (ug/mL)	Volume of soln (V_o) (mL)	Concen in soln after equil (C_{eq}) (ug/mL)	Volume of soln (V_o) (mL)	Dry mass of sorbent (m) (g)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd	
0.012	25	0.00542	25	1	0.1645	30.35	
0.012	25	0.0042	25	2	0.0975	23.21	
0.012	25	0.00284	25	3	0.0763	26.88	
0.012	25	0.00212	25	4	0.0618	29.13	
0.012	25	0.00143	25	5	0.0529	36.96	
						29.31	AVG

Donna Sandy clay loam- Adsorption

Initial soln concen (C_o) (ug/mL)	Volume of soln (V_o) (mL)	Concen in soln after equil (C_{eq}) (ug/mL)	Volume of soln (V_o) (mL)	Dry mass of sorbent (m) (g)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd	
0.012	25	0.00549	25	1	0.1628	29.64	
0.012	25	0.00353	25	2	0.1059	29.99	
0.012	25	0.0023	25	3	0.0808	35.14	
0.012	25	0.0017	25	4	0.0644	37.87	
0.012	25	0.00134	25	5	0.0533	39.78	
						34.49	AVG

Chino Loam- Adsorption

Initial soln concen (C_o) (ug/mL)	Volume of soln (V_o) (mL)	Concen in soln after equil (C_{eq}) (ug/mL)	Volume of soln (V_o) (mL)	Dry mass of sorbent (m) (g)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd	
0.012	25	0.00291	25	1	0.2273	78.09	
0.012	25	0.0017	25	2	0.1288	75.74	
0.012	25	0.00107	25	3	0.0911	85.12	
0.012	25	0.00088	25	4	0.0695	78.98	
0.012	25	0.00051	25	5	0.0575	112.65	
						86.12	AVG

Tama Silt loam- Adsorption

Initial soln concen (C_o) (ug/mL)	Volume of soln (V_o) (mL)	Concen in soln after equil (C_{eq}) (ug/mL)	Volume of soln (V_o) (mL)	Dry mass of sorbent (m) (g)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd	
0.012	25	0.00949	25	0.214	0.2932	30.90	
0.012	25	0.00912	25	0.333	0.2162	23.71	
0.012	25	0.00668	25	0.5	0.2660	39.82	
0.012	25	0.00531	25	1.167	0.1433	26.99	
0.012	25	0.00151	25	4.5	0.0583	38.59	
						32.00	AVG

Data were obtained from Tables 4-7, pp. 27-30 of the study report.

Chemical: [Methylene-^{14}C]IN-JT333
PC Code: 067710
MRID: 45795809
Guideline No: 163-1

Myaka Sand- Adsorption

Initial soln concen (C_o) (ug/mL)	Volume of soln (V_o) (mL)	Concen in soln after equil (C_{eq}) (ug/mL)	Volume of soln (V_o) (mL)	Dry mass of sorbent (m) (g)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd	
0.012	25	0.00221	25	1	0.2448	110.75	
0.012	25	0.00179	25	1	0.2553	142.60	
0.012	25	0.00014	25	5	0.0593	423.57	
0.012	25	0.00018	25	5	0.0591	328.33	
						251.31	AVG

Donna Sandy clay loam- Adsorption

Initial soln concen (C_o) (ug/mL)	Volume of soln (V_o) (mL)	Concen in soln after equil (C_{eq}) (ug/mL)	Volume of soln (V_o) (mL)	Dry mass of sorbent (m) (g)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd	
0.012	25	0.00266	25	1	0.2335	87.78	
0.012	25	0.00272	25	1	0.2320	85.29	
0.012	25	0.00037	25	5	0.0582	157.16	
0.012	25	0.00044	25	5	0.0578	131.36	
						115.40	AVG

Chino Loam- Adsorption

Initial soln concen (C_o) (ug/mL)	Volume of soln (V_o) (mL)	Concen in soln after equil (C_{eq}) (ug/mL)	Volume of soln (V_o) (mL)	Dry mass of sorbent (m) (g)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd	
0.012	25	0.00092	25	1	0.2770	301.09	
0.012	25	0.00088	25	1	0.2780	315.91	
						308.50	AVG

Tama Silt loam- Adsorption

Initial soln concen (C_o) (ug/mL)	Volume of soln (V_o) (mL)	Concen in soln after equil (C_{eq}) (ug/mL)	Volume of soln (V_o) (mL)	Dry mass of sorbent (m) (g)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd	
0.012	25	0.00237	25	1	0.2408	101.58	
0.012	25	0.00217	25	1	0.2458	113.25	
0.012	25	0.00028	25	5	0.0586	209.29	
0.012	25	0.00035	25	5	0.0583	166.43	
						147.64	AVG

Data were obtained from Table 8, p. 31 of the study report.

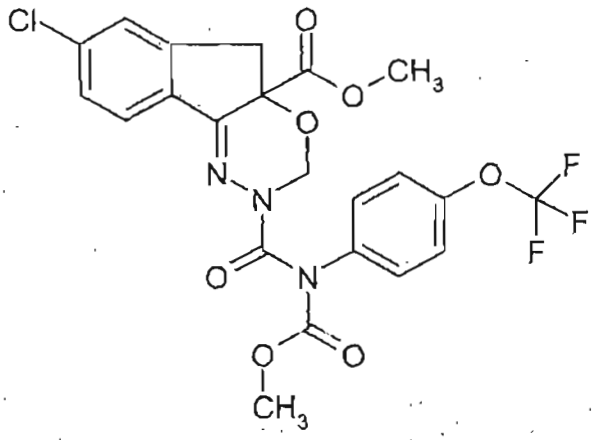
Attachment 2

Structures of Parent and Transformation Products

Indoxocarb (DPX-MP062; DPX-KN128; DPX-JW062)

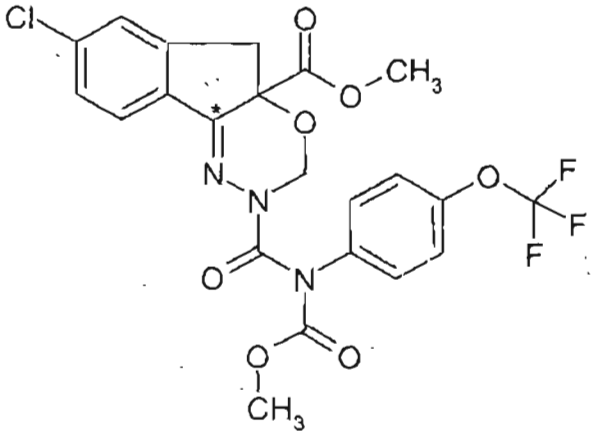
IUPAC name:	Methyl (S)-N-[7-chloro-2,3,4a,5-tetrahydro-4a-(methoxycarbonyl)indeno[1,2-e][1,3,4]oxadiazin-2-ylcarbonyl]-4'-(trifluoromethoxy)carbanilate Methyl (S)-7-chloro-2,3,4a,5-tetrahydro-2-[methoxycarbonyl(4-trifluoromethoxyphenyl)carbamoyl]indeno[1,2-e][1,3,4]oxadiazine-4a-carboxylate
CAS name:	Methyl (4aS)-7-chloro-2,5-dihydro-2-[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate
CAS No:	173584-44-6 (S enantiomer); 144171-61-9 (racemic mixture)

Unlabeled

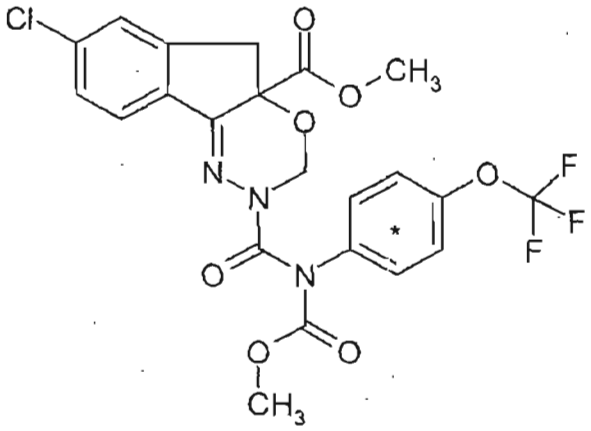


DPX-JW062

[Indanone-1-^{14}C] label



[Trifluoromethoxyphenyl(U)-^{14}C] label

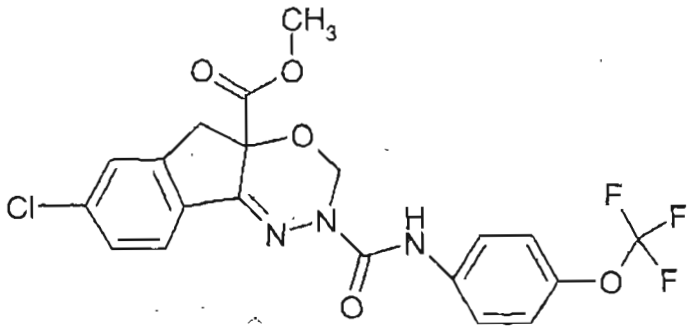


* Position of the radiolabel.

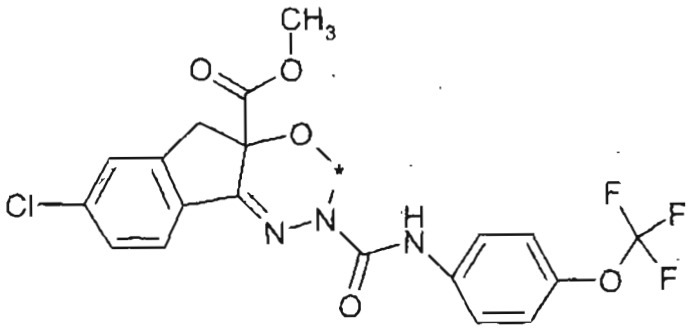
DPX-JT333 (IN-JT333)

IUPAC name:	7-Chloro-2-(4-trifluoromethoxy-phenylcarbamoyl)-2,5,-dihydro-indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylic acid methyl ester
CAS name:	Methyl 7-chloro-2,5-dihydro-2-[[[4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate
CAS No:	144171-39-1

Unlabeled



[Methylene-^{14}C] label

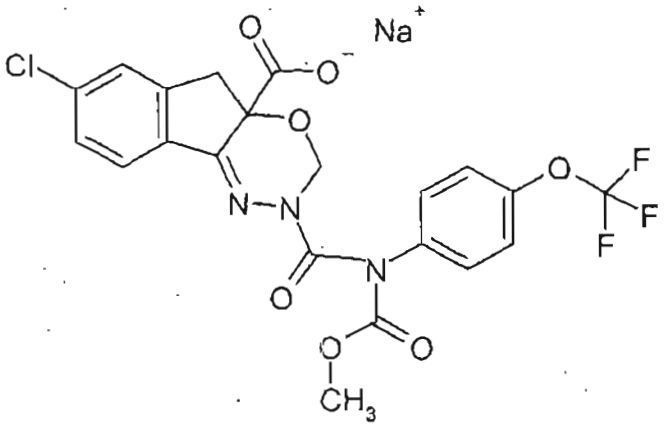


* Position of the radiolabel.

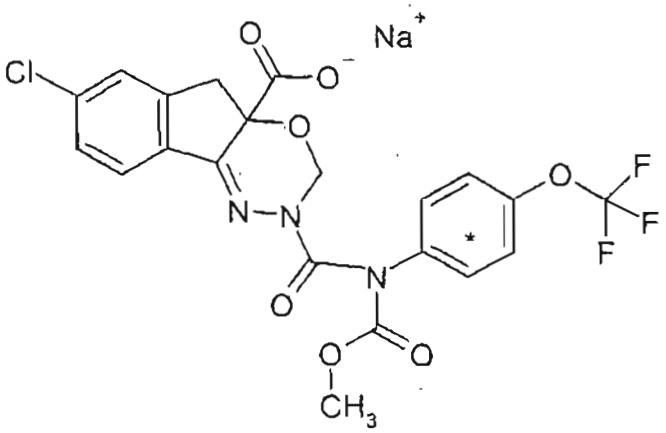
IN-KT413

IUPAC name: NA
CAS name: Sodium 7-chloro-2,5,-dihydro-2-[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylic acid
CAS No: NA

Unlabeled



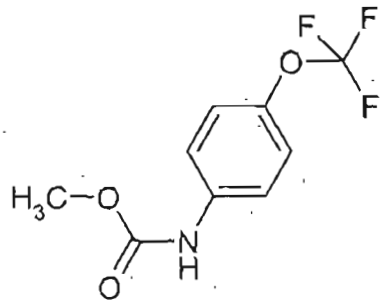
[Trifluoromethoxyphenyl-^{14}C] label



* Position of the radiolabel.

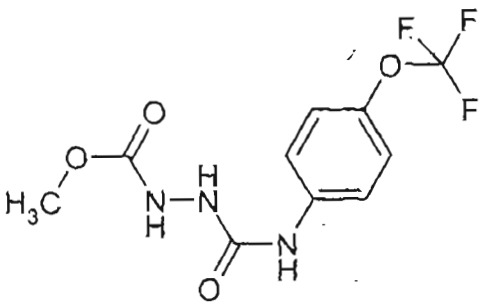
IN-KB687

IUPAC name: NA
CAS name: Methyl [4-(trifluoromethoxy)phenyl]carbamate
CAS No: 177905-10-1



IN-MF014

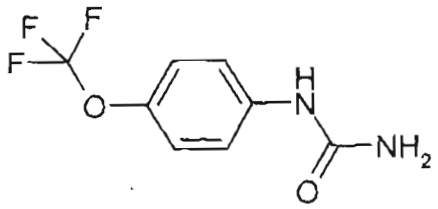
IUPAC name: NA
CAS name: Methyl 2-[[[4-(trifluoromethoxy)phenyl]amino]carbonyl]hydrazine carboxylate
CAS No: NA



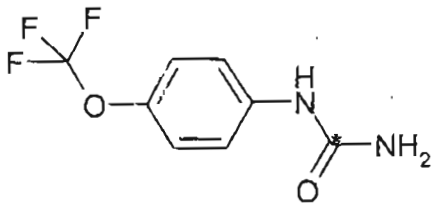
IN-MK638

IUPAC name: NA
CAS name: [4-(Trifluoromethoxy)phenyl]urea
CAS No: 82971-90-2

Unlabeled



[Carbonyl-^{14}C] label



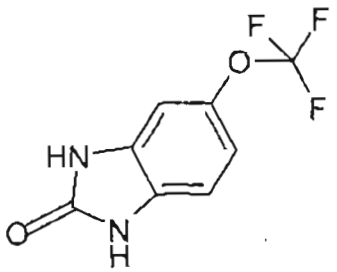
* Position of the radiolabel.

IN-MK643

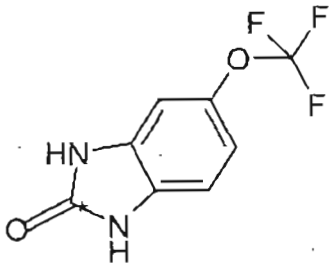
IUPAC name: NA
CAS name: 1,3-Dihydro-5-(trifluoromethoxy)-2H-benzimidazol-2-one
CAS No: NA

Unlabeled

[Carbonyl-^{14}C] label



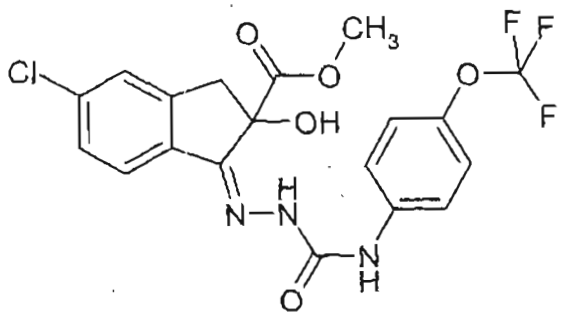
* Position of the radiolabel.



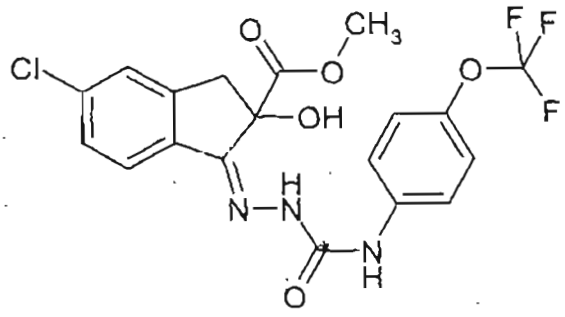
IN-JU873

IUPAC name:	NA
CAS name:	Methyl 5-chloro-2,3-dihydro-2-hydroxy-1-[[[[4-(trifluoromethoxy)phenyl]amino]carbonyl]hydrazono]-1H-indene-2-carboxylate
CAS No:	144172-25-8

Unlabeled



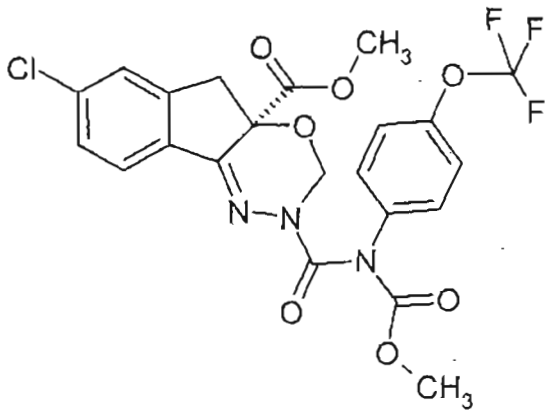
[Urea carbonyl-^{14}C] label



* Position of the radiolabel.

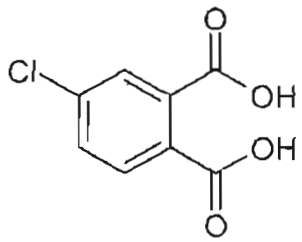
IN-KN127

IUPAC name: NA
CAS name: (R)-methyl 7-chloro-2,5-dihydro-2-[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate
CAS No: NA



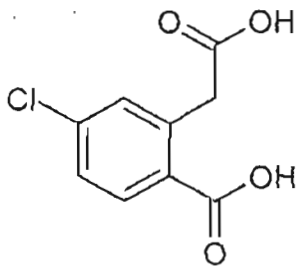
IN-C0639

IUPAC name: NA
CAS name: 4-Chloro-1,2-benzenedicarboxylic acid
CAS No: NA



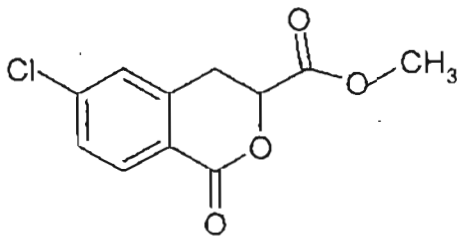
IN-MA573

IUPAC name: NA
CAS name: 2-Carboxy-5-chloro benzeneacetic acid
CAS No: NA



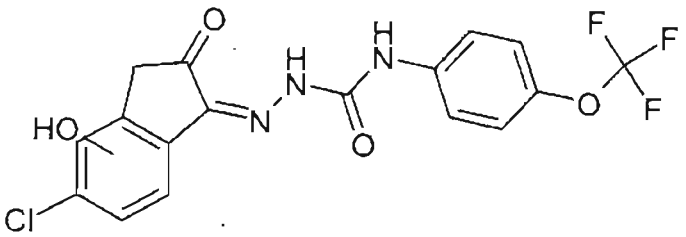
IN-MH304

IUPAC name: NA
CAS name: Methyl 6-chloro-3,4-dihydro-1-oxo-1H-2-benzopyran-3-carboxylate
CAS No: NA



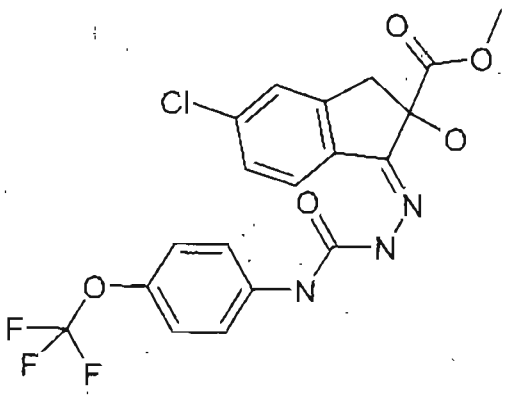
IN-ML437 Hydroxide

IUPAC name: NA
CAS name: NA
CAS No: NA



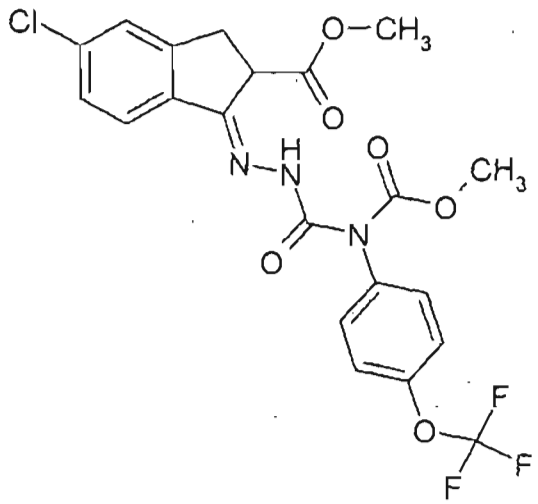
IN-MN969 (E isomer)

IUPAC name: NA
CAS name: NA
CAS No: NA



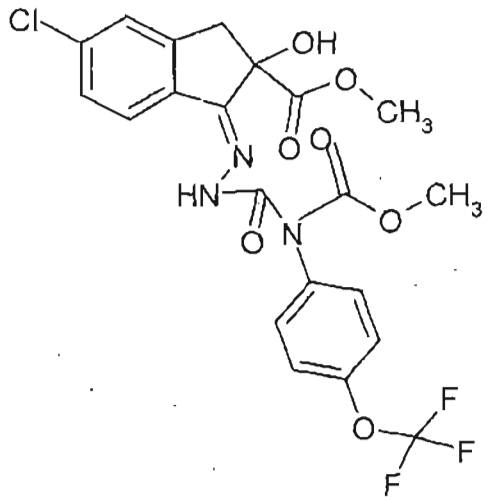
IN-MJ986

IUPAC name: NA
CAS name: Methyl 5-chloro-1-[[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino]carbonyl]hydrazono]-1H-indene-2-carboxylate
CAS No: NA



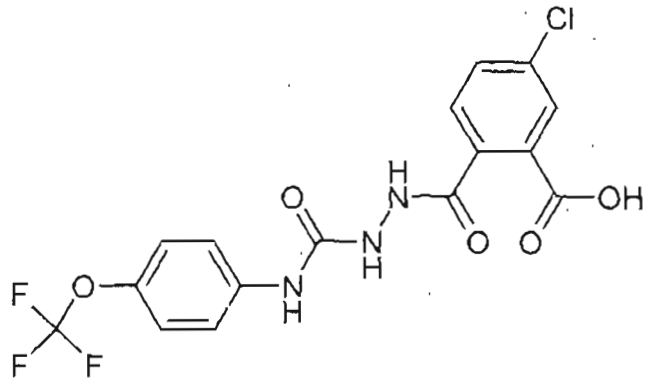
IN-KT319

IUPAC name: NA
CAS name: (E)-methyl 5-chloro-2,3-dihydro-2-hydroxy-1-[[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino]carbonyl]hydrazono]-1H-indene-2-carboxylate
CAS No: 177905-09-8 (E,Z- isomer mixture)



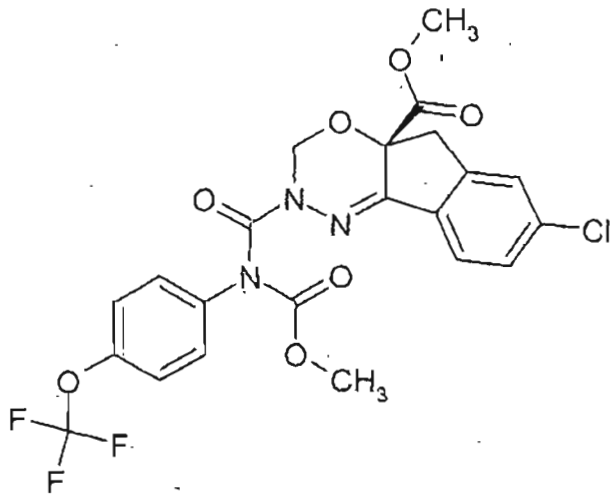
IN-ML811

IUPAC name: NA
CAS name: 4-Chloro-1,2-benzenedicarboxylate 1-[2-[[[4-trifluoromethoxy)phenyl]amino]carbonyl]hydrazide] mixed 1:1 with 4-Chloro-1,2-benzenedicarboxylate 2-[2-[[[4-(trifluoromethoxy)phenyl]amino]carbonyl]hydrazide]
CAS No: NA



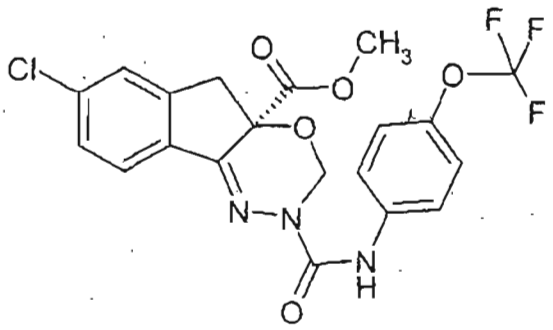
DPX-KN128 [(S)-(+) enantiomer of DPX-JW062]

IUPAC name: NA
CAS name: (S)-methyl 7-chloro-2,5-dihydro-2-[[(methoxycarbonyl-4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate
CAS No: 17354-44-6



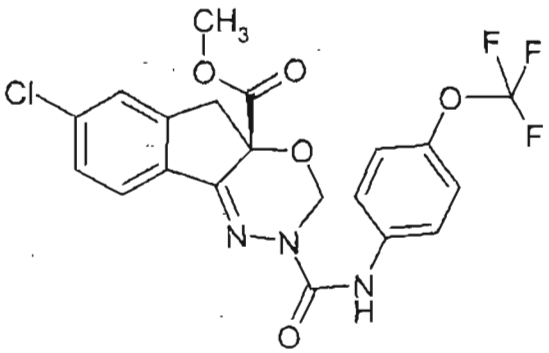
IN-IN-KN124 [(R)-(+) isomer of IN-JT333]

IUPAC name:	NA
CAS name:	(R)-methyl 7-chloro-2,5-dihydro-2-[[[4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate
CAS No:	144171-39-1 (racemic mixture)



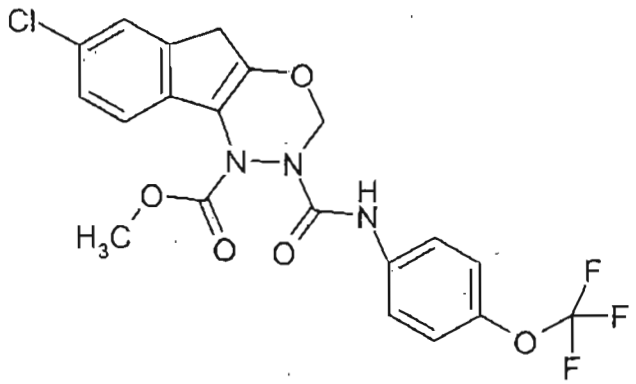
IN-KN125 [(S)-(-) isomer of IN-JT333]

IUPAC name:	NA
CAS name:	(S)-methyl 7-chloro-2,5-dihydro-2-[[[4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate
CAS No:	144171-39-1 (racemic mixture)



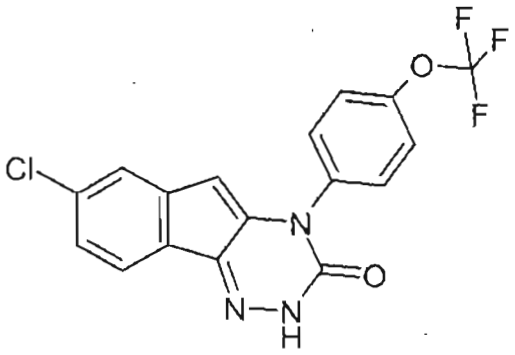
IN-MP819

IUPAC name: NA
CAS name: Methyl 7-chloro-3,5-dihydro-2-[[[4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno-[1,2-e][1,3,4]oxadiazine-1(2H)-carboxylate
CAS No: NA



IN-ML438

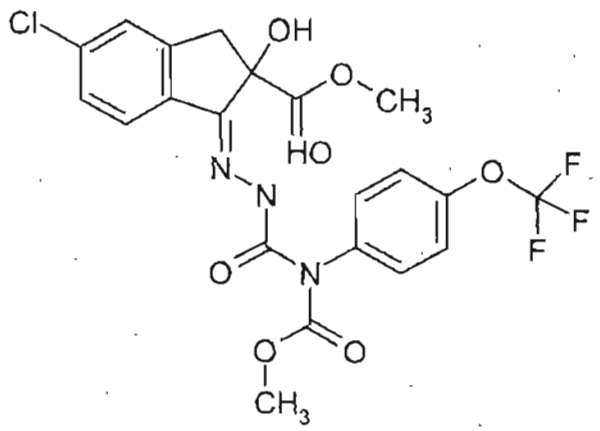
IUPAC name: NA
CAS name: 7-Chloro-2,4-dihydro-4-[4-(trifluoromethoxy)phenyl]-3H-indeno[2,1-e]-1,2,4-triazin-3-one
CAS No: NA



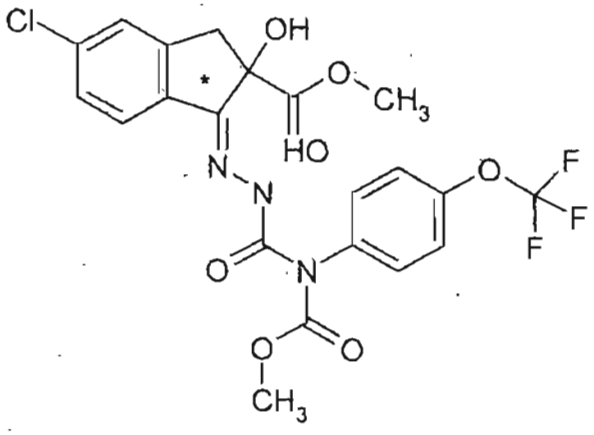
IN-KG433

IUPAC name:	5-Chloro-2-hydroxy-1-[4-(methoxycarbonyl)-4-(trifluoro-methoxy-phenyl)-semicarbazono]-indan-2-carboxylic acid methyl ester
CAS name:	Methyl 5-chloro-2,3-dihydro-2-hydroxy-1-[[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino]carbonyl]hydrazono]-1H-indene-2-carboxylate
CAS No:	177905-09-8 (E,Z- isomer mixture)

Unlabeled



[Indanone-U-^{14}C] label



* Position of the radiolabel.