IMAGE 1

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

OFFICE OF
PREVENTION, PESTICIDES, AND
TOXIC SUBSTANCES

MEMORANDUM

DATE: 19-JAN-2000

SUBJECT: PP# 8F04948. DP Barcodes: D244253, D244460, D245424, D248057. New Chemical - **Indoxacarb (DPX-MP062) in/on Brassica, Sweet Corn, Cotton, Fruiting Vegetables, Lettuce (Head and Leaf) and Pome Fruits. Evaluation of Residue Data and Analytical Methods**. Chemical No. 067710. Case No. 289487. Submission Nos.: S546511, S539237. MRID#s: 44477101-44477112, 44477317, 44477318, 44477321 - 44477344, 44477401 - 44477417, 44583301, 44815204, 44815801 - 44815803, 44815805 - 44815808, 44491704.

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THROUGH: George F. Kramer, Ph.D., Chemist
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TO: Dan Peacock/Arnold Layne (PM Team 03)
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Attached is the review of a petition from Du Pont requesting the establishment of permanent tolerances for residues of the insecticide indoxacarb (DPX-MP062) in/on pome fruits, *brassicas*, cotton, lettuce, fruiting vegetables, sweet corn, meat and milk. The primary review was performed by Dynamac Corporation under the supervision of the Health Effects Division (HED). The data assessment has undergone secondary review within Registration Action Branch 1 (RAB1) and HED's Chemistry Science Advisory Council (ChemSAC). The assessment has been revised to reflect current HED policy.

EXECUTIVE SUMMARY OF CHEMISTRY DEFICIENCIES

- Product chemistry data for 830.1550, 830.1600, 830.1620, 830.1650, 830.1670, 830.6313.
- Revised Section B.
- Determination of the residues of toxicological concern by the HED Metabolism Assessment Review Committee (MARC).
- A poultry feeding study.
- Confirmatory method for plants.
- Specificity testing for analytical methods for plants.
- Receipt of analytical methodology standards to EPA repository.
- Storage stability data, reflecting the maximum frozen storage intervals of various raw agricultural commodities (RACs) and processed samples.
- Revised Section F as follows:

Tolerances are proposed for residues of the insecticide indoxacarb [(R,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] in or on the following RACs:

Apple, pomace (wet)	3.0 ppm
Apple	1.0 ppm
Pear	0.1 ppm
Brassica, head and stem, subgroup	5.0 ppm
Cotton, undelinted seed	2.0 ppm
Cotton gin byproducts	10.0 ppm
Lettuce, leaf	10.0 ppm
Lettuce, head	4.0 ppm
Vegetables, fruiting, group	0.50 ppm
Corn, sweet, kernel plus cob with husk removed	0.02 ppm
Corn, sweet, forage	10.0 ppm
Corn, sweet, stover	15.0 ppm
Cattle, goat, horse, sheep and swine meat	0.03 ppm
Milk	0.10 ppm
Cattle, goat, horse, sheep and swine meat byproducts	0.02 ppm

Tolerances are proposed for residues of the insecticide indoxacarb [(R,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], and its metabolite, IN-JT333 [methyl 7-chloro-2,5-dihydro-2-[[[4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate] in or on the following RACs:

Milk fat	3.0 ppm
Cattle, goat, horse, sheep and swine fat	0.75 ppm

cc (without attachment IIa): PP#8F04948, S.F, RF, S. Levy
RDI: ChemSAC (1/19/00), RAB1 Chemists (12/23/99; 1/6/00), G.F. Kramer (1/19/00), M. Morrow (1/20/00)
S. Levy:806T:CM#2:(703)305-0783:7509C:RAB1

Indoxacarb (DPX-MP062)
(DP Barcodes D244253, D244460, D245424 and D248057)

PP#8F04948: Evaluation of Product and Residue Chemistry Data to Support Permanent Tolerances for Use of DPX-MP062 on *Brassica* (Head and Stem) Vegetables, Corn (Sweet), Cotton, Fruiting Vegetables, Lettuce (Head and Leaf), and Pome Fruits

May 26, 1998

Contract No. 68-D4-0010

Submitted to:
U.S. Environmental Protection Agency
Arlington, VA

Submitted by:
Dynamac Corporation
The Dynamac Building
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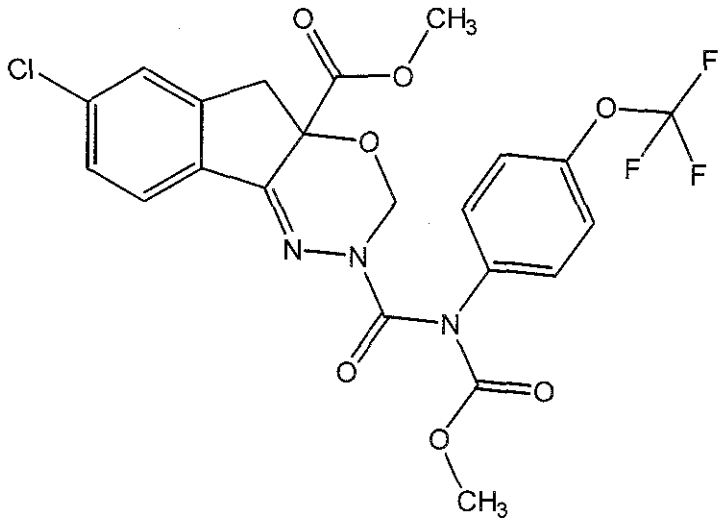
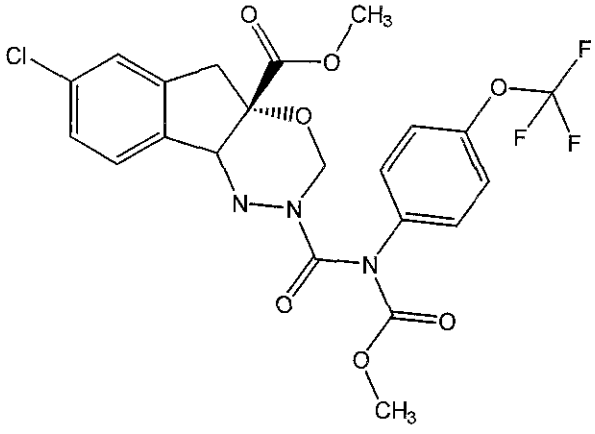
Rockville, MD 20850-3268

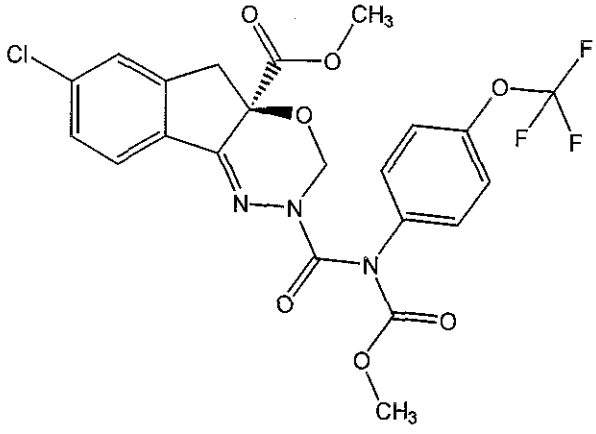
DPX-MP062



DPX-MP062



DPX-KN128 (S-Active Enantiomer)



IN-KN127 (R-Inactive Enantiomer)

PP#8F04948: EVALUATION OF PRODUCT AND RESIDUE CHEMISTRY DATA TO SUPPORT PERMANENT TOLERANCES FOR USE OF INDOXACARB IN/ON *BRASSICA* (HEAD AND STEM) VEGETABLES, CORN (SWEET), COTTON, FRUITING VEGETABLES, LETTUCE (HEAD AND LEAF), AND POME FRUITS

(DP BARCODES D244253, D244460, D245424 and D248057)

INTRODUCTION

E.I. du Pont de Nemours and Company has submitted a petition for the establishment of tolerances for residues of a new insecticide, DPX-MP062 (proposed common name indoxacarb), in/on various crop commodities, meat, and milk. Concurrently, the petitioner is requesting Section 3 registrations for two end-use products containing DPX-MP062: a 30% water dispersible granular formulation and a 1.25 lb/gal soluble concentrate formulation. The current petition was submitted as part of a combined reduced risk application for the registration of DPX-MP062. The insecticide belongs to the oxadiazine chemical family and is being registered for the control of lepidopterous pests in the larval stages. Insecticidal activity occurs via blockage of the sodium channels in the insect nervous system and mode of entry is via stomach and contact routes.

Indoxacarb [(R,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] is a 75:25 mixture of two enantiomers: S-indoxacarb, which is insecticidally active, and R-indoxacarb, which is insecticidally inactive (alternately identified by the petitioner as DPX-KN128 and IN-KN127, respectively). The petitioner is proposing the establishment of tolerances for residues of indoxacarb in/on the following RACs:

Apple, pomace (wet)	6.0 ppm
Pome fruit	2.0 ppm
Head & Stem *Brassicas*	10.0 ppm
Cottonseed	3.0 ppm
Cotton gin trash	15.0 ppm
Leaf lettuce	20.0 ppm
Head lettuce	7.0 ppm
Fruiting vegetables	0.70 ppm
Sweet corn kernel	0.02 ppm
Sweet corn forage	20.0 ppm
Sweet corn stover	25.0 ppm
Meat	0.02 ppm
Milk	0.10 ppm
Cattle kidney	0.05 ppm

The petitioner is also proposing the establishment of tolerances for residues of the DPX-MP062 active ingredient, S-indoxacarb [(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], and its metabolite, IN-JT333 [methyl 7-chloro-2,5-dihydro-2-[[[4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate], as follows:

Milk fat	0.75 ppm
Cattle fat	0.75 ppm

Several of the studies submitted in support of registration of indoxacarb were conducted using DPX-JW062, an insecticide which contains a racemic mixture of S-indoxacarb:R-indoxacarb (50:50). The petitioner noted that subsequent manufacturing process improvements led to the

production of DPX-MP062, which has been enriched to 75:25 for S-indoxacarb. HED approved a protocol submitted by Du Pont which outlined plans to use data developed with DPX-JW062 to support registration of DPX-MP062 (Memo, D223977, G. Kramer, 5/13/96). The plans for bridging DPX-JW062 residue trials for each crop involved two side-by-side trials performed with DPX-JW062 and DPX-MP062; data from these side-by-side trials are presented herein.

Because the insecticidal efficacy of DPX-MP062 is based on the concentration of S-indoxacarb, the petitioner normalized the application rates for the submitted studies on a S-indoxacarb basis. The residue analytical methods proposed for enforcement, as well as those used for data collection, do not distinguish between the enantiomers; therefore, residues are reported as the sum of S-indoxacarb and R-indoxacarb or "S-indoxacarb/R-indoxacarb." Residues of S-indoxacarb combined with R-indoxacarb, whether derived from DPX-MP062 or DPX-JW062, are referred to as S-indoxacarb/R-indoxacarb in this document.

CONCLUSIONS

OPPTS 830 Series GLNs: Product Properties

1. The following additional product chemistry data are required: (i) nominal concentrations must be identified for [redacted] impurities and [redacted] solvent listed on the CSF with upper certified limits; a revised CSF must be submitted; (ii) a description of the type of production equipment used and the duration of individual steps and the entire process are required; (iii) a discussion of the possible formation of post-production impurities resulting from degradation of the product or migration of packaging material into the product is required; (iv) data reflecting the stability of DPX-MP062 at normal and elevated temperatures and on exposure to metals and metal ions must be submitted.

OPPTS GLN 860.1200: Proposed Uses

2. The petitioner has adequately described the proposed uses of DPX-MP062 on *Brassica* vegetables (broccoli, cabbage, and cauliflower), corn (sweet), cotton, fruiting vegetables (bell and non-bell peppers and tomatoes), lettuce (head and leaf), and pome fruits (apples and pears). Crops that are registered under both labels may be planted immediately after harvest. Root crops or leafy vegetables which are not registered for use with DPX-MP062 are not to be planted for 30 days after last use. Crops not registered for use with DPX-MP062 are not to be planted for 120 days after last use. A revised Section B must be submitted for the 30% water-dispersible granular [WDG; Product Name = DPX-MP062 WG] and 1.25 lb/gal soluble concentrate [SC; Product Name = DPX-MP062 SC] formulations. These labels should be revised to specify that DPX-MP062 contains a mixture of S-indoxacarb (75% insecticidally active enantiomer) and R-indoxacarb (25% insecticidally inactive enantiomer). Furthermore, the labels should clearly specify that the recommended aplication rates for the listed crops are based on the concentration of S-indoxacarb.

OPPTS GLN 860.1300: Nature of the Residue in Plants

3a. Cotton: The cotton metabolism study is acceptable. Following a single application of [indanone-1-^{14}C]DPX-JW062 or uniformly ring labeled [trifluoromethoxyphenyl-^{14}C]DPX-JW062 at 0.223 lb ai/A (250 g ai/ha; 0.5x the maximum proposed seasonal rate) to cotton plants at the "COT 07 squaring" stage of growth (approximately 2 months old), the total radioactive residues (TRR, expressed as DPX-JW062 equivalents) in/on whole cotton plants declined from 7.069-13.596 ppm at Day 0 to 0.019-0.053 ppm at Day 90. The total radioactivity in mature cottonseed was 0.005-0.007 ppm. Unaltered DPX-JW062 was the only radioactive residue identified in/on whole cotton plants, accounting for 60.5-98.2% of the total radioactivity.

3b. Lettuce: The lettuce metabolism study is acceptable. Following a single application of [indanone-1-^{14}C]DPX-JW062 or uniformly ring-labeled [trifluoromethoxyphenyl-^{14}C]DPX-JW062 at 0.223 lb ai/A (250 g ai/ha; 0.9x the maximum proposed seasonal rate) to lettuce plants at the 4- to 5-leaf stage, the TRR (expressed as DPX-JW062 equivalents) in/on lettuce plants declined from 10.842-11.188 ppm at Day 0 to 0.202-0.471 ppm at Day 35. DPX-JW062 was the only significant radioactive residue identified in/on lettuce, accounting for 91.2-106.5% of the total radioactivity.

3c. Tomato: The tomato metabolism study is acceptable. Following four foliar applications to tomato plants of uniformly ring-labeled [trifluoromethoxyphenyl-^{14}C]DPX-JW062 at 0.06 lb ai/A/application (75 g ai/ha/application; 1x the maximum proposed seasonal rate) with a 6- to 10-day retreatment intervals, the TRR (expressed as DPX-JW062 equivalents) were 0.06-0.14 ppm in/on tomatoes and 4.23-11.35 ppm in/on leaves. DPX-JW062 was the only radioactive residue identified, accounting for 87.3-99.8% of the total radioactivity in/on tomatoes and 90.4-100.0% of the total radioactivity in/on leaves.

3d. Plant metabolism conclusions: The qualitative nature of the residue in plants is adequately understood based on acceptable studies conducted on cotton, lettuce, and tomatoes. The salient features of the studies will be presented to the HED Metabolism Assessment Review Committee (MARC) which will then determine the residues of toxicological concern. The Committee will determine the terminal residue of concern and the tolerance expression for plant commodities.

OPPTS GLN 860.1300: Nature of the Residue in Livestock

4a. Ruminants: The ruminant metabolism study is acceptable. Following oral administration of [indanone-1-^{14}C]DPX-JW062 or uniformly ring-labeled [trifluoromethoxyphenyl-^{14}C]DPX-JW062 to lactating cows for 5 consecutive days at 10 ppm (0.4x the maximum theoretical dietary burden [MTDB] for beef and dairy cattle), the TRR (expressed as DPX-JW062 equivalents), respectively, were, 0.112 and 0.057 in pooled milk, 0.537 and 0.689 ppm in liver, 0.365 and 0.288 ppm in kidney, 0.03-0.04 and 0.04-0.05 in muscle, and 0.03-1.1 and 0.06-1.1 ppm in fat. Following separation of pooled milk from the last sampling interval into cream and skim milk, there was concentration of residues in cream of 10-13x.

4b. The study sufficiently characterized/identified radioactive residues in milk and tissues. The parent, DPX-JW062, was the major residue found in all matrices and its % TRR distribution was as follows for IND-label and TMP-label samples, respectively: 25.0-77.9% and 49.1-63.1% in pooled milk, 7.1% and 11.4% in liver, 42.0% and 61.3% in kidney, 80.5% and 66.7% in perirenal fat, and 28.7% and 37.0% in foreleg muscle. Other metabolites were identified in milk and tissues at low concentrations: (i) IN-MP819 in milk (20.6-28.1% TRR, 0.016-0.023 ppm); (ii) 5-HO-DPX-JW062 in liver (6.0-9.1% TRR, 0.03-0.063 ppm) and kidney (6.3-12.8% TRR, 0.023-0.037 ppm); (iii) HO-DPX-JW062 glucuronide in liver (2.8-4.5% TRR, 0.019-0.024 ppm); (iv) IN-JT333 in perirenal fat (5.2-7.7% TRR, 0.06-0.08 ppm); (v) IN-KB687 in liver (3.2% TRR, 0.022 ppm); and (vi) IN-MN470 + IN-MF014 in liver (8.7% TRR, 0.060 ppm).

5a. Poultry: The poultry metabolism study is acceptable. Following oral administration of [indanone-1-^{14}C]DPX-JW062 or uniformly ring-labeled [trifluoromethoxyphenyl-^{14}C]DPX-JW062 to laying hens for five consecutive days at 10 ppm (16.7x the MTDB for poultry), the TRR (expressed as DPX-JW062 equivalents), respectively, were 0.03-0.10 and 0.02-0.05 ppm in egg white, 0.01-0.31 and 0.01-0.33 ppm in egg yolk, 0.45 and 0.51 ppm in fat, 0.21 and 0.25 ppm in skin with fat, 0.11 and 0.15 ppm in liver, 0.08 and 0.13 ppm in gizzard, 0.02 and 0.02 ppm in breast muscle, and 0.04 and 0.04 ppm in thigh muscle. Most of the radioactivity was readily extractable except in liver and egg yolk (120-hour sample, IND label).

5b. The study adequately characterized/identified the majority of the radioactive residues in poultry eggs and tissues. Based on the number of metabolites identified, it is concluded that DPX-JW062 is extensively metabolized in poultry. The parent, DPX-JW062, was identified at concentrations of <0.01-0.04 ppm in all matrices (except egg whites) and its percent TRR distribution was as follows for IND-label and TMP-label samples, respectively: 3.6-4.1% and 3.2-4.0% in egg yolk (72- and 120-hour samples), 4.9% and 6.4% in fat, 17.0% and 8.8% in skin with fat, 4.8% and 3.8% in liver, 25.3% and 12.2% in gizzards, 7.6% and 3.0% in thigh muscle, and 5.9% and 5.1% in breast muscle.

5c. Metabolite IN-JT333, the product of metabolism of the N-carboxymethoxy moiety of the parent, was identified in egg yolks (3.61-6.98% TRR, 0.01-0.02 ppm), fat (16.1-18.2% TRR, 0.08-0.09 ppm), skin with fat (12.7-16.7% TRR, 0.03-0.04 ppm), gizzard (4.67-7.58% TRR, 0.01 ppm), and muscle (4.54-11.8% TRR, <0.01-0.01 ppm). The monohydroxylated IN-JT333 was identified in egg yolk (9.46-13.4% TRR, 0.01-0.04 ppm), fat (13.4-15.3% TRR, 0.07-0.08 ppm), skin with fat (11.6-14.5% TRR, 0.03 ppm), and muscle (14.4% TRR, 0.01 ppm).

5d. Metabolite F was the major residue component observed in fat (37.8-45.3% TRR, 0.19-0.22 ppm) and skin with fat (16.2-29.3% TRR, 0.04-0.06 ppm). Metabolite F was also observed in egg yolks (6.7-14.4% TRR, 0.01-0.05 ppm), liver (9.0-9.2% TRR, 0.01 ppm), gizzards (5.40-7.9% TRR, 0.01 ppm), and muscle (5.9-13.2% TRR, <0.01-0.01 ppm). The following additional metabolites were identified in poultry matrices at concentrations ≤0.04 ppm: IN-KG433, IN-KT319, IN-KG433/IN-KT319, IN-JU873, IN-JU873/5-HO-IN-JT333, IN-MK638, and IN-KB687.

5e. The results of the poultry metabolism study suggest that it is not possible to establish with certainty whether finite residues will be incurred, but there is a reasonable expectation of finite residues (Category 2 of 40 CFR §180.6a). **Based on these results, a poultry feeding study is recommended by HED.**

5f. Livestock metabolism conclusions: The qualitative nature of the residue in livestock is adequately understood based on acceptable studies conducted on cows and laying hens. The HED MARC will decide the toxicological significance of identified metabolites and which residues to regulate. Tolerances based on the parent only (as proposed for meat, milk, and kidney of cattle) or active enantiomer plus the metabolite (as proposed for milk fat and cattle fat) may not be appropriate. In such an instance, additional analytical methodology, storage stability data, and livestock feeding studies may be needed.

OPPTS GLN 860.1340: Residue Analytical Method - Plant Commodities

6a. For determination of S-indoxacarb/R-indoxacarb residues in/on plant commodity samples collected from the storage stability, field residue, rotational crop, and processing studies, the petitioner utilized a GC/MSD method (designated as Method No. AMR 3493-95, Supplement No.1) and a reverse-phase HPLC/column switching method with UV detection at 310 nm (designated as Method No. AMR 2712-93). The concurrent recovery data indicate that these methods are adequate for data collection.

6b. The petitioner has proposed GC/MSD method AMR 3493-95 and HPLC/column switching/UV method AMR 2712-93 for use as enforcement methods for plant commodities. The validation and concurrent recovery data submitted with this petition indicate that method AMR 3493-95 adequately recovers residues of S-indoxacarb/R-indoxacarb from watery/non-oily matrices and that method AMR 2712-93 adequately recovers residues of S-indoxacarb/R-indoxacarb from oily and non-oily matrices. Both methods have been adequately validated by an independent laboratory. The two methods were forwarded to Beltsville, MD for a petition method validation (PMV). The plant method, Method AMR 2712-93, will be forwarded to FDA for inclusion in PAM II, pending the MARC decision. The plant method, Method 3493-95 was found **unacceptable for enforcement purposes**. However, though revisions were recommended, the petitioner does not have to submit a revised method AMR 3493-95, because an adequate plant enforcement method has been submitted (Method AMR 2712-93). The petitioner was requested to submit standards of DPX-MP062, S-indoxacarb, and IN-JT333 to the EPA repository (Memo, D257972, S. Chun, 10/05/99). **Until the receipt of the standards to the EPA repository, submission of an acceptable confirmatory method and the results of specificity testing, the requirements for analytical enforcement methodology will remain unfulfilled**. As method AMR 3493-95 utilizes GC/MSD detection, submission of an adequate version of this method will resolve the deficiencies related to method specificity and for a confirmatory method. The requirements for radiovalidation data are fulfilled, provided that S-indoxacarb/R-indoxacarb is the only residue of concern.

OPPTS GLN 860.1340: Residue Analytical Methods - Livestock Commodities

7. Samples of commodities from the submitted ruminant feeding study were analyzed for residues of S-indoxacarb/R-indoxacarb and the metabolite IN-JT333 using an HPLC/column switching/UV method (Method AMR 3337-95). This method is also proposed for the enforcement of tolerances for residues of S-indoxacarb/R-indoxacarb and IN-JT333 in milk and cow tissues. The validation and concurrent recovery data submitted with this petition indicate that method AMR 3337-95 adequately recovers residues of S-indoxacarb/R-indoxacarb and IN-JT333 from livestock commodities. The submitted radiovalidation as well as ILV data of the method are adequate. The method was forwarded to Beltsville, MD for a PMV and was found acceptable. The livestock method and the EPA addendum will be forwarded to FDA for inclusion in PAM II, pending the MARC decision.

OPPTS GLN 860.1360: Multiresidue Method

8. The petitioner has submitted acceptable data concerning the recovery of residues of S-indoxacarb/R-indoxacarb using FDA multiresidue method protocols (PAM Vol. I). The results of multiresidue testing of DPX-JW062 have been forwarded to FDA. DPX-JW062 was tested through Protocols C, D and E.

OPPTS GLN 860.1380: Storage Stability Data

9a. Plant commodities: The available storage stability data demonstrate that residues of S-indoxacarb/R-indoxacarb are relatively stable in/on various RACs and processed commodities when stored under frozen conditions. Fortified residues of S-indoxacarb/R-indoxacarb are stable in/on (maximum storage stability interval in parentheses): apples (18 months); apple juice (6 months); corn, sweet (kernels + cob with husks removed [K+CWHR], 9 months); corn, sweet, forage (3 months); corn, sweet, stover (4 months); cottonseed, undelinted (9 months); grapes (18 months); grape, wet pomace (10 months); grape, wine (10 months); lettuce (12 months); peppers (11 months); and tomatoes (12 months). Weathered residues of S-indoxacarb/R-indoxacarb are stable in/on: apple, wet pomace (12 months); lettuce (6 months but with a 12% residue decline after 12 months), and tomatoes (6 months but with a 24% residue decline after 12 months).

9b. The maximum storage intervals (from harvest to residue analysis) of samples collected from the field and processing studies are as follows: apples (11 months); apple processed fractions (2 months); broccoli (10 months); cabbage (10 months); corn, sweet (K+CWHR; 17 months); corn, sweet, forage (21 months); corn, sweet, stover (25 months); cottonseed (13 months); cotton gin byproducts (11 months); cotton processed fractions (10 months); lettuce, leaf (17 months); lettuce, head (15 months); pears (10 months); peppers (7 months); tomatoes (11 months); and tomato processed fractions (2 months).

9c. The available frozen storage stability data adequately support the storage intervals of the submitted field and processing studies for pome fruits (apples and pears) and fruiting vegetables (peppers and tomatoes). **However, additional storage stability data, reflecting the maximum frozen storage intervals of samples, are required for broccoli (or cabbage); corn, sweet (K+CWHR); cotton gin byproducts; and cotton processed commodities.** Because of translation applicability, additional data are not required for

lettuce (leaf or head). The petitioner has indicated that additional storage stability data, which will cover the maximum storage interval for cabbage, will be submitted as a supplemental report.

10. Livestock commodities: The available storage stability data demonstrate that fortified residues of S-indoxacarb/R-indoxacarb and the metabolite IN-JT333 are relatively stable under frozen storage conditions in whole milk for up to 60 days, and in the fat, muscle, and liver of cows for up to 90 days. Additionally, weathered residues of S-indoxacarb/R-indoxacarb are relatively stable in whole milk for 26 days but declined by 15-30% after 77 days of storage. Weathered residues of S-indoxacarb/R-indoxacarb are relatively stable in fat for 90 days with only 12% decline. Weathered residues of IN-JT333 exhibited 17-25% decline of residues after 90 days. Assuming that the residues of concern in milk and tissues are those proposed by the petitioner, these data adequately validate the storage intervals and conditions of samples collected from the cattle feeding study.

OPPTS GLN 860.1500: Crop Field Trials

11a. Corn, sweet (K+CWHR): The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 0.02 ppm in/on sweet corn (K+CWHR) harvested 3 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use pattern, residues of S-indoxacarb/R-indoxacarb in/on sweet corn (K+CWHR) ranged from nondetectable (<0.010) to 0.012 ppm from treatments with the DPX-JW062 formulation; residues were all nondetectable (<0.010 ppm) from treatments with the DPX-MP062 formulation. The majority of treated sweet corn samples collected for the residue decline study bore nondetectable (<0.010 ppm) residues at various sampling intervals. The proposed tolerance for sweet corn (K+CWHR) by the petitioner is 0.02 ppm. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 0.012 ppm x 0.67 = 0.008 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship. The adjusted residue value is comparable to the proposed tolerance. However, the correct terminology is "corn, sweet, kernel plus cob with husk removed". **A revised Section F is required.**

11b. Corn, Sweet, Forage: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 20.0 ppm in/on sweet corn forage harvested 3 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use pattern, residues of S-indoxacarb/R-indoxacarb in/on sweet corn forage ranged 1.7-13 ppm from treatments with the DPX-JW062 formulation, and 0.95-4.5 ppm from treatments with the DPX-MP062 formulation. The residue decline data from the FL site indicate that residues of S-indoxacarb/R-indoxacarb dissipate slightly in/on sweet corn forage over time; however, residue decline data from the CA and IL sites were too variable to make a conclusion concerning residue dissipation over time. The proposed tolerance for sweet corn forage by the petitioner is 20.0 ppm. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 13 ppm x 0.67 = 8.7 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this

relationship. Therefore, the data suggest that the proposed tolerance for sweet corn forage should be lowered from 20.0 ppm to 10.0 ppm. Also, the correct terminology is "corn, sweet, forage". **A revised Section F is required.**

11c. Corn, Sweet, Stover: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 25.0 ppm in/on sweet corn stover harvested 28-66 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb in/on sweet corn stover ranged 0.86-20 ppm from treatments with the DPX-JW062 formulation, and 1.5-13 ppm from treatments with the DPX-MP062 formulation. The proposed tolerance for sweet corn stover by the petitioner is 25.0 ppm. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 20 ppm x 0.67 = 13.4 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship. Therefore, the data suggest that the proposed tolerance for sweet corn stover should be lowered from 25.0 ppm to 15.0 ppm. Also, the correct terminology is "corn, sweet, stover". **A revised Section F is required.**

12a. Cotton, undelinted seed: The submitted data (MRID 44477408) indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 3.0 ppm in/on cottonseed harvested 14 days following the last of four broadcast applications of a 17.5% suspension emulsion formulation of DPX-JW062. Following applications according to the above maximum proposed use pattern, residues of S-indoxacarb/R-indoxacarb ranged 0.13-1.9 ppm in/on undelinted cottonseed treated with the DPX-JW062 formulation.

12b. The submitted cottonseed data (MRID 44477407) indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 3.0 ppm in/on cottonseed harvested 13-17 days following the last of four broadcast applications of either a 17.5% suspension emulsion formulation of DPX-JW062 or a 15% liquid formulation of DPX-MP062. Following applications according to the above maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 0.30-1.0 ppm in/on undelinted cottonseed treated with the DPX-JW062 formulation, and 0.033-0.92 ppm in/on undelinted cottonseed treated with the DPX-MP062 formulation. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on undelinted cottonseed over time. However, as the application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062); the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 1.9 ppm x 0.67 = 1.3 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship. The data suggest that the proposed tolerance for cottonseed should be lowered from 3.0 ppm to 2.0 ppm. Also, the correct terminology is "cotton, undelinted seed". **A revised Section F is required.**

12c. Cotton Gin Byproducts: The submitted data (MRID 44477407) indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 15.0 ppm in/on cotton gin byproducts harvested 13-17 days following the last of four broadcast applications of a 15% liquid formulation of DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 2.9-12 ppm in/on cotton gin byproducts treated with the DPX-MP062 formulation. The residue decline

data for cotton gin byproducts were too variable to make a conclusion with regards to residue dissipation over time. Applications were made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062); therefore, the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 10 ppm x 0.67 = 7.5 ppm). The data from side-by-side trials with DPX-JW062 DPX=MP062 generally confirm this relationship. Therefore, the data suggest that the proposed tolerance for cotton gin trash should be lowered from 15.0 ppm to 10.0 ppm. Also, the correct terminology is "cotton gin byproducts". **A revised Section F is required.**

Fruiting Vegetables (except Cucurbits)

13a. Peppers: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level for the fruiting vegetable group of 0.70 ppm in/on peppers harvested 3 days following the last of four broadcast applications of a 30% WDG formulation of DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged <0.020-0.079 ppm in/on bell peppers and <0.020-0.099 ppm in/on non-bell peppers treated with the DPX-MP062 formulation. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 0.099 ppm x 0.67 = 0.067 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on peppers over time.

13b. Tomatoes: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed fruiting vegetable group tolerance level of 0.70 ppm in/on tomatoes harvested 3 days following the last of four broadcast applications of a 30% WDG formulation of DPX-MP062 or DPX-JW062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged <0.020-0.13 ppm in/on tomatoes treated with the DPX-MP062 formulation and <0.020-0.43 ppm in/on tomatoes treated with the DPX-JW062 formulation. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on tomatoes over time. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 0.41 ppm x 0.67 = 0.27 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship.

13c. Fruiting Vegetable (except Cucurbits): The proposed tolerance for the crop group fruiting vegetable (except cucurbits) is 0.70 ppm. However, after the pepper and tomato data were adjusted for the exaggerated application rates, the data suggest that the proposed tolerance for the crop group fruiting vegetable (except cucurbits) should be lowered from 0.70 ppm to 0.50 ppm. Also, the correct terminology is "vegetables, fruiting, group". **A revised Section F is required.**

Head and Stem *Brassica* Subgroup

14a. Broccoli: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed head and stem *Brassica* subgroup tolerance level of 10.0 ppm in/on broccoli harvested 3 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 0.28-2.5 ppm in/on broccoli treated with the DPX-JW062 formulation, and 0.23-0.52 ppm in/on broccoli treated with the DPX-MP062 formulation. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on broccoli over time. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 2.5 ppm x 0.67 = 1.7 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship.

14b. Cabbage: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed head and stem *Brassica* subgroup tolerance level of 10.0 ppm in/on cabbage harvested 3 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 0.60-6.4 ppm in/on cabbage (with wrapper leaves) treated with the DPX-JW062 formulation, and 0.14-4.0 ppm in/on cabbage (with wrapper leaves) treated with the DPX-MP062 formulation. The additional residue data submitted for cabbage without wrapper leaves indicate that residues were substantially lower than for cabbage with wrapper leaves; the submitted data for cabbage without wrapper leaves may be used for a more accurate assessment of dietary exposure, if necessary. Residue decline cabbage data were too variable to make a conclusion concerning residue dissipation over time. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 6.4 ppm x 0.67 = 4.3 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship.

14c. Head and Stem Brassica Subgroup: The proposed tolerance for the head and stem brassica subgroup is 10.0 ppm. However, after the broccoli and cabbage data were adjusted for the exaggerated application rates, the data suggest that the proposed tolerance for the head and stem brassica subgroup should be lowered from 10.0 ppm to 5.0 ppm. Also, the correct terminology is "brassica, head and stem, subgroup". **A revised Section F is required.**

Leafy Vegetables (Except Brassica Vegetables)

15a. Lettuce, leaf: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 20.0 ppm in/on leaf lettuce harvested 3 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 3.2-13 ppm in/on leaf lettuce treated with the DPX-JW062 formulation, and 2.8-4.2 ppm in/on leaf lettuce treated with the DPX-MP062 formulation. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on leaf lettuce over time. Because application was made with the DPX-JW062

formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 13 ppm x 0.67 = 8.7 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship. Therefore, the data suggest that the proposed tolerance for leaf lettuce should be lowered from 20.0 ppm to 10.0 ppm. Also, the correct terminology is "lettuce, leaf". **A revised Section F is required.**

15b. Lettuce, head: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 7.0 ppm in/on head lettuce harvested 3 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 0.25-4.7 ppm in/on head lettuce (with wrapper leaves) treated with the DPX-JW062 formulation, and from 0.18 to 2.1 ppm in/on head lettuce (with wrapper leaves) treated with the DPX-MP062 formulation. The additional residue data submitted for head lettuce without wrapper leaves indicate that residues were substantially lower than head lettuce with wrapper leaves; the submitted data for head lettuce without wrapper leaves may be used for a more accurate assessment of dietary exposure, if necessary. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on head lettuce over time. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 4.7 ppm x 0.67 = 3.1 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship. Therefore, the data suggest that the proposed tolerance for head lettuce should be lowered from 7.0 ppm to 4.0 ppm. Also, the correct terminology is "lettuce, head". **A revised Section F is required.**

Pome Fruits Group

16a. Apples: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level for the pome fruits group of 2.0 ppm in/on apples harvested 28 days following the last of four broadcast applications of a 30% WDG formulation of DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 0.21-1.1 ppm in/on apples treated with the DPX-JW062 formulation, and 0.084-0.44 ppm in/on apples treated with the DPX-MP062 formulation. The residue decline data for apples were too variable and indeterminate to make a conclusion with regards to residue dissipation over time. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 1.1 ppm x 0.67 = 0.74 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship.

16b. Pears: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level for the pome fruits group of 2.0 ppm in/on pears harvested 28 days following the last of four broadcast applications of a 30% WDG formulation of DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 0.035-0.12 ppm in/on pears treated with the DPX-MP062 formulation. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on pears over time. Because application was made

with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 0.12 ppm x 0.67 = 0.08 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship.

16c. Pome Fruits Group summary: The apple data suggest that the proposed tolerance for pome fruits should be lowered from 2.0 ppm to 1.0 ppm. The pear data suggest that the proposed tolerance for pome fruits group should be lowered from 2.0 ppm to 0.1 ppm. Because there is more than a five-fold difference between the maximum residue in apples (1.1 ppm) and pears (0.12 ppm), **HED is not recommending for a pome fruits group tolerance. A revised Section F should be submitted with individual tolerances for apple (1.0 ppm) and pear (0.1 ppm).** If the petitioner wishes to establish additional tolerances for other crops in this group, then additional data must be submitted.

OPPTS GLN 860.1520: Processed Food/Feed

17a. Apples: The submitted apple processing data are adequate. The data indicate that residues of S-indoxacarb/R-indoxacarb concentrate 2.6x in wet pomace and reduce 0.01x in juice processed from apples bearing detectable residues.

17b. The highest average field trial (HAFT) residues of S-indoxacarb/R-indoxacarb in/on apples harvested 28 days following treatment at 1.2x the maximum proposed seasonal application rate (0.44 lb ai/A; see apple field trial data) is 1.02 ppm. The maximum S-indoxacarb/R-indoxacarb residues expected in wet apple pomace, based on the HAFT (1.02 ppm) and the observed concentration factor (2.6x), would be 2.7 ppm. These data suggest that the proposed tolerance for wet apple pomace should be lowered from 6.0 ppm to 3.0 ppm. **A revised section F should be submitted.** Because residues in the treated apples were reduced when processed into juice, the apple juice tolerance is covered by the recommended RAC tolerance.

18. Cotton: The submitted cotton processing data are adequate. The data indicate that residues of S-indoxacarb/R-indoxacarb do not concentrate, but reduce by 0.03x, 0.01x and 0.04 x in cotton hulls, meal, and refined oil, respectively, when processed from undelinted cottonseed bearing detectable residues. Because residues in the treated cottonseed were reduced when processed, the processed commodities' (hulls, meal and refined oil) tolerance is covered by the recommended RAC tolerance.

19a. Tomatoes: The submitted tomato processing data are adequate. The data indicate that residues of S-indoxacarb/R-indoxacarb concentrate 1.4x in tomato paste and reduce 0.52x in puree processed from tomatoes bearing detectable residues.

19b. The HAFT residues of S-indoxacarb/R-indoxacarb in/on tomatoes harvested 3 days following multiple foliar treatments at 1x the maximum proposed seasonal application rate (0.268 lb ai/A; see tomato field trial data) is 0.33 ppm. The maximum S-indoxacarb/R-indoxacarb residues expected in tomato paste, based on the HAFT (0.33 ppm) and the observed concentration factor (1.4x), would be 0.46 ppm. Based on the highest expected residues, no tolerance for residues of S-indoxacarb/R-indoxacarb in tomato paste is required because the recommended RAC tolerance of 0.50 ppm for the fruiting vegetables group will

not be exceeded.

OPPTS GLN 860.1480: Meat, Milk, Poultry, Eggs

Eggs, and the Fat, Meat, and Meat Byproducts of Poultry

20. A poultry feeding study was not submitted with this petition. Except for cottonseed meal, there are no poultry feed items associated with this petition. Even though the cottonseed processing study indicate that residues of S-indoxacarb/R-indoxacarb do not concentrate in cottonseed meal processed from undelinted cottonseed bearing detectable residues, **a poultry feeding study must be submitted.** In the poultry metabolism the parent and the metabolite IN-JT333 were identified in most poultry matrices following oral administration of radiolabeled test substance at 10 ppm (25x the maximum expected dietary exposure of DPX-MP062). The required poultry feeding study should analyze for the parent and all metabolites of toxicological concern. The petitioner may also be required to propose tolerances for eggs and poultry tissues based on the results of an acceptable feeding study.

Milk, and the Fat, Meat, and Meat Byproducts of Cattle, Goats, Hogs, Horses, and Sheep

21a. The dairy cattle feeding study is acceptable, pending the MARC decision. Dairy cattle were administered DPX-MP062 orally for 28 consecutive days at levels equivalent to 7.5, 22.5, and 75 ppm in the diet (mg/kg diet on a dry weight basis). The MTDB of DPX-MP062 to dairy cattle is tentatively calculated to be 22.2 ppm. The dosing levels of 7.5, 22.5, and 75 ppm represent **0.3x, 0.9x, and 3.1x,** respectively, the MTDB of DPX-MP062 to dairy cattle. The proposed tolerances for milk and cattle tissues were based by the petitioner on the 22.5-ppm feeding level. The conclusions listed below should be considered tentative until a final determination of the residues of concern in milk and cow tissues have been made by the HED MARC.

21b. Milk and milk fat: The proposed tolerance for residues of S-indoxacarb/R-indoxacarb in milk at 0.10 ppm is appropriate. However, the proposed tolerance for the residues S-indoxacarb and its metabolite IN-JT333 in milk fat at 0.75 ppm is too low to adequately cover secondary transfer of residues as a result of the proposed uses. Furthermore, the milk fat tolerance should be for the combined residues of DPX-S-indoxacarb/R-indoxacarb and the metabolite IN-JT333 because the method detects both enantiomers. **The petitioner should submit a revised Section F and propose a tolerance of 3.0 for milk fat.**

21c. Meat: The proposed tolerance for residues of S-indoxacarb/R-indoxacarb in cattle meat at 0.02 ppm is too low to adequately cover secondary transfer of residues as a result of the proposed uses. **The petitioner needs to submit a revised Section F and propose a tolerance of 0.03 ppm for meat.**

21d. Fat: The proposed tolerance for the residues S-indoxacarb and its metabolite IN-JT333 in meat fat at 0.75 ppm is adequate to cover secondary transfer of residues as a result of the proposed uses. However, the tolerance should be for the combined residues of DPX-S-indoxacarb/R-indoxacarb and the metabolite IN-JT333 because the method detects both enantiomers. **The petitioner needs to submit a revised Section F.**

21e. Kidney (Meat Byproducts): A summary of the maximum theoretical residue at each treatment level for cattle kidney is presented below. The proposed tolerance for residues of S-indoxacarb/R-indoxacarb in cattle kidney is 0.05 ppm. The feeding data indicate that residues of S-indoxacarb/R-indoxacarb in kidney were below the proposed tolerance at the 7.5-ppm feeding level.

21f. Liver (Meat Byproducts): The petitioner did not propose a tolerance for residues of S-indoxacarb/R-indoxacarb in cattle liver. The feeding data indicate that there is a potential for secondary transfer of residues in liver as a result of the proposed uses.

21g. Meat Byproducts Summary: **The petitioner needs to submit a revised Section F and propose a tolerance of 0.02 ppm for meat byproducts, which would include the proposed tolerance for cattle, kidney.** The available data for the fat, milk, meat and meat byproducts of cattle may be translated to the fat, milk, meat and meat byproducts of goats, horses, sheep, and swine. **The petitioner should include these commodities in a revised Section F.**

OPPTS GLN 860.1850: Confined Accumulation in Rotational Crops

22a. The submitted confined rotational crop study is marginally adequate because the test substance was applied at 0.268 lb ai/A of the active isomer S-indoxacarb which is 1.0x the maximum proposed seasonal rate for *Brassica* vegetables, corn (sweet), lettuce, peppers, and tomatoes but only 0.6x the maximum proposed seasonal rate for cotton. Although marginal, HED will not request the petitioner to conduct another confined rotational crop study because the nature of the residue in confined rotational crops was adequately delineated. However, in the future, all test substances must be applied at the 1.0x maximum proposed seasonal rate. Limited trials depicting the field accumulation of DPX-MP062 residues in/on rotational crops (OPPTS GLN 860.1900) are not requested, and the following proposed plantback restrictions are appropriate: crops that are registered under both labels may be planted immediately after harvest; root crops or leafy vegetables which are not registered for use with DPX-MP062 are not to be planted for 30 days after last use; and crops not registered for use with DPX-MP062 are not to be planted for 120 days after last use.

22b. The submitted study indicates that the TRR (expressed as DPX-JW062 equivalents) accumulated at levels greater than 0.01 ppm in/on the following RACs planted in sandy loam soil 36 days following application of [^{14}C]DPX-JW062 (IND or TMP label) at 0.268 lb ai/A: carrots (0.01-0.02 ppm), lettuce (0.01-0.03 ppm), soybean forage (0.06-0.13 ppm), soybean straw (0.07-0.16 ppm), soybean seed (0.03-0.08 ppm), wheat forage (0.13 ppm), wheat grain (0.01-0.24 ppm), and wheat straw (0.15-0.49 ppm). In general, the TRR declined at subsequent plantback intervals of 90 and 125 days.

22c. Neither the parent compound, DPX-JW062, nor any structurally related metabolites were detected in any rotational crop commodity at any plantback intervals. With the exception of wheat straw, wheat grain, and soybean seed, chromatographic analysis of extracts showed that the extractable radioactivity in each commodity consisted of several components characterized as polar compounds, with no single component present at >0.01 ppm. For wheat straw, no single component was >0.05 ppm at the 36-day plantback interval, and no component was >0.01 ppm at the 90- and 125 day plantback intervals.

Codex Issues

23. An international residue limit status (IRLS) sheet is appended to this review as Attachment I. The Codex Alimentarius Commission has not established maximum residue limits (MRLs) for residues of S-indoxacarb/R-indoxacarb or any of its metabolites in/on plant and livestock commodities.

RECOMMENDATIONS

Provided that the Section F is revised as indicated in Conclusions 11a, 11b, 11c, 12a, 12b, 12c, 13c, 14c, 15a, 15b, 16c, 17b, and 21b; HED can recommend in favor of this petition for the establishment of conditional tolerances for (i) S-indoxacarb/R-indoxacarb residues in/on the following RACs: apple, pomace (wet); apple; pear; *Brassica*, head and stem, subgroup; cotton, undelinted seed; cotton gin byproducts, lettuce, leaf; head lettuce; vegetables, fruiting, group; corn, sweet, kernel plus cob with husk removed; corn, sweet, forage; corn, sweet, stover; meat and meat byproducts of cattle, goat, horse, sheep and swine; milk, and (ii) S-indoxacarb/R-indoxacarb residues and its metabolite, IN-JT333 in fat of cattle, goat, horse, sheep and swine; and milk fat. The registration should be made conditional pending resolution of the deficiencies relating to: product chemistry data (Conclusion 1); revised Section B (Conclusion 2), poultry feeding study (Conclusion 5e), analytical enforcement methodology (Conclusion 6b), and storage stability data (Conclusion 9c).

The results of the plant and livestock metabolism studies will be presented to the HED MARC which will determine the DPX-MP062 residues of concern. Depending on the MARC's decision, additional data may be needed pertaining to residue analytical methods, storage stability data, magnitude of the residue in milk, eggs, and livestock tissues.

DETAILED CONSIDERATIONS

OPPTS 830 Series GLNs: Product Properties

The petitioner has submitted product chemistry data for the 52.7% DPX-MP062 manufacturing-use product (MP; no EPA Reg. No. assigned) in support all pertinent GLN topics except storage stability and corrosion characteristics (OPPTS 830.6317 and 830.6320). These product chemistry data are evaluated and presented in Attachment II of this document. For the establishment of permanent tolerances in conjunction with this petition, the following additional product chemistry data are required: (i) nominal concentrations must be identified for [redacted] impurities listed on the CSF with upper certified limits, and a revised CSF must be submitted; (ii) a description of the type of production equipment used and the duration of individual steps and the entire process are required; (iii) a discussion of the possible formation of post-production impurities resulting from degradation of the product or migration of packaging material into the product is required; (iv) data reflecting the stability of DPX-MP062 at normal and elevated temperatures and on exposure to metals and metal ions must be submitted. Data pertaining to storage stability and corrosion characteristics remain outstanding. See the attached "Review of Product Chemistry" reporting form for further details (Attachment II).

OPPTS GLN 860.1200: Proposed Uses

The petitioner provided specimen labels for a 30% water-dispersible granular [WDG; Product Name = DPX-MP062 WG] and a 1.25 lb/gal soluble concentrate formulation [SC; Product Name = DPX-MP062 SC] containing DPX-MP062. The 30% WDG formulation is proposed for use on *Brassica* vegetables (specifically broccoli, cabbage, and cauliflower), corn (sweet), fruiting vegetables (bell and non-bell peppers and tomatoes), lettuce (head and leaf), and pome fruits (apples and pears). The 1.25 lb/gal SC formulation is proposed for use on cotton only. The above formulations are proposed for multiple foliar applications using ground or aerial equipment. Application by ground equipment should be made in sufficient water to obtain uniform coverage; for aerial application, a minimum of 2 gal of water per acre (gpa) is recommended unless otherwise specified. On most crops, DPX-MP062 is to be applied at a 5- to 7-day retreatment interval. The re-entry interval (REI) for all crops is 12 hours. A summary of the proposed use rates and other pertinent use limitations is presented in Table 1.

Table 1. Summary of proposed uses of DPX-MP062 on *Brassica* vegetables, corn (sweet), cotton, fruiting vegetables, lettuce, and pome fruits.

Formulation	Single Application Rates (ai) [a]	Maximum Seasonal Rates (ai) [a]	PHI	Use Limitations
Apples and Pears				
30% WDG	0.065-0.11 lb/A	0.44 lb/A	28	Do not mix in excess of 250 gpa or in less than 50 gpa. For best results, apply in 50-150 gpa. The minimum interval between treatments is 7 days.
Broccoli, Cabbage, and Cauliflower				
30% WDG	0.025-0.065 lb/A	0.26 lb/A	3	The minimum interval between treatments is 3 days. To improve coverage, a wetting agent may be added.
Corn (Sweet)				
30% WDG	0.045-0.065 lb/A	0.26 lb/A	3 and 35 [b]	Whorl stage application only. The minimum interval between treatments is 3 days.
Cotton				
1.25 lb/gal SC	0.045-0.11 lb/A	0.44 lb/A	14	The minimum interval between treatments is 5 days.
Lettuce (Head and Leaf)				
30% WDG	0.025-0.065 lb/A	0.26 lb/A	3	The minimum interval between treatments is 3 days.
Peppers (Bell and Non-bell) and Tomatoes				
30% WDG	0.025-0.056 lb/A	0.26 lb/A	3	The minimum interval between treatments is 5 days.

[a] DPX-MP062 is a 75:25 mixture of S-indoxacarb (insecticidally active enantiomer) and R-indoxacarb (insecticidally inactive enantiomer). The proposed application rates are based on the concentration of S-indoxacarb.

[b] The proposed PHIs are 3 and 35 days for sweet corn and sweet corn fodder, respectively.

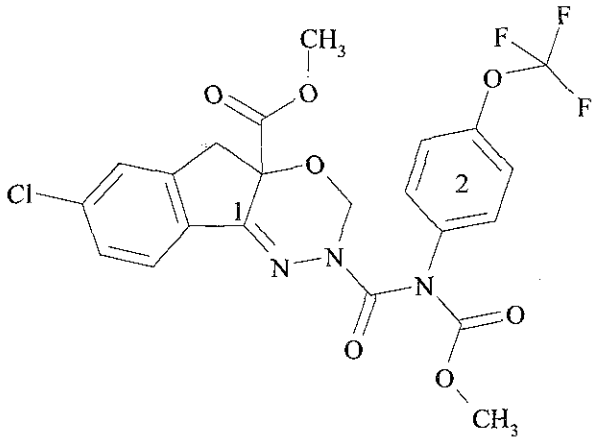
With respect to rotational crop restrictions, annual crops included in this petition [i.e., broccoli, cabbage, cauliflower, corn (sweet), cotton, lettuce (head and leaf), peppers (bell and non-bell), and tomatoes] may be planted immediately following harvest. A 30-day plantback interval is proposed for root crops or leafy vegetables (excluding head and leaf lettuce). A 120-day plantback interval is proposed for other crops (i.e., those which are not included in this petition).

Conclusions: The petitioner has adequately described the proposed uses on *Brassica* vegetables (broccoli, cabbage, and cauliflower), corn (sweet), cotton, fruiting vegetables (bell and non-bell peppers and tomatoes), lettuce (head and leaf), and pome fruits (apples and pears). However, **a revised Section B must be submitted for the 30% water dispersible granular [WDG; Product Name = DPX-MP062 WG] and 1.25 lb/gal soluble concentrate [SC; Product Name = DPX-MP062 SC] formulations. These labels should be revised to specify that DPX-MP062 contains a mixture of S-indoxacarb (75% insecticidally active enantiomer) and R-**

indoxacarb (25% insecticidally inactive enantiomer). Furthermore, the labels should clearly specify that the recommended application rates for the crops listed are based on the concentration of S-indoxacarb.

OPPTS GLN 860.1300: Nature of the Residue in Plants

The test substances for the plant metabolism studies were [indanone-1-^{14}C]DPX-JW062 and uniformly ring-labeled [trifluoromethoxyphenyl-^{14}C]DPX-JW062. The positions of the radiolabels are depicted below.



1 = [indanone-1-^{14}C]DPX-JW062
2 = [trifluoromethoxyphenyl-^{14}C]DPX-JW062

The radiolabeled test substances are also identified in this document as [IND]DPX-JW062 or the IND label and [TMP]DPX-JW062 or the TMP label.

Cotton

E.I. du Pont de Nemours and Company submitted data (citation listed below) pertaining to the metabolism of [^{14}C]DPX-JW062 in cotton. The biological phase of the study was conducted by Du Pont's Field Development Station (Greenville, MS) while the analytical phase of the study was conducted by Du Pont Agricultural Products (Wilmington, DE).

> 44477321 Scott, M.; Guseman, J. (1997) Metabolism of [^{14}C]DPX-JW062, A Racemic Mixture of S-indoxacarb and R-indoxacarb, in Cotton. Lab Project Number: AMR 2691-93. Unpublished study prepared by Du Pont Agricultural Products. 78 p.

In-life phase

The radioactive test substances, [IND]DPX-JW062 (specific activity of 55.5 µCi/mg, radiochemical purity 89.0%) or [TMP]DPX-JW062 (specific activity of 54.0 µCi/mg, radiochemical purity >96.0%) were each mixed with technical DPX-JW062 to yield final specific activities of 9.74 µCi/mg and 9.11 µCi/mg, respectively, prior to application.
Cotton plants (DPL 51 variety) which were in the "COT 07 squaring" stage of growth (approximately 2 months old) were treated with a single foliar application of formulated

[IND]DPX-JW062 or [TMP]DPX-JW062 at 0.446 lb ai/A (500 g ai/ha). Because DPX-JW062 is a racemic mixture of S-indoxacarb and R-indoxacarb (50:50), this rate is equivalent to 0.223 lb ai/A (250 g ai/ha; 0.5x the maximum proposed seasonal rate) of the insecticidally active isomer, S-indoxacarb. Applications were made using hand-held sprayers. A total of three outdoor plots were utilized, one for each of the test substances and one for a control. Each plot (2.5 ft x 4.0 ft) was wrapped in plastic prior to application to capture any drift of the treatment solutions. An exaggerated rate study (4 applications at 625 g ai/ha/application for a total of 2500 g ai/ha/season; 1.115 lb ai/A/season of the active isomer S-indoxacarb; 2.5x maximum proposed seasonal rate) was also conducted to assist in the isolation and characterization/identification. No quantitative data from this exaggerated study were reported. Adequate information pertaining to the preparation of test substances, field conditions, and plant maintenance was provided. Whole plant samples were randomly harvested from each plot soon after the application solution was dry (Day 0), and at 7, 14, 30, and 59 days (forage stages), and at 90 days (mature stage) after application. Mature plant samples were harvested by hand, the bolls were separated from the plant, and cottonseed was pulled from the open bolls. All collected samples were placed in Ziplock® bags and stored frozen prior to analyses.

Total radioactive residues (TRR)

Subsamples of collected cotton matrices were cut into half-inch pieces and homogenized with dry ice. Aliquots of homogenized plant tissues were combusted and radioassayed by liquid scintillation counting (LSC) in triplicate. The limit of detection (LOD) for TRR determination was 0.01 ppm. TRR for cotton plants were also determined by summing extracted, hydrolyzed, and unextracted residues. The petitioner used the summed TRR values for calculations of % TRR for all samples except Day 90 samples. The TRR in/on cotton matrices are presented in Table 2.

Table 2. Total radioactive residues in/on cotton matrices treated with [^{14}C]DPX-JW062 (IND or TMP label) at 0.223 lb ai/A (250 g ai/ha; 0.5x the maximum proposed seasonal rate).

Matrix	TRR in [^{14}C]DPX-JW062 equivalents [a] (ppm)	
	IND Label	TMP Label
Whole cotton plant		
Day 0 [a]	7.069	13.596
Day 7 [a]	6.345	7.352
Day 14 [a]	2.247	3.285
Day 30 [a]	0.899	0.972
Day 59 [a]	0.820	0.501
Day 90 [b]	0.019 [b]	0.053 [b]
Cottonseed		
Day 90 [b]	0.007 [b]	0.005 [b]

[a] TRR values are the sum of extracted, hydrolyzed, and unextracted residues.
[b] TRR values determined by combustion/LSC.

Extraction and hydrolysis of residues

Radioactive residues in homogenized cotton matrices were extracted with acetonitrile (ACN):water (8:2, v:v) and centrifuged. The extraction procedure was repeated two more times. The extracts were combined, and aliquots were removed and concentrated for LSC analysis.

Nonextractable residues were subjected to acid hydrolysis with 0.05, 0.5, and 5.0 N HCl at 43°C for 24 hours. The supernatants from the 0.5 and 5.0 N HCl hydrolyses were combined and reserved for HPLC analysis. Enzyme hydrolysis with cellulase was also conducted on nonextractable residues of Day 0, 7, and 14 cotton plant, but <0.01 ppm was released in the hydrolysates, and no further analyses were attempted.

Characterization/identification of residues

Extracts and hydrolysates were analyzed on four HPLC systems; metabolites were quantified on all four systems by radiochemical and UV (254 nm) detection. Initial sample analysis was conducted on HPLC System **I**, using a Zorbax®Rx-C8 column and a gradient mobile phase of ACN and water. Metabolites were identified by comparison of retention times with the following reference standards: DPX-JW062, IN-JT333, S-indoxacarb, R-indoxacarb, IN-KG433, and IN-P0036. HPLC System **II** was used to provide better resolution between DPX-JW062 and IN-JT333 (initial retention time within 1 minute of DPX-JW062 on System I). The column was the same as System 1 but a gradient mobile phase of ACN containing 2% (v:v) tetrahydrofuran and water was used. HPLC System **III** was a normal phase, chiral HPLC system designed to determine the enantiomeric ratio of DPX-JW062. This system utilized a Chiralpak AD with diol guard column and an isocratic mobile phase of isopropanol:hexane (20:80, v:v). HPLC System **IV** used a preparative HPLC column hand-packed with graphitized carbon media to isolate DPX-JW062 for mass spectral characterization. The identification of DPX-JW062 as the major radioactive component in the extract of Day 7 cotton plants treated with [^{14}C]DPX-JW062 (TMP label) was confirmed by GC/MS.

The characterization of radioactivity in the extracts and hydrolysates of cotton matrices is presented in Table 3.

Table 3. Distribution and characterization of radioactive residues in/on cotton matrices treated at 0.223 lb ai/A (250 g ai/ha; 0.5 x the maximum proposed seasonal rate) with [indanone-1-^{14}C]DPSC-JW062 and [trifluoromethoxyphenly-U-^{14}C]DPX-JW062.

Characterizaion/Identification in ppm[a,b] (%TRR)														
Matrix →:	Day 0 Whole Cotton Plant		Day 7 Whole Cotton Plant		Day 14 Whole Cotton Plant		Day 30 Whole Cotton Plant		Day 59 Whole Cotton Plant		Day 90 cotton Plant		Day 90 Cottonseed	
Metabolite /Fraction:	IND	TMP	IND	TMP	IND	TMP	IND	TMP	IND	TMP	IND	TMP	IND	TMP
DPX-JW062	6.942 (98.2)	13.189 (97.0)	5.611 (88.4)	6.888 (93.7)	2.045 (91.0)	2.979 (90.7)	0.716 (79.7)	0.789 (81.2)	0.687 (83.8)	0.413 (82.5)	0.011 (60.5)	0.045 (93.7)	NA	NA
Total (after ACN:water extraction)	6.956 (98.4)	13.229 (97.3)	6.187 (97.5)	7.153 (97.3)	2.164 (96.3)	3.285 (100.0)	0.855 (95.1)	0.920 (94.7)	0.757 (92.3)	0.496 (92.6)	0.013 (68.4)	0.046 (86.8)	<0.001 (NR)	<0.001 (NR)
Non extractable (after ACN:water extraction)	NR[c, d]	NR[c,d]	NR[c, d]	NR[c,d]	NR[c, d]	NR[c,e]	NR[c, e]	NR[c,d]	NR[c, d]	NR[c,e]	NR[c, e]	NR[c,e]	NR[c, e]	NR[c,e]
Acid hydolysate	0.4[e] (0.028)	0.111[e] (0.8)	0.041[e] (0.6)	0.061[e] (0.8)	0.043[e] (1.9)	-----	-----	0.027[e] (2.8)	0.017[e] (2.1)	-----	-----	-----	-----	-----
Non extractable	0.085[e] (1.2)	0.256[e] (1.9)	0.117[e] (1.8)	0.138[e] (1.9)	0.040[e] (1.8)	-----	-----	0.025[e] (2.6)	0.046[e] (5.7)	-----	-----	-----	-----	-----

[a] Expressed as [^{14}C]DPX-JW062 equivalents.
[b] DPX-JW062 was initally identified by HPLC and confirmed by GC/MS.
[c] NR = not reported.
[d] Subject to acid hyrolysis.
[e] Not further analyzed (NA).

Photolysis of [^{14}C]DPX-JW062-treated cotton

A photolysis experiment was conducted to further elucidate the metabolism/dissipation of DPX-JW062. Briefly, a leaf of cotton was treated with 50 µL of an ACN solution containing 100 µg [IND]DPX-JW062 by placing the solution along the mid-vein. The cotton plant was placed in a closed system in which the upper part of the plant was contained in a rat metabolism cage equipped with a quartz window to allow UV light to pass through, while the roots, lower stem, and pot were outside the cage. The entire system was sealed, and air was drawn through the apparatus into a 0.1 N sodium hydroxide trap and then through an ethylene glycol trap. The plant was exposed to simulated sunlight with light equivalent to one-half mid-day sun for 21 days. The traps were sampled throughout the 21-day exposure period. At the end of the exposure period, the plant was rinsed with ACN, and total radioactivity was determined. Radioactive residues in the leaf were extracted by an unspecified method, and the extract was analyzed on HPLC System I.

Although no quantitative and raw data were provided for the photolysis experiment, the petitioner reported that after 21 days of exposure, about 4.7% of the applied [IND]DPX-JW062 was confirmed to be [^{14}C]CO_2. Ninety percent of the remaining radioactivity was parent compound. The petitioner stated that there was chromatographic evidence of other components, mostly polar compounds, but that their low concentration precluded further analysis.

Chiral analysis of DPX-JW062

The chiral nature of DPX-JW062 isolated from plant samples was investigated to determine if there was preferential uptake/metabolism/dissipation of one enantiomer over the other. DPX-JW062 was isolated from the extract of 30-day cotton plants treated with [^{14}C]DPX-JW062 (IND and TMP label) at an exaggerated rate to facilitate isolation. The extracts were first diluted with ACN and then purified by solid-phase extraction. The final extract was injected onto HPLC System III. The petitioner reported that following chiral HPLC analysis, the ratio of S-indoxacarb to R-indoxacarb was about 1:1.

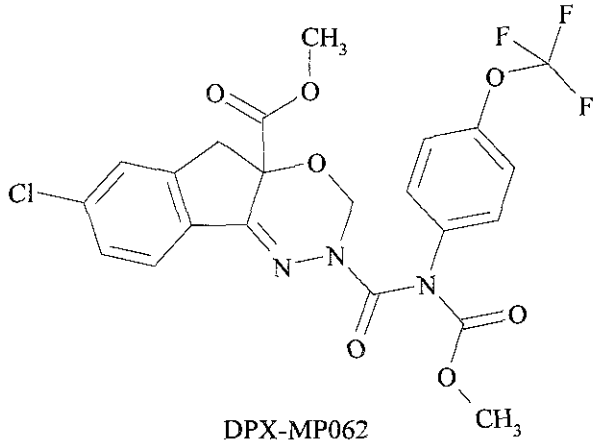
Storage stability

Cotton RAC samples were stored frozen for a maximum interval of 4.5 months prior to analysis. A storage stability study was conducted to validate the storage intervals and conditions of samples from the cotton metabolism study. A 90-day whole plant sample from cotton treated with [TMP]DPX-JW062 was extracted about 4 months after the original extraction. HPLC analysis indicated that residues of DPX-JW062 accounted for 79.1% of the total radioactivity in the extract compared with about 97.9% in the original analysis. The petitioner cited another freezer storage stability study conducted to support the residue data from cotton field trials which indicated that DPX-JW062 is stable for at least 6 months under frozen conditions. The petitioner believes that the differences seen in this study were chromatographic aberrations and not sample related.

Proposed metabolic pathway

The suggested metabolic pathway of DPX-JW062 in cotton is depicted below. The parent compound was the major radioactive residue identified in all extracts. IN-JT333, a metabolite of

concern identified in the rat, chicken, and ruminant metabolism studies, was not found. There was chromatographic evidence of degradation into more polar compounds including carbon dioxide; however, the petitioner believes that metabolism played a small role in the dissipation of DPX-JW062.



DPX-MP062

Polar Compounds

CO_2 from Photolysis Study

Study summary: The cotton metabolism study is acceptable. Following a single application of [indanone-1-^{14}C]DPX-JW062 or uniformly ring-labeled [trifluoromethoxyphenyl-^{14}C]DPX-JW062 at 0.223 lb ai/A (250 g ai/ha; 0.5x the maximum proposed seasonal rate) to cotton plants at the "COT 07 squaring" stage of growth (approximately 2 months old), the total radioactive residues (expressed as DPX-JW062 equivalents) in/on whole cotton plants declined from 7.069-13.596 ppm at Day 0 to 0.019-0.053 ppm at Day 90. The total radioactivity in mature cottonseed was 0.005-0.007 ppm. Unaltered DPX-JW062 was the only radioactive residue identified in/on whole cotton plants, accounting for 60.5-98.2% of the total radioactivity.

Lettuce

E.I. du Pont de Nemours and Company submitted data (citation listed below) pertaining to the metabolism of [^{14}C]DPX-JW062 in lettuce. The biological phase of the study was conducted by Stine-Haskell Research Center (Newark, DE), and the analytical phase of the study was conducted by Du Pont Agricultural Products (Wilmington, DE).

44477322 Gaddamidi, V.; Hashinger, B. (1997) Metabolism of [^{14}C]DPX-JW062, A Racemic Mixture of DPX-KN128 and IN-KN127 in Lettuce. Lab Project Number: AMR 2730-93. Unpublished study prepared by Du Pont Agricultural Products and Stine-Haskell Research Center. 64 p.

Lettuce plants (Pritzhead variety), which were in the 4- to 5-leaf stage and seeded/grown in pots under greenhouse conditions, were treated with a single foliar application of [IND]DPX-JW062 (specific activity 55.5 μCi/mg, radiochemical purity ≥98%) or [TMP]DPX-JW062 (specific activity 54.0 μCi/mg, radiochemical purity ≥98%) as a suspension concentrate formulation at a field equivalent rate of 0.446 lb ai/A (500 g ai/ha). Because DPX-JW062 is a racemic mixture of S-indoxacarb and R-indoxacarb (50:50), this rate is equivalent to 0.223 lb ai/A (250 g ai/ha; 0.9x the maximum proposed seasonal rate) of the insecticidally active isomer, S-indoxacarb.

A total of 10 pots were used, 4 pots for [IND]DPX-JW062, 4 pots for [TMP]DPX-JW062, and 2 pots for control. Prior to application, the lettuce pots were each covered with a 20-gallon plastic bag to capture any drift of the treatment solutions; a small slit was made just above the leaf tops. Application of the test substances was made using hand-held sprayers. Following treatment, the treated and control plants were transferred outdoors and grown to maturity under field conditions. Although an exaggerated rate study (4 applications at 625 g ai/ha/application for a total of 2500 g ai/ha/season; 1.115 lb ai/A/season of the active isomer S-indoxacarb; 4.3x maximum proposed seasonal rate) was also conducted in order to assist in the isolation and characterization/identification of metabolites, no quantitative data from this exaggerated study were reported. Adequate information pertaining to the preparation of test substances, field conditions, and plant maintenance was provided. Lettuce samples were collected non-systematically soon after the application solution was dry (Day 0) and 7, 14, 21, 28, and 35 days (maturity) after application. All collected samples were placed in plastic bags and then stored frozen prior to analyses.

Total radioactive residues (TRR)

The harvested lettuce samples were rinsed with ACN to remove surface radioactive residues. The ACN rinsates were analyzed directly by LSC. The solvent-rinsed lettuce was homogenized with dry ice, combusted, and radioassayed by LSC in triplicate. The total radioactivity (see Table 4) was determined by adding residues in the rinsate and those from combustion analysis. The LOD for TRR determination was 0.005 ppm.

Table 4. TRR in/on lettuce treated with [^{14}C]DPX-JW062 (IND or TMP label) at 0.223 lb ai/A (250 g ai/ha; 0.9x the maximum proposed seasonal rate).

Sampling Period (Days After Treatment)	TRR, ppm [^{14}C]DPX-JW062 equivalents					
	IND Label			TMP Label		
	Surface Residues (ACN Rinse)	Combustion Analysis	Total	Surface Residues (ACN Rinse)	Combustion Analysis	Total
0	5.467	5.721	11.188	3.951	6.891	10.842
7	2.244	2.931	5.175	2.097	2.724	4.821
14	0.570	2.081	2.651	0.766	1.766	2.532
21	0.379	1.035	1.414	0.289	0.998	1.287
28	0.059	0.505	0.564	0.058	0.301	0.359
35	0.072	0.399	0.471	0.022	0.180	0.202

Extraction and hydrolysis of residues

Radioactive residues in homogenized lettuce samples were extracted three times with ACN and centrifuged. The extracts were combined, and aliquots were removed and concentrated for LSC analysis. Because the magnitude of nonextractable radioactive residues was marginal (<5%), no hydrolysis procedures were attempted.

Characterization/identification of residues

The ACN rinsates and ACN extracts were separately analyzed using an HPLC System with a Zorbax®Rx-C8 column and a gradient mobile phase of ACN and water. Metabolites were quantified by UV detection (254 nm) and identified by comparison of retention times with the following reference standards: DPX-JW062 and IN-JT333. The reported limit of quantitation (LOQ) for HPLC analysis was 0.01 ppm. HPLC analyses of rinsates and extracts at all sampling periods consistently produced a single peak which corresponded to the retention time of DPX-JW062.

To confirm the identities of metabolites, the rinsates and extracts of Day 35 lettuce (treated with [^{14}C]DPX-JW062, IND and TMP label) were analyzed using one-dimensional TLC on silica gel plates developed with hexane:acetone (60:40, v:v). Radioactive areas were detected by autoradiography and were identified by comparison to unlabeled reference standards which were visualized by fluorescence quenching at 254 nm. The petitioner reported that TLC analysis of extracts resulted in only one radioactive spot with R_f values corresponding to that of DPX-JW062.

The petitioner reported conducting LC/MS analysis of Day 28 extract from the exaggerated rate study; however, no quantitative data were provided for this portion of the study. The registrant reported that there was no evidence of IN-JT333 in the mass spectrum of the sample indicating that DPX-JW062 was a single component in the treated lettuce rinsates and extracts.

The distribution and characterization of radioactivity in lettuce rinsates and extracts is presented in Table 5.

Table 5. Distribution and characterization of radioactive residues in/on lettuce treated at 0.223 lb ai/A (250 g ai/ha; 0.9 x the maximum proposed seasonal rate) with [indanone-1-^{14}C]DPSC-JW062 and [trifluoromethoxyphenyl-U-^{14}C]DPX-JW062.

Characterization/Identification in ppm[a,b] (%TRR)												
Matrix →:	Day 0 Lettuce		Day 7 Lettuce		Day 14 Lettuce		Day 21 Lettuce		Day 28 Lettuce		Day 35 Lettuce	
Metabolite /Fraction:	IND	TMP	IND	TMP	IND	TMP	IND	TMP	IND	TMP	IND	TMP
DPX-JW062 (ACN Rinsate)	5.467 (48.9)	3.951 (36.4)	2.244 (43.4)	2.097 (43.5)	0.570 (21.5)	0.766 (30.2)	0.379 (26.8)	0.289 (22.4)	0.059 (10.5)	0.058 (16.2)	0.072 (15.3)	0.022 (10.9)
DPX- JW062 (ACN Extract)	6.439 (57.6)	6.511 (60.0)	2.898 (56.0)	2.496 (51.8)	2.073 (78.2)	1.545 (61.0)	1.012 (71.6)	0.936 (72.7)	0.473 (83.9)	0.289 (80.5)	0.395 (83.9)	0.169 (83.7)
Total (after ACN)	11.906 (106.5)	10.462 (96.4)	5.142 (99.4)	4.593 (95.3)	2.643 (99.7)	2.311 (91.2)	1.391 (98.4)	1.225 (95.1)	0.532 (94.4)	0.347 (96.7)	0.467 (99.2)	0.191 (94.6
Non extractable	0.080[c] (0.7)	0.052[c] (0.5)	0.090[c] (1.7)	0.082[c] (1.7)	0.054[c] (2.0)	0.056[c] (2.2)	0.038[c] (2.7)	0.038[c] (3.0)	0.020[c] (3.5)	0.013[c] (3.6)	0.022[c] (4.7)	< 0.01[c] (4.7)

[a] Expressed as [^{14}C]DPX-JW062 equivalents.
[b] DPX-JW062 was initially identified by HPLC and confirmed by GC/MS.
[c] Not further analyzed (NA).

Storage stability

Storage stability is not an issue for this study because most lettuce samples were stored frozen for <6 months, and virtually all radioactivity was associated with the parent compound, DPX-JW062.

Proposed metabolic pathway

DPX-JW062 was the only significant radioactive residue identified in lettuce. The petitioner believes that dissipation of DPX-JW062 in lettuce could be attributed to growth dilution, and that the results of the lettuce metabolism study are consistent with those of the cotton and tomato metabolism studies.

Study summary: The lettuce metabolism study is acceptable. Following a single application of [indanone-1-^{14}C]DPX-JW062 or uniformly ring-labeled [trifluoromethoxyphenyl-^{14}C]DPX-JW062 at 0.223 lb ai/A (250 g ai/ha; 0.9x the maximum proposed seasonal rate) to lettuce plants at the 4- to 5-leaf stage, the total radioactive residues (expressed as DPX-JW062 equivalents) in/on lettuce plants declined from 10.842-11.188 ppm at Day 0 to 0.202-0.471 ppm at Day 35. DPX-JW062 was the only significant radioactive residue identified in/on lettuce, accounting for 91.2-106.5% of the total radioactivity.

Tomatoes

E.I. du Pont de Nemours and Company submitted data (citation listed below) pertaining to the metabolism of [^{14}C]DPX-JW062 in tomatoes. The biological phase of the study was conducted by Stine-Haskell Research Center (Newark, DE), and the analytical phase of the study was conducted by Du Pont Agricultural Products (Wilmington, DE).

> 44477323 Brown, A.; Young, G. (1997) Metabolism of [TMP(U)-^{14}C]DPX-JW062, A Racemic Mixture of S-indoxacarb and R-indoxacarb, Insecticide in Tomatoes. Lab Project Number: AMR 3561-95. Unpublished study prepared by Du Pont Agricultural Products and Stine-Haskell Research Center. 54 p.

Tomato plants (Heinz variety) were treated with four foliar applications of [TMP]DPX-JW062 (specific activity 52.8 µCi/mg, radiochemical purity ≥98%) as a water-dispersible granular formulation at a field equivalent rate of 0.13 lb ai/A/application (150 g ai/ha/application) with a 6- to 10- day retreatment interval. Because DPX-JW062 is a racemic mixture of S-indoxacarb and R-indoxacarb (50:50), this rate is equivalent to 0.066 lb ai/A/application (75 g ai/ha/application; 0.26 lb ai/A/season; 1x the maximum proposed seasonal rate) of the insecticidally active isomer, S-indoxacarb.

Two test plots (each 2.5 x 4 ft) were used in the study; the first plot served as the treatment plot and the second was the control plot. Plots were wrapped in plastic to capture any drift of the treatment solution. Application of the test substance was made using a hand-held sprayer. Adequate information pertaining to the preparation of test substances, field conditions, and plant maintenance were provided. Tomato leaf samples were collected immediately after the application solution dried (Day 0). Tomato fruit and leaf samples were collected before and after each application of the test substance, and 3, 7, and 14 days after the final treatment. All

collected samples were placed in plastic bags and then stored frozen prior to analyses.

Total radioactive residues (TRR)

The harvested tomato matrices were rinsed with ACN to remove surface radioactive residues. The ACN rinsates were analyzed directly by LSC. The solvent-rinsed tomato leaves and fruits were homogenized with dry ice, combusted, and radioassayed by LSC. After surface residues were removed, only one tomato sample contained TRR >0.01 ppm; this rinsed fruit sample was extracted with ACN. The total radioactivity was determined by summing residues in the rinsate, extract, and dry pulp or pellet (nonextractable). The LOQ for TRR determination was 0.005 ppm. The TRR in/on tomato matrices are presented in Table 6.

Table 6. TRR in/on tomato matrices following four foliar applications of [trifluoromethoxyphenyl-U-^{14}C]DPX-JW062 at 0.066 lb ai/A/application (75 g ai/ha/application; 1x the maximum proposed seasonal rate).

Sampling Period (Days)	TRR, ppm [^{14}C]DPX-JW062 equivalents			
	Surface Residues (ACN Rinse)	Tissue Extractable	Tissue Nonextractable	Total
Tomato fruits				
Before 2nd treatment	0.04	Extraction was not conducted (NC)	<0.01	<0.05
After 2nd treatment	0.14	NC	<0.01	<0.15
Before 3rd treatment	0.11	0.01	<0.01	<0.13
After 3rd treatment	0.08	NC	0.01	0.09
Before 4th treatment	0.05	NC	0.01	0.06
After 4th treatment	0.12	NC	0.01	0.12
3 Days after 4th treatment	0.13	NC	0.01	0.14
7 Days after 4th treatment	0.09	NC	0.01	0.10
14 Days after 4th treatment	0.07	NC	0.01	0.08
Tomato Leaves				
0	3.28	0.94	0.25	4.47
Before 2nd treatment	2.05	2.16	0.10	4.31
After 2nd treatment	10.11	1.16	0.08	11.35
Before 3rd treatment	5.23	1.65	0.06	6.94
After 3rd treatment	4.72	0.49	0.03	5.24
Before 4th treatment	4.94	0.66	0.06	5.67
After 4th treatment	7.96	1.49	0.10	9.55
3 Days after 4th treatment	8.75	0.03	<0.01	8.78
7 Days after 4th treatment	4.87	1.02	0.06	5.95

14 Days after 4th treatment	2.38	1.74	0.11	4.23

Extraction and hydrolysis of residues

Radioactive residues in homogenized tomato leaves (collected from all sampling intervals) and fruits (collected before the third treatment) were extracted three times with ACN and centrifuged. The extracts were combined, and aliquots were removed for LSC analysis. Nonextractable residues from tomato leaves were subjected to enzymatic hydrolysis (cellulase, pH 5, 4 days, 37°C) to release bound residues. The petitioner reported that only trace amounts (<0.2% TRR, ≤0.01 ppm) of nonextractable residues were released as a result of enzyme treatment; therefore, the hydrolysates were not subjected to chromatographic analysis.

Characterization/identification of residues

The ACN rinsates and ACN extracts were separately analyzed using HPLC Systems I, II, and III previously described under the "Cotton metabolism" section (note: System II for tomatoes utilized a gradient mobile phase of water with 0.25 M acetic acid and ACN). Analysis of all treated rinses and extracts of tomato fruits and leaves using HPLC Methods I and II consistently indicated a major peak which corresponded to the R_t of DPX-JW062. Minor amounts (<10% TRR) of unknown components were resolved in the extract of one leaf sample collected three days after the final treatment; however, the components were not characterized further since they were not present in any other leaf or fruit samples. IN-JT333, an active metabolite in livestock, was not detected in any tomato matrix using HPLC System I and II or any other confirmatory methods. The peak corresponding to [^{14}C]DPX-JW062 was isolated from the extract of the tomato fruit collected before the second application using HPLC System III to determine the enantiomeric ratio; the results indicated overall net retention of stereochemistry of the formulated product.

To confirm the identity of DPX-JW062, the extracts were analyzed using one-dimensional TLC on silica gel plates developed with hexane:ethyl acetate (60:40, v:v). Radioactive areas were detected by autoradiography, and identified by comparison to unlabeled reference standards which were visualized by UV light (254 nm). Additionally, LC/MS was used to confirm the presence of DPX-JW062 in the leaf extracts from samples collected before the second application and at typical harvest (14 days after the final treatment). The distribution and characterization of radioactivity in tomato matrices is presented in Tables 7a. and 7b.

Table 7a. Distribution and characterization of radioactive residues in/on tomato fruit following four foliar applications of [trifluoromethoxyphenyl-U-^{14}C]DPX-JW062 at 0.066 lb ai/A/application (75 g ai/ha/application; 1x the maximum proposed seasonal rate).

Characterization/Identification in ppm[a,b] (%TRR)									
Matrix →:	**Tomato Fruit**								
Metabolite /Fraction:	Before 2nd treatment	After 2nd treatment	Before 3rd treatment	After 3rd treatment	Before 4th treatment	After 4th treatment	3 days after 4th treatment	7 days after 4th treatment	14 days after 4th treatment
DPX-JW062 (ACN Rinsate)	0.04 (95.3)	0.14 (96.7)	0.11 (88.6)	0.08 (90.1)	0.05 (88.9)	0.12 (93.8)	0.13 (93.1)	0.09 (93.0)	0.07 (87.3)
DPX- JW062 (ACN Extract)	-----	-----	0.01 (11.2)	-----	-----	NA[c]	-----	-----	-----
Total (after ACN)	0.04 (95.3)	0.14 (96.7)	0.12 (99.8)	0.08 (90.1)	0.05 (88.9)	0.12 (93.8)	0.13 (93.1)	0.09 (93.0)	0.07 (87.3)
Non extractable	< 0.01[c] (4.7)	< 0.01[c] (3.3)	< 0.01[c] (0.2)	0.01[c] (9.9)	0.01[c] (11.1)	0.01[c] (6.2)	0.01[c] (6.9)	0.01[c] (7.0)	0.01[c] (12.7)

[a] Expressed as [^{14}C]DPX-JW062 equivalents.
[b] DPX-JW062 was initially identified by HPLC and confirmed by TLC and GC/MS.
[c] Not further analyzed (NA).

Table 7b. Distribution and characterization of radioactive residues in/on tomato leaves following four foliar applications of [trifluoromethoxyphenyl-U-^{14}C]DPX-JW062 at 0.066 lb ai/A/application (75 g ai/ha/application; 1x the maximum proposed seasonal rate).

Characterization/Identification in ppm[a,b] (%TRR)										
Matrix →:	**Tomato Leaves**									
Metabolite /Fraction:	Day 0	Before 2nd treatment	After 2nd treatment	Before 3rd treatment	After 3rd treatment	Before 4th treatment	After 4th treatment	3 days after 4th treatment	7 days after 4th treatment	14 days after 4th treatment
DPX-JW062 (ACN Rinsate)	3.28 (73.3)	2.05 (47.5)	10.11 (89.1)	5.23 (75.3)	4.72 (90.1)	4.94 (87.2)	7.96 (83.4)	8.75 (99.7)	4.87 (81.8)	2.38 (56.2)
DPX- JW062 (ACN Extract)	0.94 (21.0)	2.16 (50.2)	1.16 (10.2)	1.65 (23.8)	0.49 (9.4)	0.66 (11.7)	1.49 (15.6)	0.03 (0.3)	0.51 (8.6)	1.74 (41.1)
Total (after ACN)	4.22 (94.3)	4.21 (97.7)	11.27 (99.3)	6.88 (99.1)	5.21 (99.5)	5.60 (98.9)	9.45 (99.0)	8.78 (100.0)	5.38 (90.4)	4.12 (97.3)
Non extractable	0.25[c] (5.7)	0.10[c] (2.3)	0.08[c] (0.7)	0.06[c] (0.9)	0.03[c] (0.5)	0.06[c] (1.1)	0.10[c] (1.0)	< 0.01[c] (< 0.1)	0.06[c] (1.1)	0.11[c] (2.7)

[a] Expressed as [^{14}C]DPX-JW062 equivalents.
[b] DPX-JW062 was initially identified by HPLC and confirmed by TLC and GC/MS.
[c] Not further analyzed (NA).

Storage stability

Tomato fruits and leaves were stored frozen for intervals of 163-289 days prior to analysis. The available storage stability data for tomatoes, submitted by the petitioner in support of the tomato field trials, indicate that residues of DPX-JW062 are relatively stable in/on tomatoes under frozen storage conditions for up to one year.

Proposed metabolic pathway

DPX-JW062 was the major radioactive component found as surface dislodgeable and tissue extractable residues in/on tomato fruits and leaves. The petitioner believes that the results of the tomato metabolism study are consistent with those of the cotton and lettuce metabolism studies.

Study summary: The tomato metabolism study is acceptable. Following four foliar applications to tomato plants of uniformly ring-labeled [trifluoromethoxyphenyl-^{14}C]DPX-JW062 at 0.06 lb ai/A/application (75 g ai/ha/application; 1x the maximum proposed seasonal rate) with a 6- to 10-day retreatment intervals, the total radioactive residues (expressed as DPX-JW062 equivalents) were 0.06-0.14 ppm in/on tomatoes and 4.23-11.35 ppm in/on leaves. DPX-JW062 was the only radioactive residue identified, accounting for 87.3-99.8% of the total radioactivity in/on tomatoes and 90.4-100.0% of the total radioactivity in/on leaves.

Plant metabolism conclusions: The qualitative nature of the residue in plants is adequately understood based on acceptable studies conducted on cotton, lettuce, and tomatoes. HED will present the salient features of these studies to the HED MARC which will then determine the residues of toxicological and regulatory concern. If the MARC determines that other metabolites of toxicological and regulatory concern, then additional data may be required by the Agency.

OPPTS GLN 860.1300: Nature of the Residue in Livestock

The test substances for the livestock metabolism studies were [indanone-1-^{14}C]DPX-JW062 and uniformly ring-labeled [trifluoromethoxyphenyl-^{14}C]DPX-JW062. The positions of the radiolabels are depicted in the section, "OPPTS 860.1300: Nature of the Residue in Plants."

Ruminants

E.I. du Pont de Nemours and Company submitted data (citations listed below) pertaining to the metabolism of [^{14}C]DPX-JW062 in ruminants. The biological phase of the study was conducted by Huntingdon Life Sciences, Ltd. (HLS; Cambridgeshire, England). The analytical phase of the study was also conducted by HLS with some confirmatory procedures performed by Du Pont Agricultural Products (Wilmington, DE).

44477324 Scott, M. (1997) Metabolism of [C^{14}]-DPX-JW062, A Racemic Mixture of DPX-KN128 and IN-KN127, in the Lactating Ruminant. Lab Project Number: AMR 2979-94: DPT 307/960247: DPT/307. Unpublished study prepared by Du Pont Agricultural Products and Huntingdon Life Sciences, Ltd. 245 p.

44477325 Scott, M. (1997) Metabolism of [C^{14}]-DPX-JW062, A Racemic Mixture DPX-KN128 and IN-KN127, in the Lactating Ruminant. Supplement No. 1. Lab Project Number: AMR 2979-94: DPT 307/960247. Unpublished study prepared by Du Pont Agricultural Products and Huntingdon Life Sciences, Ltd. 9 p.

In-life phase

The radioactive test substances, [IND]DPX-JW062 (specific activity 55.5 μCi/mg, radiochemical purity >99%) and [TMP]DPX-JW062 (specific activity 54.0 μCi/mg, radiochemical purity >99.0%) were mixed with technical DPX-JW062 and dispensed into gelatin capsules to yield formulated test substances with a specific activity 10.0 μCi/mg prior to dosing.

The test animals were two adult lactating Friesian cows; it was not specified whether or not a control animal was used in the study. The cows were housed individually in metal floor pens in a building which provided suitable environmental conditions. The capsules were administered orally by balling gun once per day after the morning milking for five consecutive days. Cow 1 received [IND]DPX-JW062, and Cow 2 received [TMP]DPX-JW062. Each cow received 200 mg of DPX-JW062 per day except for Cow 2 on Day 2 which received 178 mg. The dose of 200 mg/day was the equivalent of 10 ppm of [C^{14}]DPX-JW062 per day based on a daily food consumption of 20 kg. The daily dose was equivalent to 0.12x and 0.61x the MTDB for beef and dairy cattle, respectively (see "OPPTS GLN 860.1480: Meat, Milk, Poultry, Eggs" for calculation of dietary burden). The animals were fed twice daily at the time of milking with concentrate rations and meadow hay; fresh drinking water was available *ad libitum*. The petitioner provided sufficient descriptions of preparation of dose capsules and animal husbandry practices as well as data concerning daily feed intake, body weights, and milk production.

Milk was collected twice daily (between 9 a.m. and 1 p.m. and between 3:30 p.m. and 5 p.m.). The morning milk samples, collected following the final dose, were separated into skim milk and cream. The cows were sacrificed 23.5 hours after the final dose, and the following samples were

collected: liver, kidneys, bile, contents of the entire gastrointestinal tract, foreleg and rump muscle, and fat (subcutaneous, omental, and perirenal). All milk and tissue samples were stored frozen (<-15°C) until processing and analysis.

Total radioactive residues (TRR)

Portions of all milk samples were pooled proportional to their total volumes to produce pooled composite samples for each animal per label. Afternoon and the following morning milk samples were pooled in the same manner to yield representative daily samples. Aliquots of pooled milk as well as cream and skim milk (from the Day 6 a.m. collection) were analyzed in triplicate by LSC for total radioactivity.

Portions of kidney, fat, and muscle tissues were finely minced, and aliquots were solubilized in NCS II solubilizer for 18 hours at 50-55°C. Following solubilization, methanol was added to each tissue, and the samples were left in darkness for about 18 hours prior to combustion/LSC. Portions of liver tissues were allowed to thaw overnight in the refrigerator. After thawing, the liver samples were cut into pieces and homogenized. Soluene 350®was added to the homogenized liver samples, and the mixture was sonic heated (50°C) in darkness for 20 hours. Aliquots of the Soluene 350®/liver mixture were analyzed by LSC for total radioactivity. The LOQ for total radioactivity determination was 0.009 ppm.

The TRR are summarized in Tables 8 and 9. Table 8 shows that total radioactivity in milk increased at each collection interval. Residues in cream concentrated 10-13x to about 1.74 ppm for both IND-label and TMP-label samples. The petitioner believes the concentration of residues in milk cream was not unexpected considering the lipophilic nature of DPX-JW062 [$K_{ow} \approx$ 41000 at pH 5 (most stable pH) and 25°C]. Skim milk contained 0.123 ppm total residues for the IND-label sample and 0.086 ppm for the TMP-label sample. In tissues, the highest total radioactivity was found in perirenal fat (1.1 ppm) with lower levels in omental fat (0.65-0.80 ppm). The TRR in liver and kidneys were 0.537-0.689 ppm and 0.288-0.365 ppm, respectively.

Table 9 presents the TRR is composite milk and all tissues. The petitioner reported that urinary and fecal excretion was the major elimination route for DPX-JW062, accounting for 73% and 80% of the total administered dose for the IND and TMP labels, respectively.

Table 8. Total radioactive residues in milk from cows following administration of [^{14}C]DPX-JW062 (IND or TMP label) at 10 ppm for five consecutive days.		
Matrix	TRR, ppm (DPX-JW062 equivalents)	
	IND Label	TMP Label
Milk		
0-24 hr	0.038 [a]	0.023 [a]
24-48 hr	0.120 [a]	0.059 [a]
48-72 hr	0.153 [a]	0.081 [a]
72-96 hr	0.135 [a]	0.086 [a]
96-119 hr	0.180 [a]	0.129 [a]
Composite milk sample from all collection intervals (as determined by HLS)	0.12	0.05
Composite milk sample from all collection intervals (as determined by Du Pont)	0.112	0.057
Skim milk (101-119.5 hr)	0.123	0.086
Cream (101-119.5 hr)	1.74	1.74

[a] Average total radioactivity for the 24-hour collection.

Table 9. Total radioactive residues in milk (composite) and tissues from cows following administration of [^{14}C]DPX-JW062 (IND or TMP label) at 10 ppm for five consecutive days.				
Matrix	TRR, DPX-JW062 equivalents			
	IND Label		TMP Label	
	ppm	% TRR	ppm	% TRR
Composite milk sample from all collection intervals (as determined by HLS)	0.12	0.8	0.05	0.7
Liver	0.537	0.447	0.689	0.517
Kidney	0.365	0.05	0.288	0.03
Muscle				
foreleg	0.04	0.005	0.05	0.006
rump	0.03	0.004	0.04	0.004
Fat				
omental	0.65	0.08	0.80	0.09
perirenal	1.1	0.09	1.1	0.06
subcutaneous	0.03	0.003	0.06	0.005
Bile	3.3	0.11	4.9	0.13
Whole Blood	0.11	0.002	0.12	0.002
Plasma	0.14	-----	0.15	-----
Urine (composite)	-----	19.3	-----	19.8
Feces (composite)	-----	53.3	-----	60.2
Total	-----	74.3	-----	81.6

Extraction and hydrolysis of residues

Milk and tissue samples were subjected to extraction and/or hydrolysis procedures for residue characterization and identification. The petitioner provided adequate descriptions of the fractionation schemes used for the analysis of DPX-JW062 residues in cow milk and tissues, and provided extraction procedures for each matrix. During the extraction and fractionation procedures, aliquots of extracts, hydrolysates, and nonextractable residues were analyzed for radioactivity by LSC or combustion/LSC. The general extraction and fractionation procedures are summarized below.

Milk: Milk samples were initially analyzed by HLS. Radioactive residues in composite milk samples from all collection intervals were extracted twice with ACN using an orbital shaker. After each extraction, the extract was separated from residual milk solids by centrifugation. The above-described procedures extracted 96.1% and 95.4% of the total radioactivity from IND label and TMP label milk samples, respectively. The ACN extracts were combined and reserved for chromatographic analysis.

Milk samples were re-analyzed by Du Pont. Radioactive residues in composite milk samples were extracted with methylene chloride instead of ACN. The petitioner reported that methylene chloride extracted 52.9% and 90.4% of the total radioactivity from IND label and TMP label milk samples, respectively, suggesting that the percent extracted for the IND-label sample was much lower than for the TMP-label sample. The petitioner could find no explanation but felt that this was an anomalous result based on preliminary extraction efficiency conducted by HLS which showed no significant differences in extraction with ACN or methylene chloride. No quantitative or raw data from these procedures were presented.

Fat and muscle: Radioactive residues in fat were extracted twice with ACN, and residues in muscle were extracted twice with acetone following the same procedures described for milk. All extracts were combined, concentrated, and reserved for chromatographic analysis. The nonextractable residues of fat were further extracted with ACN:water (1:1, v:v). The nonextractable residues of muscles were sequentially extracted with ACN:water (1:1, v:v), and enzymes (protease and pronase, 24 hours at 37°C with each enzyme). Due to low levels of radioactivity in the respective extracts and supernatants following extraction of bound residues, no chromatographic analyses were conducted.

Liver and kidney: Radioactive residues in liver and kidney were extracted with ACN. After extraction, the extract was separated from pellets by centrifugation. The pellets were subjected to further ACN extraction (once for kidney and twice for liver). The ACN extracts were combined, concentrated, and reserved for chromatographic analysis. An aliquot of the ACN extract (crude or concentrated) was partitioned with hexane-saturated ACN to separate lipids for metabolite isolation. The hexane washes were combined, concentrated, and reserved for chromatographic analysis. The residual pellets were subjected to enzymatic hydrolysis (Pronase E, 22 hours at 37°C) and centrifuged. The hydrolysates were reserved for chromatographic analysis.

Characterization and identification of residues

Milk: The ACN milk extracts were initially analyzed by HLS using HPLC Method 3 with a Zorbax®Rx-C8 column and gradient mobile phase of water and ACN containing 2% (v:v) tetrahydrofuran (THF). Metabolites were quantified by UV detection (254 nm) and identified by comparison of retention times with reference standards. HPLC analysis of the composite samples, and subsequent mass spectral confirmation, indicated that the parent compound, DPX-JW062, was the major radioactive residue, accounting for 77.9% and 63.1% of the total radioactivity for IND-label and TMP-label samples, respectively. No other residue was present at a concentration greater than 0.01 ppm. To confirm the identities of metabolites, milk extracts were analyzed using one-dimensional TLC on glass-backed Kieselgel 60 F_{254} plates developed with 1-butanol:2-butanone:water:ammonia (6:3:2:1:, v:v:v:v). Radioactive areas were detected by autoradiography, visualized under UV light (254 nm), and identified by comparison to reference standards.

Milk samples were re-analyzed by Du Pont for mass spectral characterization of residues and for determination of enantiomeric ratio of DPX-JW062. For mass spectral characterization, the pooled milk extracts were subjected to solid-phase extraction clean-up using a Supelco ENVI-Chrom SPE column. The eluate was collected, and the remaining residues were eluted with ACN. The ACN eluates were combined, concentrated, and reconstituted in ACN. Aliquots of the concentrated sample were separately analyzed using Du Pont HPLC Method 2 [Aquasil C18 column, isocratic mobile phase of ACN containing 2% (v:v) THF and water, detectors similar to those described above] and LC/MS. LC/MS analysis of the composite samples indicated that unchanged parent was the principal residue accounting for 25.0% and 49.1% of the total radioactivity for IND-label and TMP-label samples, respectively. The metabolite IN-MP819 was also found in milk at 20.6% and 28.1% of the total radioactivity for IND-label and TMP-label samples, respectively. The reported LOQ for this portion of the study were 0.004 ppm for the IND label and 0.002 for the TMP label.

For determination of the enantiomers of S-indoxacarb and R-indoxacarb, the peaks associated with DPX-JW062 from Cow 1 (IND label) pooled milk and Cow 2 (TMP label) Day 5 samples were subjected to solid-phase extraction prior to HPLC chiral analysis. The isolated peaks were loaded onto separate SPE columns and the eluates were collected. The columns were eluted with water and ACN. The eluates were analyzed by Du Pont Method 4 [Chiralcel OD with Diol guard column, gradient mobile phase of isopropanol:hexane:ethanol (10:89:1, v:v:v), detectors similar to those described above]. Chiral HPLC analysis of isolated DPX-JW062 indicated a ratio of S-indoxacarb to R-indoxacarb of about 2:1 indicating some enantiomer selectivity during absorption and/or metabolism.

Table 10 summarizes the characterization by HLS and Du Pont in composite milk samples.

Table 10. Distribution of TRR in Comp. Milk[b] from cows dosed with [indanone-1-^{14}C]DPSC-JW062 and [trifluoromethoxyphenyl-U-^{14}C]DPX-JW062 at 10 ppm in the diet for five consecutive days

Du Pont				HLS			
TRR: (ppm)		0.112	0.057	TRR: (ppm)		0.12	0.05
Concentration of Metabolites in ppm[a] (%TRR)							
Metabolite	Extraction	IND[c]	TMP[c]	Metabolite	Extraction	IND[c]	TMP[c]
DPX-JW062	Methylene Chloride	0.028 (25.0%)	0.028 (49.1)	DPX-JW062	ACN	0.09 (77.9 %)	0.03 (63.1)
IN-JT333		ND[d]	ND	M1[g]		0.01 (4.7)	<0.01 (4.2)
IN-MP819		0.023 (20.6)	0.016 (28.1)	M2[h]		-----	<0.01 (7.4)
5-HO-IN-JT333		ND	ND	M3[i]		-----	<0.01 (2.9)
5-HO-DPX-JW062[e]		ND	ND	M4[j]		0.01 (5.3)	0.01 (11.8)
IN-KG433		ND	ND				
IN-KB687		-----	ND				
IN-MN470 + IN-MF014		-----	ND				
HO-DPX-JW062-Glucuronide		ND	ND				
Total Characterized		0.051 (45.6)	0.044 (77.2)	Total Characterized		0.12 (96.1)	<0.05 (95.5)
Unknowns		0.01 (1 - 6.2)[f]	0.01 (8.2)				
Total Extracted		0.059 (52.9)	0.051 (90.4)	Total Extracted		0.12 (96.1)	0.05 (95.4)
Total Unextracted		0.053 (47.1)	0.006 (9.6)	Total Unextracted		<0.01 (3.9)	<0.01 (4.6)

[a] ppm expressed as DPX-JW062 equivalents.
[b] composite sample prepared from all collection intervals.
[c] IND = Indanone-1-^{14}C; TMP = Trifluoromethoxyphenyl ring - ^{14}C.
[d] ND = Not detected.
[e] 2 Hydroxylated DPX-JW062 diastereoisomers.
[f] 4 unknown milk metabolites each < 0.01 ppm each.
[g] M1 had retention time similar to IN-KG433.
[h] M2, present only in TMP labeled, could be IN-MN470 and/or IN-MF014.
[i] M3, present only in TMP labeled, could be IN-P0036.
[j] M4 had retention time similar to IN-KT319.

Liver: The liver ACN extracts were initially analyzed by Du Pont using HPLC Method 1 with a Zorbax®Rx-C8 column and gradient mobile phase of ACN containing 2% (v:v) THF and water; detectors were as above. Unknown metabolites were isolated using semi-preparative HPLC and identified by LC/MS. To determine if the milk metabolite that co-eluted with the parent was also present in liver, the extracts were also analyzed by Du Pont HPLC Method 3 with Keystone Prism RP and guard columns and an isocratic mobile phase of ACN containing 2% (v:v) THF and water (UV detection at 254 nm). The chromatograms provided by the petitioner suggested extensive metabolism of DPX-JW062. A number of metabolites were identified, with the parent as the major component in the ACN extract, accounting for 7.1% and 11.4% of the total radioactivity for IND-label and TMP-label samples, respectively. Hydroxylated parent 5-HO-

DPX-JW062 (diastereoisomers) and the glucuronide of hydroxylated parent were the only other metabolites with concentrations greater than 0.01 ppm. HED notes that in the discussion of results the petitioner stated that IN-JT333 was not detected (<0.01 ppm) in liver; however, the petitioner listed IN-JT333 along with IN-MP819, 5-HO-IN-JT333, and IN-KG433 as characterized residues in its table summary; the LOD for this analytical phase was not reported.

Kidney: The kidney ACN extracts were analyzed using Du Pont Method I (described above). To determine if the milk metabolite that co-eluted with the parent was also present in kidney, the extracts were analyzed by Du Pont HPLC Method 3 (described above). Chiral analysis was conducted using HPLC Method 5. Identification of major radioactive residues was by comparison of retention times with those of reference standards. HPLC analysis of the ACN extracts identified the parent as the major component accounting for 42.0% and 61.3% of the total radioactivity for IND-label and TMP-label samples, respectively. The only other metabolite identified was hydroxylated parent 5-HO-DPX-JW062 (diastereoisomers) which was present at 6.3% and 12.8% of the total radioactivity for IND-label and TMP-label samples, respectively. Chiral HPLC analysis of isolated DPX-JW062 indicated a ratio of S-indoxacarb to R-indoxacarb of about 2.5:1 indicating some enantioselectivity during absorption and/or metabolism.

Perirenal fat: Fat samples were analyzed by HLS. Residue characterization in fat was focused on perirenal fat because it contained the highest radioactivity. Initial identification was achieved by HPLC co-chromatography (Method 3 described above) and later confirmed by mass spectrometry. The parent was the major residue, accounting for 80.5% and 66.7% of the total radioactivity for IND-label and TMP-label samples, respectively. The metabolite IN-JT333 was identified and comprised 5.2% and 7.7% of the total radioactivity for IND-label and TMP-label samples, respectively.

Foreleg muscle: Foreleg samples were analyzed by HLS. Identification was achieved by HPLC (Method 3 described above) and TLC (same method as for milk but developed with chloroform:methanol:acetic acid, 90:10:1; v:v:v) co-chromatography and by analogy with MS results from other samples. Identification was later confirmed by mass spectrometry. The parent was the major residue, accounting for 28.7% and 37.0% of the total radioactivity for IND-label and TMP-label samples, respectively. No other component in the ACN extract had a concentration greater than 0.01 ppm.

The distribution and characterization of radioactivity in the extracts and hydrolysates of cow milk and tissues is presented in Table 11. The chemical structures and full chemical names of identified metabolites are depicted in Figure 1.

Table 11. Distribution of TRR in tissues from cows dosed with [indanone-1-^{14}C]DPSC-JW062 or [trifluoromethoxyphenyl-U-^{14}C]DPX-JW062 at 10 ppm in the diet for five consecutive days.

	Concentration of Metabolites in ppm[a] (%TRR)							
	Foreleg Muscle		**Liver**		**Kidney** [n]		**Perirenal Fat**	
TRR: (ppm)	0.04	0.05	0.537	0.689	0.365	0.288	1.1	1.1
Metabolites ↓	IND[c]	TMP[c]	IND[c]	TMP[c]	IND[c]	TMP[c]	IND[c]	TMP[c]
DPX-JW062	0.01 (28.7)	0.02 (37.0)	0.038 (7.1)	0.079 (11.4)	0.153 (42.0)	0.177 (61.3)	0.89 (80.5)	0.72 (66.7)
IN-JT333	ND	ND	<0.01 (<2.0)	<0.01 (<2.0)	ND	ND	0.06 (5.2)	0.08 (7.7)
IN-MP819	-----	-----	<0.01 (<2.0)	<0.01 (<2.0)	ND	ND	ND	ND
5-HO-IN-JT333	ND	ND	<0.01 (<2.0)	<0.01 (<2.0)	ND	ND		
5-HO-DPX-JW062[e]	<0.01 (<25)	<0.01 (<20)	0.030 (6.0)	0.063 (9.1)	0.023 (6.3)	0.037 (12.8)		
IN-KG433	ND	ND	<0.01 (<2.0)	<0.01 (<2.0)	ND	ND	ND	ND
IN-KB687	------	ND	------	0.022 (3.2)	-----	ND	-----	ND
IN-MN470 + IN-MF014	------	ND	------	0.060 (8.7)	-----	ND	-----	ND
HO-DPX-JW062-Glucuronide	ND	ND	0.024 (4.5)	0.019 (2.8)	ND	ND	ND	ND
Total Identified	~0.02 (53.7)	~0.02 (57.0)	0.132 (25.5)	0.283 (41.1)	0.176 (48.2)	0.214 (74.3)	0.95 (86.4)	0.80 (72.7)
Unknowns	0.01 (2.3 - 18.3)[g]		< 0.01 - 0.052 (1 - 8) [h]		0.008-0.043 (2.2 - 12)[i]	0.034 (12.5)	0.12[j] (11.3)	0.21[k] (19.6)
Total Extracted	0.032 (80.5)	0.040 (80.5)	0.294 (54.7)[l]	0.402 (58.3)[l]	0.257 (70.4)[l]	0.247 (85.8)[l]	1.07 (97.1)	1.03 (94.0)
Total Unextracted	0.008[o] (19.5)	0.01[o] (19.5)	0.243[l] (45.3)	0.287[l] (41.7)	0.108[l] (29.6)	0.041[l] (14.2)	0.03 (2.9)	0.07 [k, p] (6.0)
Protease Hydrolysis (liver and kidney only)	Not Applicable		0.125[m] (23.3)	0.183[m] (26.5)	0.069[m] (18.9)	0.028[m] (9.9)	Not Applicable	
Residues Remaining	Not Applicable		0.118 (22.0)	0.105 (15.2)	0.039 (10.7)	0.013 (4.3)	Not Applicable	

[a] ppm expressed as DPX-JW062 equivalents.
[b] composite sample prepared from all collection intervals.
[c] IND = Indanone-1-^{14}C; TMP = Trifluoromethoxyphenyl ring - ^{14}C.
[d] ND = Not detected.
[e] 2 Hydroxylated DPX-JW062 diastereomers.
[f] 4 unknown milk metabolites each < 0.01 ppm each.
[g] 6 unknown muscle metabolites each < 0.01 ppm each.
[h] Multiple unknown for TMP- TRR of 0.123 ppm with each ≤0.052 ppm; for IND - TRR of 0.125 ppm with each < 0.038 ppm .
[i] Multiple unknowns.
[j] Multiple unknowns whose TRR is 0.12 ppm with each ≤0.03 ppm.
[k] Multiple unknowns whose TRR is 0.21 ppm with each ≤0.09 ppm.
[l] Before protease hydrolysis.
[m] The petitioner reported the HPLC analysis of the hydrolysate did not resolve the parent or IN-JT333. The majority of liberated residues were characterized as polar compounds. No further characterization of these residues was attempted.
[n] An aliquot of the kidney's ACN extract was partitioned with hexane. The hexane fraction (3.5% TRR, 0.013 ppm) was not further characterized.
[o] Sequentially extracted with ACN:water, protease, and pronase..
[p] Extracted with ACN:water.

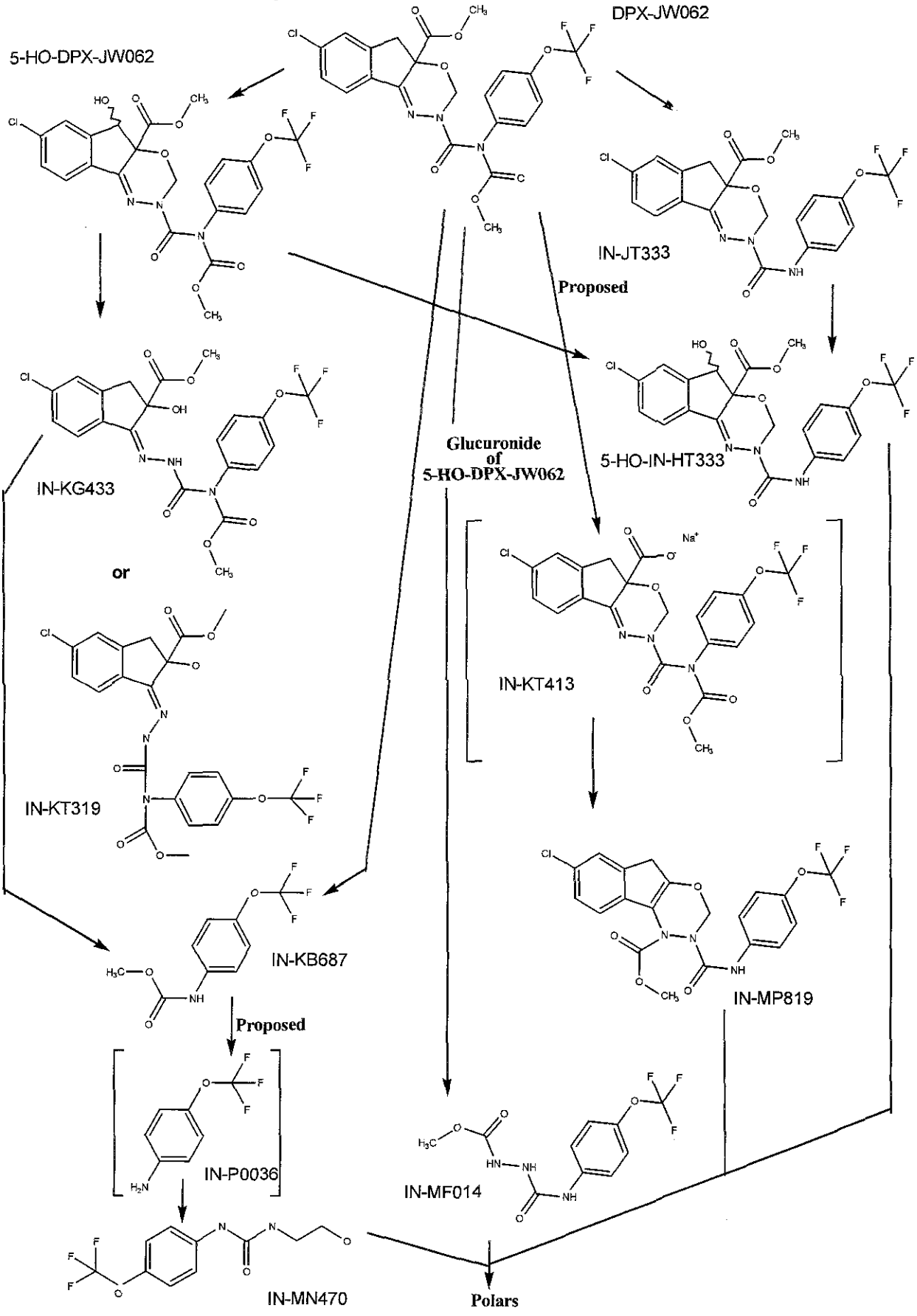
Storage stability

Milk and tissue samples were stored frozen for 4-37 months prior to analysis. A storage stability study was performed to validate the storage intervals and conditions of samples from the ruminant metabolism study. Subsamples of milk were re-extracted (as previously described) and the extracts were re-analyzed 33 months after their initial analysis. Subsamples of perirenal fat and muscle were also re-analyzed 20-21 months after their initial analysis. There were no significant changes in the chromatographic profiles of tissues extracted over a period of 33 months. Although changes in concentration were observed for parent and some metabolites in some samples, the petitioner believes that this is a case of sample-to-sample variation. Qualitatively, there were no significant differences.

Proposed metabolic pathway

The petitioner demonstrated that DPX-JW062 is metabolized by several pathways. The parent undergoes hydrolysis of a carbomethoxy group to form IN-JT333. IN-JT333, a significant metabolite in fat, was found in the rat and poultry metabolism studies. IN-MP819, found in milk, is most likely a re-arrangement product of IN-KT413, the free acid of DPX-JW062. DPX-JW062 and IN-JT333 are also hydroxylated on the indanone ring to form diastereomeric pair 5-HO-DPX-JW062 and 5-HO-IN-JT333 which were also *in vitro* rat metabolites. HO-IN-JT333, a minor liver metabolite in this study was found as a poultry metabolite. 5-HO-DPX-JW062 is conjugated with glucuronic acid and was found in the liver and kidney as a minor metabolite. Finally, the oxadiazine ring is cleaved to form IN-KB687, IN-MF014, and IN-MN470. IN-KB687 was an *in vitro* rat liver metabolite and is a proposed intermediate in the rat metabolism study. IN-MN470 was formed from the addition of ethanolamine to IN-P0036, a reaction previously described in the literature for an amino compound. These proposed pathways are consistent with the rat and poultry metabolism studies. Figure 1 shows the proposed metabolic pathway in ruminants.

Figure 1. Proposed metabolic pathway in ruminants.



Study summary: The ruminant metabolism study is acceptable. Following oral administration of [indanone-1-^{14}C]DPX-JW062 or uniformly ring-labeled [trifluoromethoxyphenyl-^{14}C]DPX-JW062 to lactating cows for 5 consecutive days at 10 ppm (0.4x the MTDB for beef and dairy cattle), the TRR (expressed as DPX-JW062 equivalents), respectively, were, 0.112 and 0.057 in pooled milk, 0.537 and 0.689 ppm in liver, 0.365 and 0.288 ppm in kidney, 0.03-0.04 and 0.04-0.05 in muscle, and 0.03-1.1 and 0.06-1.1 ppm in fat. Following separation of pooled milk from the last sampling interval into cream and skim milk, there was concentration of residues in cream of 10-13x.

The study sufficiently characterized/identified radioactive residues in milk and tissues. The parent, DPX-JW062, was the major residue found in all matrices and its % TRR distribution was as follows for IND-label and TMP-label samples, respectively: 25.0-77.9% and 49.1-63.1% in pooled milk, 7.1% and 11.4% in liver, 42.0% and 61.3% in kidney, 80.5% and 66.7% in perirenal fat, and 28.7% and 37.0% in foreleg muscle. Other metabolites were identified in milk and tissues at low concentrations: (I) IN-MP819 in milk (20.6-28.1% TRR, 0.016-0.023 ppm); (ii) 5-HO-DPX-JW062 in liver (6.0-9.1% TRR, 0.03-0.063 ppm) and kidney (6.3-12.8% TRR, 0.023-0.037 ppm); (iii) HO-DPX-JW062 glucuronide in liver (2.8-4.5% TRR, 0.019-0.024 ppm); (iv) IN-JT333 in perirenal fat (5.2-7.7% TRR, 0.06-0.08 ppm); (v) IN-KB687 in liver (3.2% TRR, 0.022 ppm); and (vi) IN-MN470 + IN-MF014 in liver (8.7% TRR, 0.060 ppm).

Poultry

E.I. du Pont de Nemours and Company submitted data (citation listed below) pertaining to the metabolism of [^{14}C]DPX-JW062 in hens. The biological and analytical phases of the study were conducted by Hazelton Wisconsin, Inc. (Madison, WI) and Du Pont Agricultural Products (Wilmington, DE), respectively.

> 44477326 Li, Y. (1997) Metabolism of (carbon 14)-DPX-JW062 (Racemic Mixture of DPX-KN128 and IN-KN127) in Laying Hens: Lab Project Number: AMR 3187-94: HWI 6324-128. Unpublished study prepared by Du Pont Agricultural Products and Hazleton Wisconsin, Inc. 224 p.

In-life phase

The radioactive test substances used in the study, [IND]DPX-JW062 (specific activity 45.1 μCi/mg, radiochemical purity >95%) or [TMP]DPX-JW062 (specific activity 52.8-54.0 μCi/mg, radiochemical purity >95%) were mixed with technical DPX-JW062 and dispensed into gelatin capsules to yield formulated test substances with a specific activity 10.0 μCi/mg prior to dosing.

The test substances were administered orally by balling gun to two groups of white leghorn laying hens (5 hens per group), once per day for five consecutive days; an additional five hens received formulation blank for controls. Each treatment hen received 1.2 mg of DPX-JW062 per day which is equivalent to 10 ppm of [C^{14}]DPX-JW062 per day based on a daily feed consumption of 120 g. The daily dose was equivalent to 25x the MTDB for poultry of 0.4 ppm, based on cottonseed meal (the only poultry feed commodity with proposed DPX-MP062 uses), a recommended tolerance of 2.0 ppm for cottonseed, and 20% maximum percent of diet. Hens were fed a commercial poultry feed and water *ad libitum*. The petitioner provided sufficient

descriptions of preparation of dose capsules and animal husbandry practices as well as data concerning daily feed intake, body weights, and egg production.

Ten additional laying hens (five each treatment group, IND or TMP label) were orally dosed with 8 mg of DPX-JW062 per day for five consecutive days (equivalent to ~65 ppm of [C^{14}]DPX-JW062 per day based on a daily feed consumption of 120 g) to assist in the isolation and characterization/identification of metabolites.

Eggs were collected twice daily (a.m. and p.m.) during the test period. The p.m. eggs were refrigerated and combined with the following day's a.m. eggs. Eggs were separated into yolks and whites, and frozen separately. The hens were sacrificed 21-24 hours after the final dose, and the following samples were collected: liver, gizzard, muscle (breast and thigh), fat, skin with fat, gastrointestinal tract and contents, and shelled eggs present in the oviduct. Eggs from the oviduct were combined with eggs from Day 5. All egg and tissue samples were stored frozen (-30 to -10°C) prior to processing and analysis.

Total radioactive residues (TRR)

Portions of composited egg whites and yolk were separately homogenized. Tissue samples were cut into small pieces and homogenized with dry ice. Aliquots of homogenized eggs and tissues were analyzed by combustion/LSC for total radioactivity. The TRR are summarized in Table 12; the LOD for total radioactivity determination was ≤0.0065 ppm. The results demonstrate that total radioactivity in egg yolks increased with each collection interval, and that concentration was higher in egg yolks than in egg whites. In tissues, the highest total radioactivity was found in fat (0.45-0.51 ppm); low residue concentrations were observed in liver, muscle, gizzards, skin with fat, and egg whites.

The petitioner reported that urinary and fecal excretion was the major elimination route for DPX-JW062, accounting for 88% and 87% of the total administered dose for hens dosed with [IND]DPX-JW062 and [TMP]DPX-JW062, respectively.

Table 12. Total radioactive residues in eggs and tissues from hens following administration of [^{14}C]DPX-JW062 (IND or TMP label) at 10 ppm for five consecutive days.				
Matrix	TRR, DPX-JW062 equivalents			
	IND Label		TMP Label	
	ppm	%TRR	ppm	%TRR
Egg, whites				
24 hr	0.07	0.04	0.04	0.02
48 hr	0.09	0.04	0.04	0.02
72 hr	0.03	0.02	0.02	0.01
96 hr	0.08	0.04	0.05	0.02
120 hr	0.10	0.07	0.05	0.03
Composite sample from high dose study [a]	-----	0.21	-----	0.10
Egg, yolks				
24 hr	0.01	<0.01	0.01	<0.01
48 hr	0.06	0.01	0.06	0.02
72 hr	0.11	0.03	0.13	0.03
96 hr	0.19	0.05	0.24	0.03
120 hr	0.31	0.10	0.33	0.50
Composite sample from high dose study [a]	-----	0.19	-----	0.18
Fat	0.46	0.84	0.51	0.88
Liver	0.11	0.07	0.15	0.09
Gizzard	0.08	0.04	0.13	0.07
Skin with fat	0.21	0.16	0.25	0.16
Muscle (breast)	0.02	0.18	0.02	0.16
Muscle, (thigh)	0.04		0.04	
Blood	0.03	0.06	0.17	0.27
Excreta	-----	87.6	-----	87.0
GI Tract w/ contents	-----	0.36	-----	0.42
Total	-----	89.7	-----	89.3

[a] Hens were dosed with 8 mg of DPX-JW062 per day for five consecutive days (equivalent to ~65 ppm [C^{14}]DPX-JW062 per day).

Extraction and hydrolysis of residues

Poultry tissue and egg (white and yolk) samples were subjected to extraction and/or hydrolysis procedures for residue characterization and identification. The petitioner provided adequate descriptions of the fractionation schemes used for the analysis of DPX-JW062 residues in eggs and tissues, and provided extraction procedures for each matrix. During the extraction and fractionation procedures, aliquots of extracts, hydrolysates, and nonextractable residues were analyzed for radioactivity by LSC or combustion/LSC. The general extraction and fractionation procedures are summarized below.

Residues in all egg and tissue samples were extracted using the following general method, unless otherwise specified below. A portion of the homogenized sample was further homogenized with ACN in an ice bath and centrifuged. The supernatant was collected, and the residues were extracted twice more with ACN. The ACN extracts were combined, concentrated, and partitioned with hexane to remove the fatty fractions. The hexane fraction was washed with ACN and discarded because of negligible residue levels (<5% TRR). The ACN fraction was concentrated and reserved for HPLC analysis.

Egg whites: Radioactive residues in egg white samples (72- and 120-hour, and composite samples from the high dose study) were extracted using the general method; however, ACN extracts were not partitioned with hexane.

Fat and skin with fat: Radioactive residues in fat and skin with fat samples were extracted using the general method; however, the nonextractable residues were solubilized in hexane for LSC analysis.

Liver: Radioactive residues in liver samples were extracted using the general method; however, following partitioning with hexane and concentration, the ACN extract was re-centrifuged and the remaining pellet was rinsed with methanol to recover additional radioactivity.

The nonextractable residues remaining following extraction of the 120-hour egg yolk from the IND label and liver samples from both labels were further characterized by enzyme hydrolysis (protease, pH 7.5, overnight). The enzyme hydrolysate was centrifuged with ACN. The remaining pellet was washed with ACN and sodium phosphate buffer. All supernatants were combined, concentrated, and lyophilized. The lyophilized pellet was extracted with methanol, and the methanol fraction was concentrated for HPLC analysis; the methanol extract from egg yolk was partitioned with hexane, ethyl acetate, and ACN to obtain a clear solution for HPLC analysis. The nonextractable residues from egg yolk and liver remaining following methanol extraction were combined and subjected to acid hydrolysis (6 M HCl at reflux) and centrifuged. The acid hydrolysate was then partitioned three times with ethyl acetate. The aqueous fraction was adjusted to pH 8 and re-partitioned with ethyl acetate. The ethyl acetate basic and acidic fractions were concentrated for HPLC analysis.

Characterization and identification of residues

The extracts and hydrolysate of the egg and tissue samples were analyzed by HPLC methods using UV (200-400 nm) and radiochemical detection. To initially analyze and quantitate metabolites in the crude extracts, HPLC method 2 using a PRP-1 and guard column, and gradient mobile phase of ACN and water with 0.025% (v:v) trifluoroacetic acid was used. Sample extracts were re-analyzed using HPLC method 4 which utilized a Zorbax Rx C-8 and guard column (same gradient mobile phase solvents and detection). To quantitate residues in egg white extracts, and in egg yolk and liver hydrolysates following enzyme or acid hydrolysis, a similar HPLC method was used. HPLC method 3 is the same as method 4 but uses a different gradient rate. Residues were quantitated by cochromatography with reference standards. Table 13 presents the characterization in eggs.

Table 13. Distribution of TRR in eggs from poultry dosed with [indanone-1-^{14}C]DPSC-JW062 and [trifluoromethoxyphenyl-U-^{14}C]DPX-JW062 at 10 ppm in the diet for five consecutive days.

	Concentration of Metabolites in ppm[a] (%TRR)							
	72- hour egg whites		120-hour egg white		72-hour egg yolk		120-hour egg yolk	
TRR: (ppm)	0.032	0.023	0.099	0.046	0.113	0.134	0.314	0.332
Metabolites ↓	IND[b]	TMP[b]	IND[b]	TMP[b]	IND[b]	TMP[b]	IND[b]	TMP[b]
DPX-JW062	HPLC resolved multiple components, none of which were present at > 0.02 ppm	-----	HPLC resolved multiple components, none of which were present at > 0.02 ppm	-----	0.01 (4.12)	<0.01 (3.19)	0.01 (3.59)	0.01 (4.01)
IN-JT333		-----		-----	0.01 (4.03)	0.01 (3.61)	0.02 (6.23)	0.02 (6.98)
IN-KG433		-----		-----	0.02 (19.1)	0.02 (13.2)	0.04 (13.9)	0.04 (12.3)
IN-KT319[c]		-----		-----	0.01 (7.52)	0.01 (5.34)	0.02 (5.61)	0.02 (5.89)
IN-JU873[d]		-----		-----	0.01 (5.33)	0.01 (8.53)	0.02 (7.26)	0.03 (7.95)
5-HO-IN-JT333		-----		-----	0.01 (11.6)	0.01 (9.46)	0.04 (13.4)	0.04 (12.9)
IN-MK638		< 0.01 (14.7)		0.01 (13.2)	-----	0.01 (5.92)	-----	0.03 (7.81)
IN-KB687		0.01 (24.8)		0.01 (19.1)	-----	0.01 (9.56)	-----	0.03 (10.4)
Metabolite F		-----		-----	0.01 (9.58)	0.01 (6.72)	0.05 (14.4)	0.04 (12.7)
Total Characterized (ACN extracted)		<0.02 (39.5)		<0.02 (32.3)	0.08 (61.3)	<0.10 (65.5)	0.20 (64.4)	0.26 (80.9)
Nonextractable after ACN extraction	<0.01[e] (9.45)	<0.01[e] (6.49)	0.01[e] (8.18)	<0.01[e] (1.82)	0.02[e] (21.0)	0.03[e] (20.5)	0.07[f] (21.5)	0.02[e] (5.88)
MeOH	-----	-----	-----	-----	-----	-----	0.03[g] (9.55)	-----
Non extractable after MeOH	-----	-----	-----	-----	-----	-----	NR[h]	-----
EtOAc	-----	-----	-----	-----	-----	-----	0.01[i] (3.18)	-----
Aqueous	-----	-----	-----	-----	-----	-----	0.01[j] (3.18)	-----
Nonextractable	-----	-----	-----	-----	-----	-----	NR[h,k]	-----

[a] ppm expressed as DPX-JW062 equivalents.
[b] IND = Indanone-1-^{14}C; TMP = Trifluoromethoxyphenyl ring - ^{14}C.
[c] IN-KT319 coeluted with 5-OH-JT333 isomer.
[d] IN-JU873 and 5-OH-JT333 isomer had very similar retention time in HPLC method 4, the quantitation was based on the combination of on-line Ramona integration and LSC of fractions collected.
[e] Not further analyzed.
[f] Subjected to enzyme hydrolysis (protease digestion) and ACN:water wash. The supernatant was lyophilized and extracted with methanol.
[g] Partitioned with hexane, ethyl acetate (EtOAc), and ACN to obtain clear solution for HPLC analysis. HPLC analysis resolved multiple peaks; TRR too low for further identification.
[h] NR= no residues.
[i] Subjected to acid hydrolysis (6 M HCl). The supernatant was partitioned with EtOAc..
[j] HPLC analysis resolved multiple peaks; TRR too low for further identification.
[k] Adjusted to pH 8 and partitioned with EtOAc. The resulting EtOAc and aqueous fraction each contained <0.01 ppm and were not further analyzed.

Metabolites in the ACN extracts of fat and 120-hour egg yolk were isolated/purified by preparative HPLC methods. The isolated metabolites were analyzed by LC/MS to confirm initial residue characterization. Metabolites in the composite TMP-treated egg white samples from the high dose rate study were also isolated using HPLC method 3. Five fractions were collected and concentrated for further HPLC analysis. Most fractions decomposed after concentration; therefore, only one fraction was analyzed by LC/MS.

Metabolite F was observed in all hen commodities except egg whites. In an attempt to identify the component, Metabolite F was isolated from the ACN extract of fat, and the isolated residue was analyzed by LC/MS. The petitioner reported that based on mass spectra, this metabolite was an intact molecule with an apparent molecular weight of 483 and was significantly different from the parent. High resolution mass spectrometry was conducted, and the data were consistent with the proposed molecular formula of $C_{20}H_{13}F_3ClN_3O_6$. The proposed chemical structure of Metabolite F along with other residue components identified in livestock matrices is depicted in Figure 1.

For determination of the enantiomers of S-indoxacarb and R-indoxacarb, the DPX-JW062 and IN-JT333 peaks isolated from fat were analyzed by chiral HPLC Method 6 (Chiralpak AD column, isocratic mobile phase of hexane:isopropanol (80:20, v:v), detectors same as above). A ratio of S-indoxacarb to R-indoxacarb of 2.8-3.2:1, and of IN-KN125 to IN-KN124 (enantiomers of IN-JT333) of 1.8-2.0:1 were obtained, indicating that the active enantiomers for both DPX-JW062 and its metabolite IN-JT333 were enriched in fat.

The distribution and characterization of radioactivity in the extracts and hydrolysates of hen eggs and tissues is presented in Table 14. The chemical structures and full chemical names of identified metabolites are depicted in Figure 3.

Table 14. Distribution of TRR in tissues from poultry dosed with [indanone-1-^{14}C]DPSC-JW062 and [trifluoromethoxyphenyl-U-^{14}C]DPX-JW062 at 10 ppm in the diet for five consecutive days.

	Concentration of Metabolites in ppm[a] (%TRR)											
	Fat		**Skin with fat**		**Liver**		**Gizzard**		**Muscle, thigh**		**Muscle, breast**	
TRR: (ppm)	0.457	0.508	0.213	0.253	0.105	0.146	0.079	0.128	0.04	0.037	0.02	0.017
Metabolites ↓	IND[b]	TMP[b]	IND[b]	TMP[b]	IND[b]	TMP[b]	IND[b]	TMP[b]	IND[b]	TMP[b]	IND[b]	TMP[b]
DPX-JW062	0.02 (4.97)	0.03 (6.43)	0.04 (17.0)	0.02 (8.81)	0.01 (4.81)	0.01 (3.76)	0.02 (25.3)	0.02 (12.2)	<0.01 (7.60)	<0.01 (3.04)	<0.01 (5.92)	<0.01 (5.10)
IN-JT333	0.08 (16.1)	0.09 (18.2)	0.04 (16.7)	0.03 (12.7)	-----	-----	0.01 (7.58)	0.01 (4.67)	0.01 (11.8)	<0.01 (4.54)	<0.01 (8.88)	<0.01 (6.3)
IN-KG433	0.03[c] (5.94)	0.03[c] (5.63)	0.01[c] (4.95)	0.02[c] (7.00)	0.01[f] (5.80)	0.01[f] (7.39)	<0.01[f] (2.90)	0.01[f] (6.07)	<0.01[h] (6.89)	<0.01[h] (10.9)	<0.01[h] (9.59)	<0.01[h] (9.53)
IN-KT319	0.02[d] (4.62)	0.03[d] (5.00)	0.01[d] (5.02)	0.02[d] (6.53)					<0.01[i] (4.55)	<0.01[i] (3.97)	<0.01[i] (3.95)	<0.01[i] (4.04)
IN-JU873	0.01[e] (1.64)	0.01[e] (1.83)	<0.01[e] (1.33)	0.02[e] (6.56)	0.02[g] (16.8)	0.03[g] (17.4)	0.01[g] (12.5)	0.01[g] (9.82)	<0.01 (4.29)	0.01[j] (14.0)	<0.01[j] (20.3)	<0.01[j] (22.3)
5-OH-IN-JT333	0.07 (13.4)	0.08 (15.3)	0.03 (14.5)	0.03 (11.6)					0.01 (14.4)			
IN-MK638	-----	-----	-----	0.01 (4.49)	-----	0.01 (4.64)	-----	0.01 (6.31)	-----	0.01 (16.4)	-----	<0.01 (13.5)
IN-KB867	-----	0.01 (1.69)	-----	0.01 (3.04)	-----	0.01 (4.67)	-----	0.01 (6.24)	-----	<0.01 (7.15)	-----	<0.01 (7.05)
Metabolite F	0.22 (45.3)	0.19 (37.8)	0.06 (29.3)	0.04 (16.2)	0.01 (9.18)	0.01 (9.00)	0.01 (7.98)	0.01 (5.40)	0.01 (13.2)	<0.01 (5.86)	<0.01 (9.77)	<0.01 (10.7)
Total Characterized (ACN extraction)	0.45 (92.0)	0.48 (91.9)	<0.20 (88.8)	0.20 (76.9)	0.05 (36.6)	0.08 (46.9)	<0.06 (56.3)	0.08 (50.7)	<0.04 (62.7)	<0.04 (65.9)	<0.02 (58.4)	<0.02 (78.5)
Total Extracted (ACN extraction)	0.45 (98.8)	0.50 (99.2)	0.21 (99.7)	0.25 (99.4)	0.05 (51.4)	0.09 (65.0)	0.06 (81.9)	0.09 (71.1)	0.04 (93.5)	0.03 (86.6)	0.02 (89.2)	0.02 (91.2)
Total Unextracted (after ACN extraction)	0.01[k] (1.20)	<0.01[k] (0.81)	<0.01[k] (0.26)	<0.01[k] 0.57	0.05[l] (48.6)	0.05[l] (35.0)	0.01[k] (18.1)	0.04[k] (29.0)	<0.01[k] (6.49)	<0.01[k] (13.4)	<0.01 (6.49)	<0.01 (8.85)
MeOH extraction	Not Applicable		Not Applicable		0.01[k] (10.5)	0.01[k] (5.17)	Not Applicable		Not Applicable		Not Applicable	
Nonextractable (after MeOH extraction)	Not Applicable		Not Applicable		NR[l,n]	NR[l,n]	Not Applicable		Not Applicable		Not Applicable	

Table 14. Distribution of TRR in tissues from poultry dosed with [indanone-1-^{14}C]DPSC-JW062 and [trifluoromethoxyphenyl-U-^{14}C]DPX-JW062 at 10 ppm in the diet for five consecutive days.

	Concentration of Metabolites in ppm[a] (%TRR)											
	Fat		**Skin with fat**		**Liver**		**Gizzard**		**Muscle, thigh**		**Muscle, breast**	
TRR: (ppm)	0.457	0.508	0.213	0.253	0.105	0.146	0.079	0.128	0.04	0.037	0.02	0.017
Metabolites ↓	IND[b]	TMP[b]	IND[b]	TMP[b]	IND[b]	TMP[b]	IND[b]	TMP[b]	IND[b]	TMP[b]	IND[b]	TMP[b]
EtOAc	Not Applicable		Not Applicable		0.01[m] (11.3)	0.02[m] (10.8)	Not Applicable		Not Applicable		Not Applicable	
Aqueous	Not Applicable		Not Applicable		0.01[o] (11.6)	0.01[o] (8.77)	Not Applicable		Not Applicable		Not Applicable	
Nonextractable	Not Applicable		Not Applicable		0.02 (11.6)	0.01 (5.75)	Not Applicable		Not Applicable		Not Applicable	

[a] ppm expressed as DPX-JW062 equivalents.
[b] IND = Indanone-1-^{14}C; TMP = Trifluoromethoxyphenyl ring - ^{14}C.
[c] IN-KG43 coeluted with In-MN969, mass spectra indicated that trace amounts of IN-MN969 also present.
[d] IN-KT319 coeluted with 5-OH-JT333 isomer.
[e] IN-JU873 and 5-OH-JT333 isomer had very similar retention time in HPLC method 4, the quantitation was based on te combination of on-line Ramona integration and LSC of fractions collected.
[f] This was the total % and ppm for In-KG433, In-MN969, IN-KT319, and 5-OH-JT333 isomer.
[g] IN-JU873 and 5-OH-JT333 coeluted in this method, the data were the total % and ppm for both metabolites.
[h] This may contain both In-KG433 and In-MN969.
[i] This may contain both In-KT319 and 5-OH-JT333 isomer.
[j] IN-JU873 and 5-OH-JT333 were not completely resolved, the data were the total % and ppm of both metabolites if they were not able to be separated.
[k] Not further analyzed.
[l] Subjected to enzyme hydrolysis (protease digestion) and ACN:water wash. The supernatant was lyophilized and extracted with methanol.
[m] HPLC analysis resolved multiple peaks, each present at <0.01 ppm.
[n] NR= no residues.
[o] Adjusted to pH 8 and partitioned with EtOAc. The resulting EtOAc and aqueous fraction each contained <0.01 ppm and were not further analyzed.

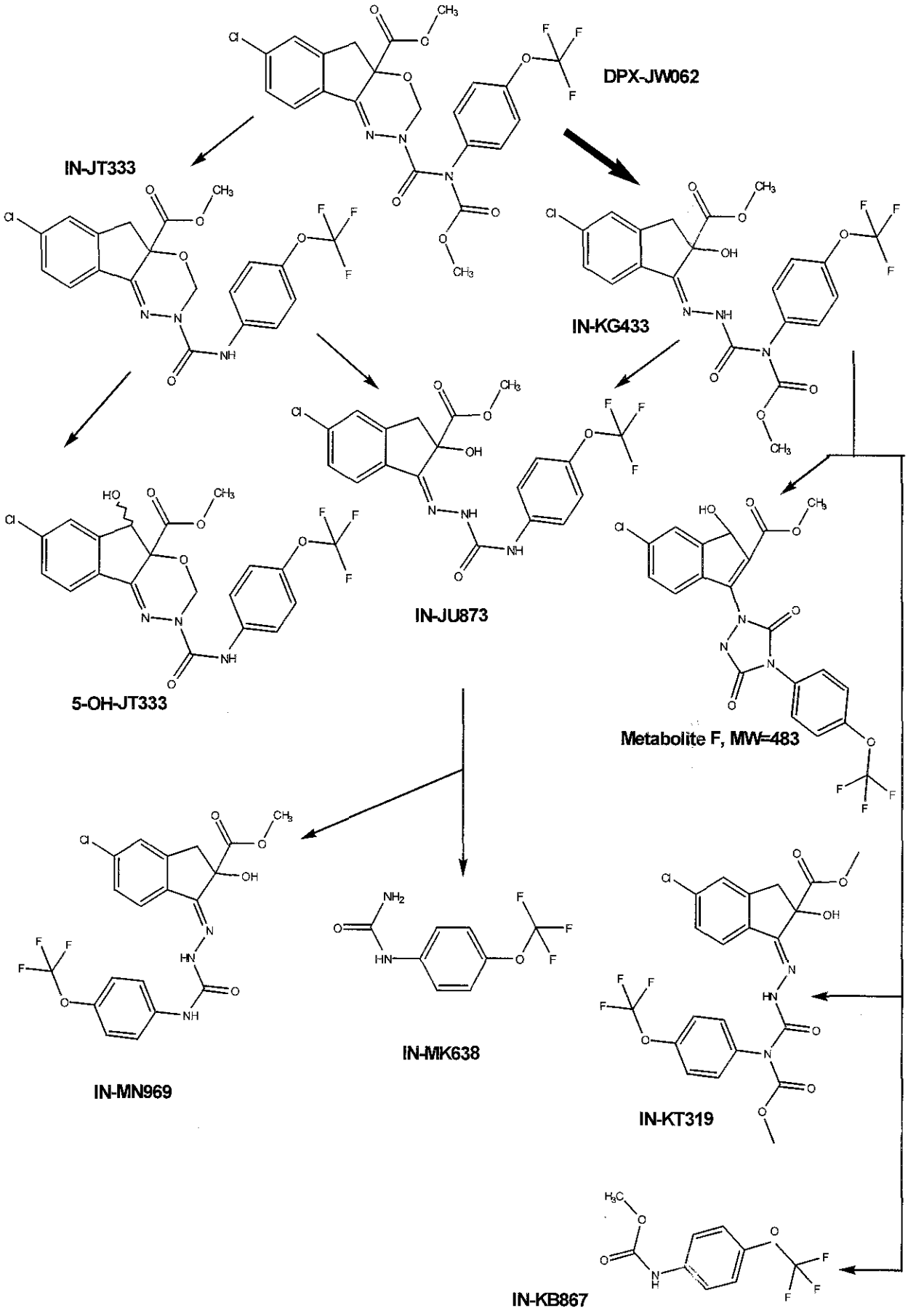
Storage stability

Egg and tissue samples were stored frozen for 2-12 months prior to analysis. Samples were originally extracted and analyzed by HPLC Method 1 within ~3 months of sacrifice. Samples were re-extracted, and the extracts were analyzed using similar HPLC methods approximately 1 year after the initial analysis. There were no significant changes in the chromatographic profiles of tissues extracted over a period of 12 months. The petitioner reported that an additional peak was observed in the 120-hour egg white sample extract, but essentially no major differences were observed.

Proposed metabolic pathway

The petitioner has demonstrated that DPX-JW062 is metabolized by three major pathways: the opening of the oxadiazine ring, the loss of the N-carboxymethoxy moiety to form IN-JT333, and hydroxylation at the C-5 position. Opening of the oxadiazine ring would form IN-KG433 and its related isomer IN-KT319. IN-KG433 appears to be further metabolized to Metabolite F and/or IN-JU873 by hydration/rehydration. Loss of the N-carboxymethoxy moiety of the parent compound yields IN-JT333 which may be further oxidized on the 5-position or the oxidiazine ring opened to form IN-JU873 and its related isomer IN-MN969. The petitioner has demonstrated that the proposed metabolic pathways for poultry are consistent with rat and ruminant metabolism studies. Figure 2 presents the proposed metabolic pathway in poultry.

Figure 2. Propose metabolic pathway in poultry.



Study summary: The poultry metabolism study is acceptable. Following oral administration of [indanone-1-^{14}C]DPX-JW062 or uniformly ring-labeled [trifluoromethoxyphenyl-^{14}C]DPX-JW062 to laying hens for five consecutive days at 10 ppm (16.7x the MTDB for poultry), the TRR (expressed as DPX-JW062 equivalents), respectively, were 0.03-0.10 and 0.02-0.05 ppm in egg white, 0.01-0.31 and 0.01-0.33 ppm in egg yolk, 0.45 and 0.51 ppm in fat, 0.21 and 0.25 ppm in skin with fat, 0.11 and 0.15 ppm in liver, 0.08 and 0.13 ppm in gizzard, 0.02 and 0.02 ppm in breast muscle, and 0.04 and 0.04 ppm in thigh muscle. Most of the radioactivity was readily extractable except in liver and egg yolk(120-hour sample, IND label).

The study adequately characterized/identified the majority of the radioactive residues in poultry eggs and tissues. Based on the number of metabolites identified, it is concluded that DPX-JW062 is extensively metabolized in poultry. The parent, DPX-JW062, was identified at concentrations of <0.01-0.04 ppm in all matrices (except egg whites) and its percent TRR distribution was as follows for IND-label and TMP-label samples, respectively: 3.6-4.1% and 3.2-4.0% in egg yolk (72- and 120-hour samples), 4.9% and 6.4% in fat, 17.0% and 8.8% in skin with fat, 4.8% and 3.8% in liver, 25.3% and 12.2% in gizzards, 7.6% and 3.0% in thigh muscle, and 5.9% and 5.1% in breast muscle.

Metabolite IN-JT333, the product of metabolism of the N-carboxymethoxy moiety of the parent, was identified in egg yolks (3.61-6.98% TRR, 0.01-0.02 ppm), fat (16.1-18.2% TRR, 0.08-0.09 ppm), skin with fat (12.7-16.7% TRR, 0.03-0.04 ppm), gizzard (4.67-7.58% TRR, 0.01 ppm), and muscle (4.54-11.8% TRR, <0.01-0.01 ppm). The monohydroxylated IN-JT333 was identified in egg yolk (9.46-13.4% TRR, 0.01-0.04 ppm), fat (13.4-15.3% TRR, 0.07-0.08 ppm), skin with fat (11.6-14.5% TRR, 0.03 ppm), and muscle (14.4% TRR, 0.01 ppm).

Metabolite F, characterized as the product of dehydration and rehydration of IN-KG433, was the major residue component observed in fat (37.8-45.3% TRR, 0.19-0.22 ppm) and skin with fat (16.2-29.3% TRR, 0.04-0.06 ppm). Metabolite F was also observed in egg yolks (6.7-14.4% TRR, 0.01-0.05 ppm), liver (9.0-9.2% TRR, 0.01 ppm), gizzards (5.40-7.9% TRR, 0.01 ppm), and muscle (5.9-13.2% TRR, <0.01-0.01 ppm). The following additional metabolites were identified in poultry matrices at concentrations ≤0.04 ppm: IN-KG433, IN-KT319, IN-KG433/IN-KT319, IN-JU873, IN-JU873/5-HO-IN-JT333, IN-MK638, and IN-KB687.

The results of the poultry metabolism study suggest that it is not possible to establish with certainty whether finite residues will be incurred, but there is a reasonable expectation of finite residues (Category 2 of 40 CFR §180.6). Based on these results, a poultry feeding study is requested.

Livestock metabolism conclusions: The qualitative nature of the residue in livestock is adequately understood based on acceptable studies conducted on cows and laying hens. HED will present the salient features of these studies to the HED MARC which will then determine the residues of toxicological and regulatory concern. Tolerances based on the parent only (as proposed for meat, milk, and kidney of cattle) or active enantiomer plus the metabolite (as proposed for milk fat and cattle fat) may not be appropriate. In such an instance, additional data may be required by the Agency.

Figure 3. DPX-JW062 and its metabolites in cotton (MRID 44477321), lettuce (MRID 44477322), tomato (MRID 44477323), ruminant (MRIDs 44477324 and 44477325), and poultry (MRID 44477326) commodities.

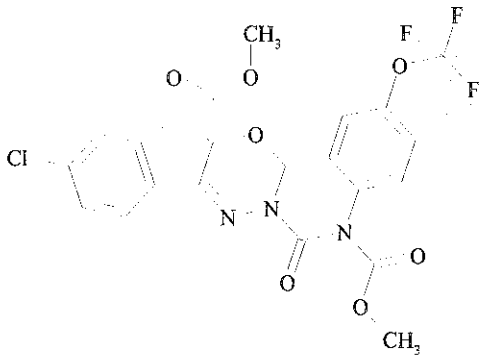
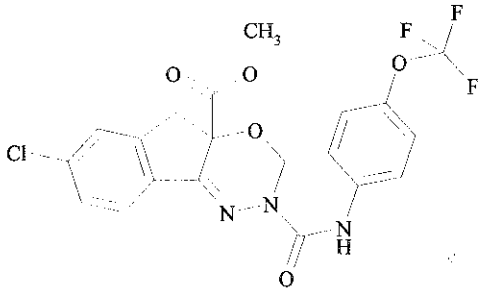
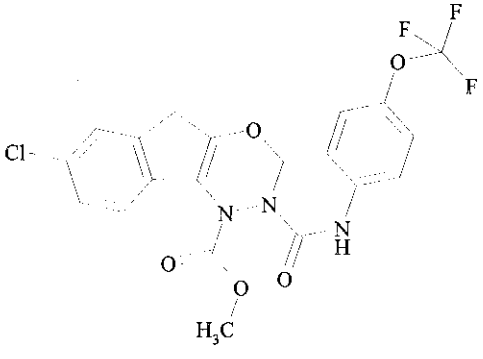
Common Name Chemical Name	Structure	Substrate
DPX-JW062; **DPX-MP062;** **S-indoxacarb/R-indoxacarb** CAS Name: (R,S)-Methyl 7-chloro-2,5-dihydro-2-[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino]-carbonyl]indeno[1,2-e][1,3,4]-oxadiazine-4a(3H)-carboxylate		Plant Metabolism - cotton, seed and plant - lettuce - tomato, fruits and leaves Livestock Metabolism -cow milk, liver, kidney, fat, and muscle - poultry egg yolk, fat, skin with fat, liver, gizzard, thigh muscle, and breast muscle
IN-JT333 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 Inverted Name: Indeno-[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylic acid, 7-chloro-2,5-dihydro-2-[[[4-(trifluoromethoxy)-phenyl]amino]carbonyl]-, methyl ester		Livestock Metabolism - cow liver and perirenal fat - poultry egg yolk, fat, skin with fat, gizzard, thigh muscle, and breast muscle
IN-MP819 CAS Inverted Name: Indeno-[1,2-e][1,3,4]oxadiazine-1(2H)-carboxylic acid, 7-chloro-3,5-dihydro-2-[[[4-(trifluoromethoxy)-phenyl]amino]carbonyl]-, methyl ester		Livestock Metabolism -cow milk and liver

Figure 3. DPX-JW062 and its metabolites in cotton (MRID 44477321), lettuce (MRID 44477322), tomato (MRID 44477323), ruminant (MRIDs 44477324 and 44477325), and poultry (MRID 44477326) commodities.

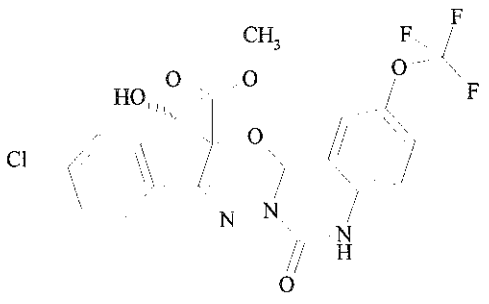
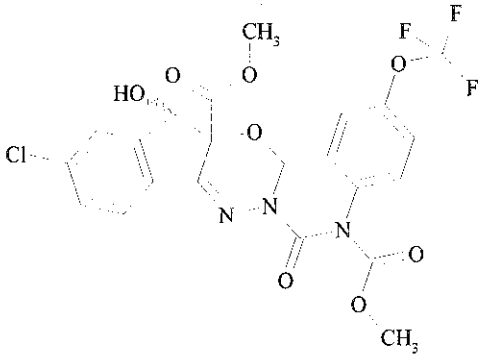
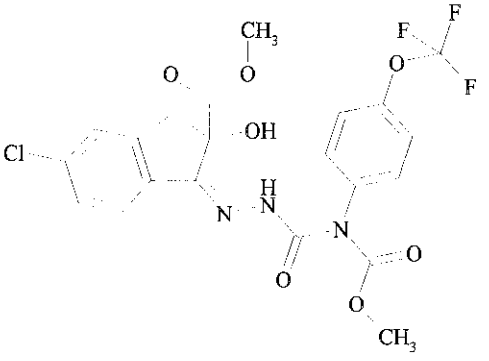
Common Name Chemical Name	Structure	Substrate
5-HO-IN-JT333 CAS Inverted Name: Methyl 7-chloro-2,5-dihydro-5-hydroxy-2-[[[4-(trifluoromethoxy)phenyl]-amino]carbonyl]indeno[1,2-e]-[1,3,4]oxadiazine-4a(3H)-carboxylate		<u>Livestock Metabolism</u> -cow liver - poultry egg yolk, fat, skin with fat, liver, gizzard, thigh muscle, and breast muscle
5-HO-DPX-JW062 CAS Inverted Name: Methyl 7-chloro-2,5-dihydro-5-hydroxy-2-[[methoxycarbonyl)[4-(trifluoromethoxy)phenyl]-amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate		<u>Livestock Metabolism</u> - cow foreleg muscle, liver, and kidney
IN-KG433 CAS Name: Methyl 5-chloro-2,3-dihydro-2-hydroxy-1-[[[(methoxycarbonyl)[4-trifluoromethoxy) phenyl]amino]carbonyl]hydrazono]-1H-indene-2-carboxylate CAS Inverted Name: 1H-indene-2-carboxylic acid, 5-chloro-2,3-dihydro-2-hydroxy-1-[[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino]-carbonyl] hydrazono]-, methyl ester (Z)		<u>Livestock Metabolism</u> - cow liver - poultry egg yolk, fat, skin with fat, liver, gizzard, thigh muscle, and breast muscle

Figure 3. DPX-JW062 and its metabolites in cotton (MRID 44477321), lettuce (MRID 44477322), tomato (MRID 44477323), ruminant (MRIDs 44477324 and 44477325), and poultry (MRID 44477326) commodities.

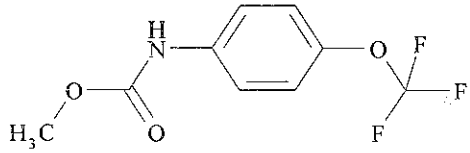
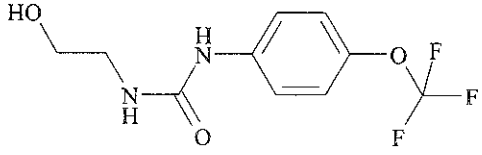
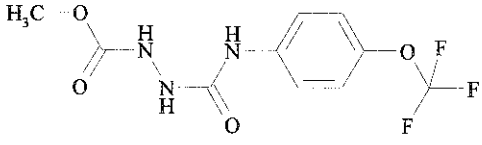
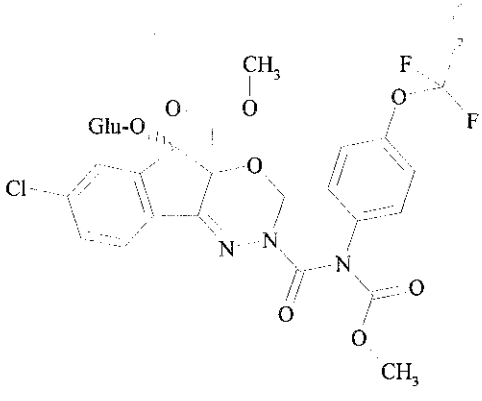
Common Name Chemical Name	Structure	Substrate
IN-KB687 CAS Inverted Name: Methyl [4-(trifluoro-methoxy)phenyl]-carbamate		<u>Livestock Metabolism</u> - cow liver - poultry egg white, egg yolk, fat, skin with fat, liver, gizzard, thigh muscle, and breast muscle
IN-MN470 CAS Inverted Name: Urea, N-(2-hydroxyethyl)-N'-[4-trifluoromethoxy)phenyl]urea		<u>Livestock Metabolism</u> - cow liver
IN-MF014 CAS Inverted Name: Methyl 2-[[[4-(trifluoromethoxy)phenyl]amino]-carbonyl]hydrazine carboxylate		<u>Livestock Metabolism</u> - cow liver
Glucuronide of 5-HO-DPX-JW062 CAS Inverted Name: Not available		<u>Livestock Metabolism</u> - cow liver

Figure 3. DPX-JW062 and its metabolites in cotton (MRID 44477321), lettuce (MRID 44477322), tomato (MRID 44477323), ruminant (MRIDs 44477324 and 44477325), and poultry (MRID 44477326) commodities.

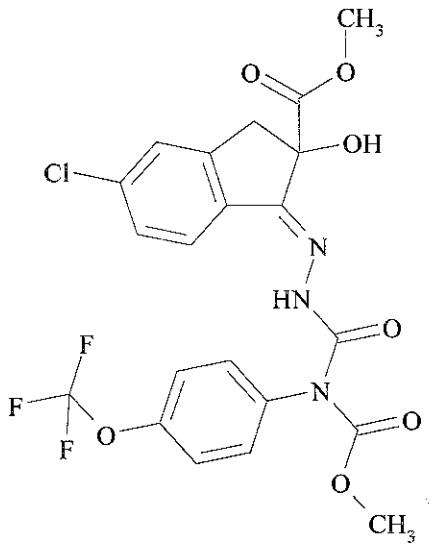
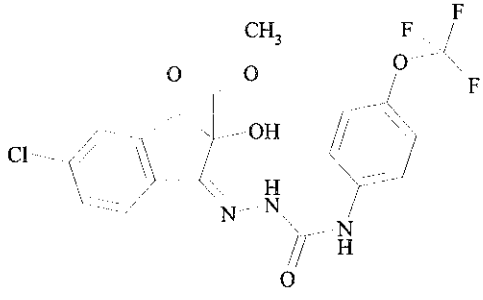
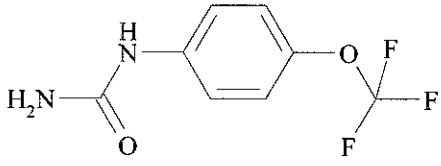
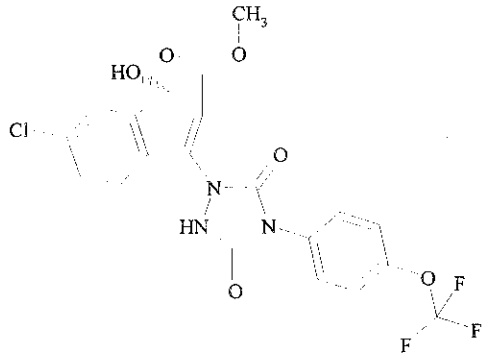
Common Name Chemical Name	Structure	Substrate
IN-KT319 Note: IN-KT319 is a geometrical isomer of IN-KG433. CAS Name: (E)-methyl 5-chloro-2,3-dihydro-2-hydroxy-1-[[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino]-carbonyl]hydrazono]-IH-indene-2-carboxylate		Livestock Metabolism - poultry egg yolk, fat, skin with fat, liver, gizzard, thigh muscle, and breast muscle
IN-JU873 CAS Name: Methyl 5-chloro-2,3-dihydro-2-hydroxy-1-[[[[4-(trifluoromethoxy)phenyl]amino]-carbonyl]hydrazono]-1H-indene-2-carboxylate		Livestock Metabolism - poultry egg yolk, fat, skin with fat, liver, gizzard, thigh muscle, and breast muscle
IN-MK638 CAS Name: N-[4-(trifluoro-methoxy)phenyl]urea		Livestock Metabolism - poultry egg white, egg yolk, skin with fat, liver, gizzard, thigh muscle, and breast muscle

Figure 3. DPX-JW062 and its metabolites in cotton (MRID 44477321), lettuce (MRID 44477322), tomato (MRID 44477323), ruminant (MRIDs 44477324 and 44477325), and poultry (MRID 44477326) commodities.

Common Name Chemical Name	Structure	Substrate
Metabolite F Characterized as the product of dehydration and rehydration of IN-KG433.		Livestock Metabolism - poultry egg yolk, fat, skin with fat, liver, gizzard, thigh muscle, and breast muscle

OPPTS GLN 860.1340: Residue Analytical Method

The petitioner has submitted 3 analytical methods (2 plant methods and 1 livestock method). The methods proposed for data gathering and enforcement are the same with only minor differences. The petitioner also submitted a comparison study for one of the plant methods.

Plant Commodities

Residue data collection methods

Method No. AMR 3493-95, Supplement No. 1

Samples of RACs and processed commodities from the submitted field trial and storage stability studies were analyzed for residues of S-indoxacarb/R-indoxacarb using the following GC/MSD method:

44477330 Gagnon, M.; Guinivan, R. (1995) Residue Procedure for the Analysis of DPX-JW062 in Crops by GC-MSD: Lab Project Number: AMR 3493-95. Unpublished study prepared by Du Pont Agricultural Products. 55 p.

44477331 Gagnon, M.; Guinivan, R. (1996) Residue Procedure for the Analysis of DPX-KN128/IN-KN127 in Crops and Related Process Fractions by GC-MSD: Supplement No. 1: Lab Project Number: AMR 3493-95. Unpublished study prepared by Du Pont Agricultural Products. 109 p.

Briefly, for all commodities **except corn and cottonseed**, samples are homogenized with ethyl acetate:water (150:20, v:v) and centrifuged. Following phase separation, the ethyl acetate supernatant is evaporated to dryness under nitrogen, reconstituted in hexane, and purified by silica solid-phase

extraction (SPE)/carbon SPE on a Silica Mega Bond Elut® cartridge connected in series with a carbon Supelclean™ ENVI™-Carb cartridge. For apple juice, grape juice, and wine, the ethyl acetate supernatant is reduced to dryness, then reconstituted in water and partitioned twice with hexane and centrifuged; the combined hexane supernatant is concentrated by evaporation prior to SPE. For cottonseed, samples are homogenized with acetonitrile (ACN):hexane (50:100, v:v), and the ACN supernatant is subjected to clean up and analysis. Residues of S-indoxacarb/R-indoxacarb are eluted from the cartridges with hexane:isopropanol (95:5, v:v). The eluate is evaporated to dryness under nitrogen, resuspended in ethyl acetate, and analyzed with a GC system equipped with an HP Ultra 2 capillary column and a mass selective detector. For analysis of residues at 0.02-0.25 ppm, the dried sample is reconstituted in 2 mL of ethyl acetate, and standards are prepared in control matrix. For analysis of residues at ≥0.20 ppm samples are further diluted with varying volumes of ethyl acetate depending on the matrix, and standards are prepared in ethyl acetate to eliminate matrix effects. The petitioner noted that this modification for higher residue levels does not eliminate matrix effects in apples, grapes, tomato paste, or tomato dry pomace. The reported LODs/LOQs for S-indoxacarb/R-indoxacarb are 0.003/0.007 ppm with standards prepared in control matrix and 0.03/0.08 ppm for diluted samples with standards prepared in ethyl acetate.

The petitioner submitted method validation data and concurrent recovery data for a number of crops. Samples were obtained from field trial and processing studies (control samples), and were fortified with S-indoxacarb/R-indoxacarb at 0.010-1.0 ppm (for analysis with standards prepared in control matrix) and 0.20-1.0 ppm (for analysis with standards prepared in ethyl acetate). The results of the method validation study are presented in Table 15, and concurrent recovery data generated in conjunction with the field trial and processing studies are presented in Table 16. Concurrent method recovery data for samples from the storage stability study are presented in Tables 28A and 25B of the "Storage Stability Data" section.

Alternate procedure: A description and validation data were also submitted for the following alternate procedure for method AMR 3493-95, which involves a modified extraction scheme and silica-GPC clean up. The petitioner stated that this method provides better clean up but requires 30% more time. Briefly, samples are homogenized with ethyl acetate:water (130:20, v:v) and centrifuged. The extraction/centrifugation is repeated with ethyl acetate alone, and the combined ethyl acetate supernatants are evaporated to near dryness using rotary evaporation, then reconstituted with ethyl acetate and evaporated to dryness under nitrogen. After reconstitution in hexane, the sample is applied to a Silica Mega Bond Elut® cartridge. Residues of S-indoxacarb/R-indoxacarb are eluted from the cartridge with hexane:isopropanol (95:5, v:v), and the eluate is evaporated to dryness under nitrogen, resuspended in ethyl acetate, and applied to a Phenogel® column. The 14- to 16.5-minute fraction containing S-indoxacarb/R-indoxacarb residues is collected, and the volume is adjusted with the addition of ethyl acetate prior to analysis on the GC/MSD system described above. Method validation data (fortifications at 0.01-0.5 ppm) for the alternate procedure are presented in Tables 15; concurrent recovery data generated in conjunction with the field trial and processing studies are included in Table 16. Concurrent method recovery data for samples from the storage stability study analyzed by the alternate procedure are presented in Table 28A of the "Storage Stability Data" section.

The results of the method validation study are presented in Table 15. Recoveries from method validation studies conducted by EN-CAS using samples fortified with S-indoxacarb/R-indoxacarb at 0.050-0.25 ppm are also presented in Table 15. Concurrent recovery data generated in conjunction with the field trial and processing studies are presented in Table 16.

Table 15. Method validation recoveries of S-indoxacarb/R-indoxacarb from samples of untreated raw agricultural and processed commodities fortified with S-indoxacarb/R-indoxacarb at 0.010-1.0 ppm and analyzed by GC/MSD and HPLC/column switching/UV methods.

Commodity (Laboratory)	Method of Analysis for Determination of S-indoxacarb/R-indoxacarb	LOQ (ppm) [a]	Fortification Level Range (ppm)	Range % Recovery [b]	Average % Recovery
Apple (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.007	0.020 - 0.25	76-110 122 (1)	95 ± 14 n=12
		0.007 (alternate cleanup)	0.010 - 0.20	70-115	93 ± 15 n=14
		0.08 (standards prepared in EtOAc)	0.20- 0.60	86 - 113	93 ± 11 n =5
		0.08 (alternate cleanup and standards prepared in EtOAc)	0.20- 0.50	72 - 114	90 ± 16 n = 7
Apple juice (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.007	0.020 - 0.25	72-106	88 ± 10 n = 12
		0.08 (standards prepared in EtOAc)	0.30 - 1.0	94 - 119	110 ± 9 n = 6
Apple pomace, wet (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.007	0.020 - 1.0	76- 119	99 ± 11 n = 19
		0.08 (standards prepared in EtOAc)	0.30 - 1.0	75 - 99	87 ± 10 n = 6
Applesauce [c] (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.007	0.020 - 0.25	61 (1) 73-108	86 ± 13 n = 18
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	74 - 99	80 ± 11 n = 5
Broccoli (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.007	0.020 - 0.25	77-113	99 ± 10 n = 12
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	67 (1) 79 - 105	98 ± 13 n =10
Cabbage (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.007	0.020 - 0.25	71-118 125 (1) 133 (1)	105 ± 18 n = 12

Commodity (Laboratory)	Method of Analysis for Determination of S-indoxacarb/R-indoxacarb	LOQ (ppm) [a]	Fortification Level Range (ppm)	Range % Recovery [b]	Average % Recovery
		0.007 (alternate cleanup)	0.020 - 0.25	72 -113	87 ± 11 n = 18
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	108 - 119	112 ± 6 n = 5
		0.08 (alternate cleanup and standards prepared in EtOAc)	0.20 - 0.60	107 - 120 122 (1)	117 ± 6 n = 5
Cauliflower (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.007	0.020 - 0.25	73 -113	95 ± 13 n = 18
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	76 - 108	89 ± 14 n = 5
Celery (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.007 (alternate cleanup)	0.020 - 0.25	70-117	91 ± 13 n = 18
		0.08 (alternate cleanup and standards prepared in EtOAc)	0.20 - 0.50	74 - 100	88 ± 11 n = 4
Cottonseed, undelinted (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.007	0.020 - 0.25	72-118 128 (1)	98 ± 16 n = 16
Grapes (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.007	0.020 - 0.25	71-118	88 ± 13 n = 11
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	65 (1) 84 - 117	92 ± 20 n = 5
		0.08 (alternate cleanup and standards prepared in EtOAc)	0.010 - 0.50	81-119 122 (1) 130 (1)	103 ± 13 n = 21
Grape juice [c] (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No. 1	0.007	0.020 - 0.25	73-100	85 ± 9 n = 17
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	71 - 114	94 ± 16 n = 5
Grape, raisins (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No. 1	0.007	0.020 - 0.25	73 - 102	86 ± 8 n = 12
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	91 - 119	105 ± 13 n = 5

Commodity (Laboratory)	Method of Analysis for Determination of S-indoxacarb/R-indoxacarb	LOQ (ppm) [a]	Fortification Level Range (ppm)	Range % Recovery [b]	Average % Recovery
Grape pomace, wet (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No. 1	0.007	0.020 - 0.25	78 - 113	98 ± 11 n = 18
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	93 - 101	98 ± 3 n = 5
Grape pomace, dry (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No. 1	0.007	0.020 - 0.60	80-119	98 ± 14 n = 17
Grape, wine [c] (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No. 1	0.007	0.020 - 0.25	83-116	100 ± 12 n = 12
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	81 - 107	94 ± 11 n = 5
Lettuce, head (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No. 1	0.007	0.020 - 0.25	76-117 127 (1)	98 ± 13 n =18
		0.007 (alternate cleanup)	0.020 - 0.25	79 - 118 125 (1) 131 (1)	102 ± 14 n = 18
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	93 - 110	101 ± 8 n = 5
		0.08 (alternate cleanup and standards prepared in EtOAc)	0.20 - 0.50	88 - 112	102 ± 10 n = 4
Lettuce, leaf (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.008 (alternate cleanup and standards prepared in EtOAc)	0.20 - 0.50	75 - 110	93 ± 16 n = 4
Pear (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.007	0.020 - 0.25	72-117	97 ± 15 n = 12
		0.007 (alternate procedure)	0.010 - 0.20	66 (1) 68 (1) 75 -117	89 ± 18 n = 14
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	76 - 84	79 ± 3 n = 5
		0.08 (alternate cleanup and standards prepared in EtOAc)	0.20 - 0.50	67 (1) 89 - 118	97 ± 24 n = 4

Commodity (Laboratory)	Method of Analysis for Determination of S-indoxacarb/R-indoxacarb	LOQ (ppm) [a]	Fortification Level Range (ppm)	Range % Recovery [b]	Average % Recovery
Pepper (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.007	0.010 - 0.50	71 - 114	96 ± 11 n = 17
		0.007 (alternate cleanup)	0.010	94 - 115 131 (1)	107 ± 14 n = 6
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	84 - 108	98 ± 10 n = 5
Spinach (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No.1	0.007 (alternate procedure)	0.020 - 0.25	69 (1) 72 - 110 122 (1)	95 ± 14 n = 18
Tomato (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplemental No. 1	0.007	0.020 - 0.25	69 (1) 74 - 108	89 ± 13 n = 12
		0.007 (alternate cleanup)	0.010 - 0.20	75-118 131 (1)	102 ± 14 n = 14
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	101 - 118	109 ± 7 n = 4
		0.08 (alternate cleanup and standards prepared in EtOAc)	0.20 - 0.50	92 - 108 129 (1)	105 ± 11 n = 8
Tomato paste (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No. 1	0.007	0.020 - 1.0	77 - 120	97 ± 11 n = 30
	GC/MSD Method No. AMR 3493-95, Supplement No. 2	1.0 [e] (standards prepared in EtOAc)	1.0 - 1.5	84 - 118	96 ± 12 n = 6
Tomato puree (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No. 1	0.007	0.020 - 0.25	74 - 109	92 ± 11 n = 12
		0.08 (standards prepared in EtOAc)	0.30 - 0.60	89 - 102	91 ± 9 n = 4
Tomato juice (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No. 1	0.007	0.020 - 0.25	76 - 114	92 ± 11 n = 11
		0.08 (standards prepared in EtOAc)	0.20 - 0.60	75 - 111	98 ± 15 n = 5
Tomato ketchup (Du Pont)	GC/MSD Method No. AMR 3493-95, Supplement No. 1	0.007	0.020 - 0.25	83 - 119	106 ± 13 n = 12
		0.08 (standards prepared in EtOAc)	0.30 - 0.60	73 - 104	87 ± 15 n = 4

[a] Where the LOQ is 0.007 ppm, standards were prepared in control matrix; where the LOQ is 0.08 ppm, samples were diluted with ethyl acetate and standards were prepared in ethyl acetate (corresponding to the proposed GC/MSD enforcement method, Supplement No. 2); "alternate cleanup" refers to the extraction/clean-up procedure involving silica-GPC.

[b] Recovery values outside the acceptable 70-120% range are listed separately.
[c] Includes analyses conducted with and without the hexane partitioning step.
[d] According to the petitioner, this sample was contaminated with S-indoxacarb/R-indoxacarb; this value was not included in calculating the mean.
[e] Data from MRID 44477332 submitted for the GC/MSD tolerance enforcement method, AMR 3493-95 Supplement No. 2.

Method No. AMR 2712-93

Samples of corn and cotton commodities from the submitted field trials and cotton processing study were analyzed for residues of S-indoxacarb/R-indoxacarb using the following reverse-phase HPLC/column switching method with UV detection at 310 nm:

> 44477327 Klemens, F.; McVicker, J.; Radcliff, J. (1997) Analytical Enforcement Method (HPLC/Column Switching/UV) for the Determination of Residues of S-indoxacarb and R-indoxacarb in Crops: Lab Project Number: AMR 2712-93: 95-0095: AMR3284-95.Unpublished study prepared by Du Pont Agricultural Products. 124 p.

Briefly, samples are homogenized with hexane-saturated ACN:ACN-saturated hexane (100:50, v:v) and centrifuged (2x). Following phase separation, the ACN phase is concentrated and purified by SPE on Mega Bond Elut® cartridges (Silica and/or SAX). For cotton forage, residues are eluted from the cartridge with hexane:isopropanol (85:15, v:v); for the remaining matrices, residues are not retained on the cartridge (initial and ACN rinse effluents are collected). The resulting eluates are evaporated to dryness under nitrogen and resuspended in mobile phase (ACN:0.03 M phosphate buffer, pH 3.0 (50:50, v:v)), then injected onto a Zorbax® SB-Cyano column. At ± 0.5 minutes relative to the peak retention time for S-indoxacarb/R-indoxacarb, a valve switches the effluent to flow through a Zorbax® ODS column where further analytical separation occurs. Once the first column has been cleaned and equilibrated to the mobile phase of the second column, the analytical separation occurs with both columns in series using an isocratic mobile phase of ACN:0.03 M phosphate buffer, pH 3.0 (60:40, v:v). The reported LOQs for S-indoxacarb/R-indoxacarb are 0.010 ppm for sweet corn K+CWHR and forage, cottonseed, and cotton forage, hulls, meal, and refined oil, and 0.050 ppm for sweet corn stover and cotton gin byproducts. GC/MSD method AMR 3493-95, Supplement No. 2 (described below) is proposed as a confirmatory method for cottonseed.

The petitioner submitted method validation data for sweet corn K+CWHR, forage, and stover, cottonseed, and cotton gin byproducts, hulls, forage, meal, and refined oil. The samples were obtained from the field trial and processing studies (control samples), and were fortified with S-indoxacarb/R-indoxacarb at 0.010-0.050 ppm. The results of the method validation study are presented in Table 16. Concurrent recovery data generated in conjunction with the field trial and processing studies are presented in Table 17.

Table 16. Method validation recoveries of S-indoxacarb/R-indoxacarb from samples of untreated raw agricultural and processed commodities fortified with S-indoxacarb/R-indoxacarb at 0.010-1.0 ppm and analyzed by GC/MSD and HPLC/column switching/UV methods.

Commodity (Laboratory)	Method of Analysis for Determination of S-indoxacarb/R-indoxacarb	LOQ (ppm) [a]	Fortification Level Range (ppm)	Range % Recovery [b]	Average % Recovery
Corn, sweet (K+CWHR) (Du Pont)	HPLC/Column Switching/UV Method No. AMR 2712-93	0.010	0.010 - 0.050	88-114	100 ± 7 n = 15
Corn, sweet, forage (Du Pont)	HPLC/Column Switching/UV Method No. AMR 2712-93	0.010	0.010 - 0.050	82-97	89 ± 5 n = 14
Corn, sweet, stover (Du Pont)	HPLC/Column Switching/UV Method No. AMR 2712-93	0.050	0.010 - 0.050	88-111	95 ± 6 n = 18
Corn, sweet, stover (EN-CAS)	HPLC/Column Switching/UV Method No. AMR 2712-93	0.050	0.050 - 0.25	75-99	87 ± 11 n = 8
Cottonseed, undelinted (Du Pont)	HPLC/Column Switching/UV Method No. AMR 2712-93	0.010	0.010 - 0.050	66 (1) 84-118 142 (1)	100 ± 16 n = 18
Cotton gin byproducts (Du Pont)	HPLC/Column Switching/UV Method No. AMR 2712-93	0.050	0.010 - 0.050	69 (1) 70 - 90 125 (1)	82 ± 17 n = 9
Cotton gin byproducts (EN-CAS)	HPLC/Column Switching/UV Method No. AMR 2712-93	0.050	0.050 - 0.25	81-110	90 ± 10 n = 8
Cotton forage (Du Pont)	HPLC/Column Switching/UV Method No. AMR 2712-93	0.010	0.010 - 0.050	70 - 108	85 ± 11 n = 9
Cotton hulls (Du Pont)	HPLC/Column Switching/UV Method No. AMR 2712-93	0.010	0.010 - 0.050	71-94 135 (1) [d]	84 ± 8 n = 12
Cotton meal (Du Pont)	HPLC/Column Switching/UV Method No. AMR 2712-93	0.010	0.010 - 0.050	73-98	84± 8 n = 9
Cotton, oil, refined (Du Pont)	HPLC/Column Switching/UV Method No. AMR 2712-93	0.010	0.010 - 0.050	78-89	82 ± 4 n = 9

[a] Where the LOQ is 0.007 ppm, standards were prepared in control matrix; where the LOQ is 0.08 ppm, samples were diluted with ethyl acetate and standards were prepared in ethyl acetate (corresponding to the proposed GC/MSD enforcement method, Supplement No. 2); "alternate cleanup" refers to the extraction/clean-up procedure involving silica-GPC.

[b] Recovery values outside the acceptable 70-120% range are listed separately.

[c] Includes analyses conducted with and without the hexane partitioning step.

[d] According to the petitioner, this sample was contaminated with S-indoxacarb/R-indoxacarb; this value was not included in calculating the mean.

Comments: The petitioner utilized a GC/MSD method (designated as Method No. AMR 3493-95, Supplement No. 1) and a reverse-phase HPLC/column switching method with UV detection at 310 nm (designated as Method No. AMR 2712-93) for determination of S-indoxacarb/R-indoxacarb residues in/on plant commodity samples collected from the storage stability, field residue, rotational crop, and processing studies. The concurrent recovery data indicate that these methods are adequate for data collection.

Enforcement methods

Method No. AMR 3493-95, Supplement No. 2

The petitioner is proposing a modification of GC/MSD method AMR 3493-95 for the enforcement of tolerances for residues of S-indoxacarb/R-indoxacarb in/on watery/non-oily commodities including apples, apple wet pomace, apple sauce, broccoli, cabbage, cauliflower, lettuce, pears, peppers, tomatoes, tomato paste, and ketchup. The method description and validation data were referenced in:

> 44477332 Gagnon, M.; Guinivan, R.; Desmond, P. (1997) Analytical Enforcement Procedure for the Analysis of DPX-KN128/IN-KN127 in Crops and Related Process Fractions by GC-MSD: Supplement No. 2: Lab Project Number: AMR 3493-95. Unpublished study prepared by Du Pont Agricultural Products. 62 p.

This method is the same as method AMR 3493-95, Supplement No. 1 (described above) except that procedures for analysis of residues at 0.02-0.25 ppm and the alternate analytical procedure involving silica-GPC clean up are not included; all of the tolerances currently proposed for plant commodities are ≥2.0 ppm, except for sweet corn kernel for which a separate enforcement method is being proposed (see below). Following silica SPE/carbon SPE, dried samples are reconstituted in varying volumes of ethyl acetate depending on the plant matrix, and standards are prepared in ethyl acetate; ion 527 is monitored for initial analysis. To confirm identification of S-indoxacarb/R-indoxacarb, samples are concentrated to 1 mL under a stream of nitrogen, and reinjected onto the GC/MSD with ion monitoring at m/e 218, 321, and 527. The reported LOQs for S-indoxacarb/R-indoxacarb are 0.03-0.044 ppm for most matrices, and 0.3-1.0 ppm for apple wet pomace, tomato paste, and ketchup.

Method validation included in the submission were duplicates of data presented with the data collection method except for tomato paste; the results of the method validation data for tomato paste are presented in Table 15.

Comparison of the data collection method and the proposed enforcement method: To confirm that methods AMR 3493-95, Supplement No. 1 and AMR 3493-95, Supplement No. 2 give comparable results, the petitioner conducted the following study:

> 44491704 Gagnon, M.; Guinivan, R.; Desmond, P. (1997) Analytical Enforcement Procedure for the Analysis of DPX-KN128 and IN-KN127 in Crops and Related Process Fractions by GC-MSD: Supplement No. 3: Lab Project Number: AMR 3493-95: SUPPLEMENT NO. 3. Unpublished study prepared by Du Pont Agricultural Products. 11 p.

Samples of apples, broccoli, lettuce, and tomatoes with the highest residue levels resulting from treatment at the maximum proposed label rate were selected from the field trials. Samples were extracted, purified, and analyzed by GC/MSD with standards prepared in control matrix (Supplement No. 1) or standards prepared in ethyl acetate (Supplement No. 2). The petitioner noted that because of the high levels of residues, samples of crops analyzed according to the Supplement No. 1 method were diluted with ethyl acetate at levels identical to samples analyzed according to Supplement No. 2. The results of the study are presented in Table 17. The petitioner included concurrent recovery data from fortifications of untreated samples. These data are presented in Table 18. These data demonstrate that GC/MSD method AMR 3493-95, Supplements 1 and 2 are comparable in recovering residues of S-indoxacarb/R-indoxacarb from apples, broccoli, lettuce, and tomatoes.

Table 17. Comparison of recoveries of S-indoxacarb/R-indoxacarb from samples of various treated raw agricultural commodities from the field trials by GC/MSD methods AMR 3493-95, Supplement No. 1 and AMR 3493-95, Supplement No. 2.

Crop	AMR 3493-95, Supplement No. 1		AMR 3493-95, Supplement No. 2	
	Residues found (ppm)	Average (ppm)	Residues found (ppm) [a]	Average (ppm)
Apples	0.27	0.67	0.25	0.66
	0.86		0.84	
	0.86		0.94	
	0.58		0.54	
	0.80		0.74	
Broccoli	0.73	0.44	1.05	0.59
	0.49		0.66	
	0.32		0.38	
	0.29		0.35	
	0.39		0.46	
Lettuce	6.5	9.8	9.0	8.5
	9.8		9.9	
	8.6		9.0	
	12		7.2	
	12		7.2	
Tomato	0.14	0.11	0.20	0.20
	0.13		0.21	
	0.13		0.20	
	0.20		0.28	
	0.086		0.11	

[a] Mean of two injections made at different concentrations to improve signal-to-noise ratio; calculated by the study reviewer.

Table 18. Concurrent recoveries from fortified samples of untreated raw agricultural commodities analyzed by GC/MSD Method Nos. AMR 3493-95, Supplement No. 1 and AMR 3493-95, Supplement No. 2.

Crop	Fortification Level (ppm)	% Recovery	
		AMR 3493-95, Supplement No. 1	AMR 3493-95, Supplement No. 2 [a]
Apple	0.75	89	132, 65
	1.5	88	76, 62
Broccoli	0.4	87	132, 65
	1.0	87	78, 55
Lettuce	6.5	85	100
	10.5	100	82
Tomato	0.10	81	113, 70
	0.25	86	72, 64

[a] Second injections were made at different concentrations to improve signal-to-noise ratio.

Method No. AMR 2712-93

The petitioner is proposing reverse-phase HPLC/column switching method with UV detection at 310 nm, method AMR 2712-93, for the enforcement of tolerances for residues of S-indoxacarb/R-indoxacarb in/on oily and non-oily crops (cotton and sweet corn commodities).

Independent Laboratory Validations (ILV)

Method No. AMR 3493-95, Supplement No. 2

The petitioner submitted the following data pertaining to the ILV of the GC/MSD method in spinach and tomatoes. These matrices were selected by the petitioner because they proved difficult to analyze.

> 44477328 Lyle, T.; James, J. (1997) Independent Laboratory Validation of a Proposed Tolerance Enforcement Analytical Method for the Determination of DPX-KN128/IN-KN127 in Crops and Related Process Fractions by GC/MS: Lab Project Number: AMR 4623-97:97-0036: AMR 3493-94. Unpublished study prepared by EN-CAS Analytical Labs. 100 p.

The validation studies were conducted by EN-CAS Analytical Laboratories (Winston-Salem, NC). Samples of untreated spinach leaves and tomatoes (commercially obtained) were fortified with S-indoxacarb/R-indoxacarb at 0.50-5.0 ppm and analyzed by the test laboratory using Method AMR 3493-95, Supplement No. 2. Following clean up, spinach samples were reconstituted in 25 mL of ethyl acetate; tomato samples were reconstituted in 15 mL of ethyl acetate (later diluted 1 to 2). It is noted that the dilution volume for tomatoes differs from the dilution volume specified in the enforcement method submission; a dilution volume for spinach was not specified in the submission. The results of the ILV are presented in Table 19. Only one trial was required for each matrix. The following two minor modifications were made: the instructions for SPE cartridge conditioning were revised slightly and use of fused silica packing in the inlet liner was added for the GC analysis. The laboratory indicated that a set of seven samples could be prepared and analyzed by a single analyst within a 6-hour period. The ILV data

indicate that GC method AMR 3493-95 adequately recovers residues of S-indoxacarb/R-indoxacarb from spinach and tomatoes. The fortification levels used in the study represent the LOQ and 2x the LOQ for spinach and tomatoes; spinach leaves were also fortified at 10x the LOQ.

Table 19. ILV of GC/MSD method AMR 3493-95, Supplement No. 2 using samples of spinach and tomatoes.

Commodity	Fortification Level, ppm	% Recovery
Spinach	0.50	84, 121
	1.0	114, 115
	5.0	106, 111
Tomato	0.30	100, 111
	0.60	89, 99

According to PR Notice 96-1, samples should be fortified at the proposed tolerance and at the proposed LOQs. The highest proposed tolerance in this petition is 20 ppm for leaf lettuce, and the highest fortification level from the above ILV study was 5.0 ppm. Although the ILV study failed to provide data at a fortification level of 20 ppm, the Agency will not request additional ILV data for GC/MSD method AMR 3493-95 since concurrent method validation, conducted by the registrant, demonstrated adequate method recovery at high fortification levels (see Table 15).

Method No. AMR 2712-93

The petitioner submitted the following data pertaining to the ILV of the HPLC/column switching/UV method in sweet corn and cotton commodities.

> 44477329 Lochhaas, C. (1997) Independent Laboratory Validation of a Proposed Enforcement Analytical Method for the Determination of DPX-KN128 and IN-KN127 in Crops by HPLC/Column Switching/UV: Lab Project Number: AMR 4625-97: 44139: AMR 2712-93. Unpublished study prepared by ABC Labs., Inc. and Du Pont Agricultural Products. 121 p.

The validation studies were conducted by ABC Laboratories (Columbia, MO). Samples of untreated sweet corn (K+CWHR), sweet corn forage, cottonseed, and cotton gin byproducts (from the crop field trials) were fortified with S-indoxacarb/R-indoxacarb at 0.01-20.0 ppm and analyzed by the test laboratory using method AMR 2712-93. The results of the ILV study are presented in Table 20. Only one trial was required for each matrix and only minor modifications were needed due to equipment differences. The laboratory indicated that two calendar days are needed to prepare and analyze six samples. The ILV data indicate that HPLC/column switching UV method AMR 2712-93 adequately recovers residues of S-indoxacarb/R-indoxacarb from sweet corn (K+CWHR), sweet corn forage, cottonseed, and cotton gin byproducts. The fortification levels used in the study represent the LOQs and the proposed tolerance levels for sweet corn and cotton commodities.

Table 20. ILV of HPLC/column switching/UV method AMR 2712-93 using samples of sweet corn and cotton commodities.		
Commodity	Fortification Level, ppm	% Recovery
Corn, sweet (K+CWHR)	0.01	83, 83
	0.02	80, 80
Corn, sweet, forage	0.01	72, 83
	10.0	100, 110
Cottonseed	0.01	88, 94
	3.0	93, 117
Cotton gin byproducts	0.05	88, 88
	20	75, 85

PMV

PMVs were requested for both plant methods (Memo, D245242, N. Dodd, 04/27/98). The PMVs have been completed. The petitioner is requested to submit standards of DPX-MP062, S-indoxacarb, and IN-JT333 to the EPA repository (Memo, D257972, S. Chun, 10/05/99).

Method 2712-93

The HPLC/column switching/UV Method AMR 2712-93, was found acceptable for enforcement by the Analytical Chemistry Laboratory Branch (ACLB) and will be forwarded to the Food and Drug Administration (FDA) to be included in the Pesticide Analytical Manual II (PAM II). The recoveries are acceptable. The LOQ of 0.01 ppm is applicable to pome fruit, head and stem Brassicas, cotton (see, forage, hulls, meal, and refined oil), head and leaf lettuce, fruiting vegetables, and sweet corn (K+CWHR) and sweet corn forage. The LOQ of 0.05 ppm is applicable to cotton gin byproducts and sweet corn stover. ACLB estimated the approximate LOD to be 0.0025 ppm for the commodities investigated. No revisions are recommended by ACLB (Memo, P. Golden and P. Schermerhorn, 7/21/99).

Method AMR 3493-95

ACLB found the GC/MSD method **unacceptable** for enforcement purposes due to lack of clear instructions in the procedure. Also, there were unacceptable recoveries (>120%) for some RACs. It was recommended by ACLB (Memo, D. Rains and D. Swineford, 9/20/99) not to forward the method to the FDA. It was recommended that the petitioner consider the conclusions reported in ACLB's memo when revising the method.

Confirmatory Method

The petitioner has not proposed a confirmatory method. Until the petitioner proposes an acceptable confirmatory method or re-submits an acceptable version of Method AMR 3493-95, the requirements for a confirmatory method remain unfulfilled.

Specificity Test

The petitioner has not demonstrated that Method AMR 3493-95 is specific for residues of indoxacarb. Until the petitioner submits an acceptable specificity test or submits an acceptable version of GC/MSD 0Method AMR 3493-95, the requirements for a specificity test remain unfulfilled.

Radiovalidation of the proposed enforcement method

The petitioner has submitted extraction efficiency data (citations listed below) for GC/MSD Method AMR 3493-95 and HPLC/column switching/UV method AMR 2712-93 for the determination of S-indoxacarb/R-indoxacarb in corn commodities, cotton, lettuce, potatoes, and tomatoes.

44477333 Behmke, F. (1997) Extraction Efficiency of Analytical Methods for the Determination of (carbon 14)DPX-JW062 (Racemic Mixture of DPX-KN128 and IN-KN127) Derived Residues in Corn: Lab Project Number: AMR 3320-95: AMR-3457-95: 9290017. Unpublished study prepared by Du Pont Agricultural Products. 58 p.

44477334 Behmke, F. (1997) Extraction Efficiency of Analytical Methods for the Determination of (carbon 14)DPX-MP062 (A Mixture of DPX-KN128 and IN-KN127) Derived Residues in Cotton: Lab Project Number: AMR 4594-97. Unpublished study prepared by Du Pont Agricultural Products. 27 p.

44477335 Behmke, F. (1997) Extraction Efficiency of Analytical Methods for the Determination of (carbon 14)DPX-JW062 (Racemic Mixture of DPX-KN128 and IN-KN127) Derived Residues in Lettuce: Lab Project Number: AMR 3315-95. Unpublished study prepared by Du Pont Agricultural Products. 23 p.

44477336 Behmke, F. (1997) Extraction Efficiency of Analytical Methods of DPX-KN128 and IN-KN127) Derived Residues in Potatoes: Lab Project Number: AMR 3457-95: AMR-3320-95: 9290017. Unpublished study prepared by Du Pont Agricultural Products. 46 p.

44477337 Behmke, F. (1997) Extraction Efficiency of Analytical Methods DPX-KN128 and IN-KN127) Derived Residues in Tomatoes: Lab Project Number: AMR 4633-97: AMR-4594-97. Unpublished study prepared by Du Pont Agricultural Products. 24 p.

Extraction efficiency studies were conducted by Du Pont using aged radiolabeled samples from the plant metabolism studies for lettuce (TMP-label). Corn and potato samples were generated by treating plants grown in pots with [TMP]DPX-JW062 formulated as a 60% WDG formulation; foliar spray applications were made at the maximum proposed seasonal rate of 0.532 lb ai/A for each crop. Subsamples of each crop were extracted with ethyl acetate:water (15:2, v:v; Method AMR 3493-95) and hexane-saturated ACN:ACN-saturated hexane (2:1, v:v; Method AMR 2712-93). Following extraction, the samples were centrifuged, and the supernatants were analyzed by LSC. Extraction efficiencies were determined by comparing the TRR in the samples from combustion with the TRR in the extracts. Results are presented in Table 21. These data fulfill requirements for radiovalidation of the proposed method.

Table 21. Extraction efficiency recoveries of [^{14}C]S-indoxacarb/R-indoxacarb from corn, cotton, lettuce, potato and tomato commodities using Method Nos. AMR 3493-95 and AMR 2712-93.		
Crop	% Recovery [a]	
	AMR 3493-95	AMR 2712-83
Corn (K+CWHR)	88.52-116.39; **103.28**	76.23-86.48; **80.41**
Corn forage	88.74-100.41; **93.49**	75.31-81.35; **78.04**
Corn fodder	88.73-95.94; **92.86**	86.68-95.36; **91.73**
Lettuce	82.1-90.9; **86.5**	95.8-97.1; **96.5**
Potatoes	83.2-95.7; **90.9**	83.6-116.4; **92.8**

[a] Five samples were analyzed for each analysis; average recovery values are **bolded**.

Conclusions on Analytical Enforcement Methodology for Plants: The petitioner has proposed GC/MSD method AMR 3493-95 and HPLC/column switching/UV method AMR 2712-93 for use as enforcement methods for plant commodities. The validation and concurrent recovery data submitted with this petition indicate that method AMR 3493-95 adequately recovers residues of S-indoxacarb/R-indoxacarb from watery/non-oily matrices and that method AMR 2712-93 adequately recovers residues of S-indoxacarb/R-indoxacarb from oily and non-oily matrices. Both methods have been adequately validated by an independent laboratory. The two methods were forwarded to Beltsville, MD for a final PMV. The plant method, Method AMR 2712-93, will be forwarded to FDA for inclusion in PAM II. The plant method, Method 3493-95, was found unacceptable for enforcement purposes.

However, though revisions were recommended, the petitioner does not have to submit a revised method AMR 3493-95, because an adequate plant enforcement method has been submitted (Method AMR 2712-93). The petitioner was requested to submit standards of DPX-MP062, S-indoxacarb, and IN-JT333 to the EPA repository (Memo, D257972, S. Chun, 10/05/99). **Until the receipt of the standards to the EPA repository, submission of an acceptable confirmatory method and the results of specificity testing, the requirements for analytical enforcement methodology will remain unfulfilled.** As method AMR 3493-95 utilizes GC/MSD detection, submission of an adequate version of this method will resolve the deficiencies related to method specificity and for a confirmatory method. The requirements for radiovalidation data are fulfilled, provided that S-indoxacarb/R-indoxacarb is the only residue of concern.

Livestock Commodities

Residue data collection and enforcement methods for livestock commodities

Method No. AMR 3337-95: Samples of commodities from the submitted cow feeding study were analyzed for residues of S-indoxacarb/R-indoxacarb and the metabolite IN-JT333 using the following reverse-phase HPLC/column switching method with UV detection at 310 nm. This method is also proposed for the enforcement of tolerances of residues of S-indoxacarb/R-indoxacarb and IN-JT333 in milk and cow tissues.

44477338 Amoo, J.; Beaver-Stetser, E. (1997) Analytical Method (HPLC/Column Switching/UV) for the Determination of Residues of DPX-KN128/IN-KN127 and IN-JT333 in Animal Matrices-Whole and Skim Milk, Cream, Fat, Muscle, Liver, and Kidney: Lab Project Number: AMR 3337-95. Unpublished study prepared by Du Pont Agricultural Products. 129 p.

The method involves different extraction and clean-up procedures for milk and tissues as presented below.

Whole and skim milk: Samples are homogenized with ACN and centrifuged (2x). The combined supernatants are evaporated to dryness using rotary evaporation, reconstituted in ACN, and evaporated to dryness again under a stream of nitrogen. If additional clean up is required, the dried extract is redissolved in 0.03 M potassium phosphate buffer, pH 3, and applied to a Sep-Pak C18 cartridge. Residues of S-indoxacarb/R-indoxacarb and IN-JT333 are eluted from the cartridge with ACN, and the purified extract is evaporated to dryness under nitrogen, resuspended in mobile phase (ACN:0.03 M potassium phosphate buffer (50:50, v:v)), and filtered.

Cream, liver, and kidney: Samples are homogenized with ACN:hexane (50:25, v:v), centrifuged, and the supernatant is collected. Following phase separation the ACN phase is collected, a second aliquot of ACN is added to the hexane phase, and centrifugation and phase separation are repeated. The ACN phases are partitioned with a second aliquot of hexane and combined following phase separation, then evaporated to dryness using rotary evaporation, and reconstituted in ACN. For *cream*, samples are then evaporated to dryness again under a stream of nitrogen. If additional clean up is required, the extracts are purified on a Sep-Pak C18 cartridge as described above for milk. For *liver and kidney*, the ACN extract is partitioned with hexane, evaporated to dryness under nitrogen, and reconstituted in hexane then applied to a Silica Mega Bond Elut® column. The column is eluted sequentially with hexane, isopropanol:hexane (2:98, v:v), and isopropanol:hexane (5:95, v:v) to remove fatty components; residues of S-indoxacarb/R-indoxacarb and IN-JT333 are eluted from the column with a second aliquot of isopropanol:hexane (5:95, v:v). The resulting eluate is evaporated to dryness under nitrogen, resuspended in mobile phase, and filtered.

Fat and muscle: Samples are homogenized with ethyl acetate and centrifuged (2x). The combined supernatants are evaporated to dryness using rotary evaporation. The extract is purified by the addition of hexane followed by ACN. The rinsates are combined, and the ACN phase is collected following phase separation, partitioned with a second aliquot of hexane, then evaporated to dryness under nitrogen. The dried extract is resuspended in mobile phase and filtered.

The purified extracts for each matrix are then injected onto a Zorbax® SB-Cyano column. At ±0.5 minutes relative to the respective peak retention times for S-indoxacarb/R-indoxacarb and IN-JT333, a valve switches the effluent onto a Zorbax® ODS column where further analytical separation occurs. Once the first column is cleaned and equilibrated to the mobile phase of the second column, the analytical separation occurs with both columns in series using an isocratic mobile phase of ACN:0.03 M phosphate buffer, pH 3.0 (60:40, v:v). The reported LOQ for S-indoxacarb/R-indoxacarb and IN-JT333 in milk, cream, and livestock tissues is 0.01 ppm each. GC/MSD analysis using the conditions described for plant method AMR 3493-95, selected ion monitoring at m/e 527 and 469, and the extraction procedures described above, is proposed as a confirmatory method.

The petitioner submitted method validation data for whole milk, skim milk, cream, fat, muscle, liver, and kidney, including validation data for whole and skim milk and cream extracted without the C18 SPE clean-up procedure. Samples were fortified separately with S-indoxacarb/R-indoxacarb and IN-JT333 at 0.010-5.0 ppm. The results of the method validation study are presented in Table 22. Concurrent recovery data generated in conjunction with the cattle feeding study are presented in Table 23.

Table 22. Method validation recoveries of S-indoxacarb/R-indoxacarb and IN-JT333 from samples of ruminant commodities fortified separately with S-indoxacarb/R-indoxacarb and IN-JT333 at 0.010-5.0 ppm and analyzed by HPLC/column switching/UV method AMR 3337-95.

Commodity (MRID)	Fortification Level (ppm)	% Recovery [a]	
		S-indoxacarb/R-indoxacarb	IN-JT333
Whole milk (C18 SPE) (44477338)	0.010	82-95 (6); **86**	78-85 (6); **82**
	0.050	76-84 (4); **79**	66(1); 76 -82 (3); **76**
	5.0	72-84 (4); **79**	72-84 (4); **79**
Whole milk (no clean up) (44477342)	0.010	80-96 (3); **86**	80-84 (3); **83**
	0.10	82-108 (3); **97**	71- 92 (3); **83**
	5.0	76-104 (3); **94**	76-97 (3); **88**
Skim milk (C18 SPE) (44477338)	0.010	86-109 (6); **95**	80-96 (6); **88**
	0.050	74-82 (4); **77**	70-78 (4); **74**
	5.0	74-94 (4); **87**	70-90 (4); **85**
Skim milk (no clean up) (44477342)	0.010	79-106 (3); **89**	84-95 (3); **91**
	0.10	100-106 (3); **102**	90-100 (3); **96**
	5.0	**98** (3)	93-100 (3); **96**
Cream (C18 SPE) (44477338)	0.010	90-105 (7); **99**	76-87 (7); **82**
	0.050	76-94 (4); **84**	72-82 (4); **75**
	5.0	78-96 (4); **84**	78-96 (4); **84**
Cream (no clean up) (44477342)	0.010	70-94 (5); **83**	59 (1); 70-98 (4); **77**
	0.10	95-104 (3); **99**	81-86 (3); **83**
	5.0	89-106 (3); **95**	72-91 (3); **81**
Fat (44477338)	0.010	89-108 (6); **100**	81-95 (6); **88**
	0.050	82-86 (4); **84**	72-80 (4); **76**
	5.0	76-82 (4); **80**	70-76 (4); **74**
Fat (44477342)	0.010	82-103 (3); **93**	73-92 (3); **83**
	0.10	87-101 (4); **91**	74-91 (4); **82**
	5.0	81-83 (3); **82**	72-75 (3); **73**

Commodity (MRID)	Fortification Level (ppm)	% Recovery [a]	
		S-indoxacarb/R-indoxacarb	IN-JT333
Muscle (44477338)	0.010	84-108 (6); **94**	82-93 (6); **86**
	0.050	70-88 (4); **82**	72-96 (4); **82**
	5.0	78-84 (4); **81**	78-88 (4); **83**
Muscle	0.010	94-101 (3); **97**	77-91 (3); **82**
	0.10	86-87 (4); **87**	85-88 (4); **86**
	5.0	73-80 (3); **77**	72-80 (3); **77**
Liver (44477338)	0.010	84-109 (6); **97**	86-106 (6); **94**
	0.050	70-100 (4); **87**	80-92 (4); **86**
	5.0	70-86 (4); **81**	82-88 (4); **85**
Liver (44477342)	0.010	81-108 (4); **95**	70-81 (4); **75**
	0.10	77-89 (4); **84**	71-78 (4); **76**
	5.0	81-88 (3); **84**	76-82 (3); **78**
Kidney (44477338)	0.010	92-105 (6); **99**	75-89 (6); **84**
	0.050	84-90 (4); **87**	72-84 (4); **77**
	5.0	78-94 (4); **85**	80-92 (4); **85**
Kidney (44477342)	0.010	90-116 (4); **104**	91-96 (4); **93**
	0.10	98-109 (4); **103**	72-77 (4); **73**
	5.0	98-115 (4); **106**	67 (2); 74, 75 (2); **71**

[a] Recovery values outside the acceptable 70-120% range are listed separately; the number of samples is reported in parentheses. Average recovery values are **bolded**.

Table 23. Concurrent recoveries of S-indoxacarb/R-indoxacarb and IN-JT333 from samples of ruminant commodities fortified separately with S-indoxacarb/R-indoxacarb and IN-JT333 at 0.010-5.0 ppm and analyzed by HPLC/column switching/UV method AMR 3337-95 (data are from MRID 44477342).

Commodity	Fortification Level (ppm)	% Recovery [a]	
		S-indoxacarb/R-indoxacarb	IN-JT333
Whole milk (no clean up)	0.01	72-107 (22); **91**	63, 64 (2); 70-99 (20); **84**
	0.10	86-95 (4); **89**	79-88 (4); **85**
	0.20	84-104 (4); **92**	84-97 (4); **89**
	0.25	79-105 (9); **94**	74-95 (9); **86**
	0.50	90-107 (4); **99**	88-103 (4); **96**
Skim milk (no clean up)	0.01	80-108 (8); **97**	85-100 (8); **92**
	0.25	86-105 (8); **95**	82-108 (8); **91**
Cream (no clean up)	0.01	77-111 (8); **93**	79-108 (7); 122 (1); **98**
	0.25	**84** (1)	**71** (1)
	3.0	82-86 (3); **84**	63, 67 (2); 75 (1); **68**
	5.0	74-87 (4); **81**	54, 63 (2); 71, 72 (2); **65**
Fat	0.01	91-100 (3); **95**	96-105 (3); **99**
	0.10	**93** (1)	**91** (1)
	0.20	**108** (1)	**100** (1)
	2.0	**94** (1)	**94** (1)
Muscle	0.01	93-96 (3); **95**	97-102 (3); **99**
	0.05	98, 102 (2); **100**	97, 101 (2); **99**
	0.10	**101** (1)	**107** (1)
Liver	0.01	90-103 (3); **97**	89-104 (3); **95**
	0.05	89, 108 (2); **99**	84, 98 (2); **91**
	0.10	**102** (1)	**100** (1)
Kidney	0.01	96-105 (3); **101**	86-88 (3); **87**
	0.05	92, 95 (2); **94**	78, 83 (2); **81**
	0.10	**100** (1)	**77** (1)

[a] Recovery values outside the acceptable 70-120% range are listed separately; the number of samples is reported in parentheses. Average recovery values are **bolded**.

Radiovalidation of the proposed enforcement method

The petitioner submitted extraction efficiency data for HPLC/column switching/UV method AMR 3337-95 for the determination of S-indoxacarb/R-indoxacarb in ruminant commodities.

Extraction efficiency studies were conducted by Du Pont using aged radiolabeled samples from the cow metabolism study. Subsamples of whole milk, muscle, fat, and liver were extracted according to the procedures described above with ACN or ethyl acetate depending on the matrix. Following extraction, the extracts were analyzed by LSC. Extraction efficiencies were determined by comparing the TRR in the samples from combustion with the TRR in the extracts. Results of the radiovalidation studies are presented in Table 24.

The petition noted that the low recoveries from liver samples by the extraction procedures employed here (two extractions) are comparable to the recovery of 63% obtained in the cow metabolism study (three extractions) for the indanone label, and stated that HPLC analysis of the indanone-labeled extracts yielded similar levels of DPX-JW062 from the residue (0.041 ppm) and metabolism (0.038 ppm) extraction procedures.

Table 24. Extraction efficiency recoveries of [^{14}C]S-indoxacarb/R-indoxacarb from livestock commodities using Method AMR 3337-95.

Matrix	% Recovery [a]
Whole milk	99-105 (4); **102**
Muscle	88, 96 (2); **92**
Fat	123, 127 (2); **125**
Liver -^{14}C-indanone	**52** (1)
^{14}C-trimethylamine	**49** (1)

[a] Recovery values outside the acceptable 70-120% range are listed separately; the number of samples is reported in parentheses. Average recovery values are **bolded**.

ILV

The petitioner submitted the following data pertaining to the ILV of the HPLC/column switching/UV method in livestock commodities.

> 44477339 Miller, C.; James, J. (1997) Independent Laboratory Validation of a Proposed Tolerance Enforcement Analytical Method (HPLC/Column Switching/UV) for the Determination of DPX-KN128 and IN-KN127 and IN-JT333 in Animal Matrices-Whole and Skim Milk, Cream, Fat, Muscle, Liver and Kidney: Lab Project Number: AMR 4624-97: 97-0035: AMR 3337-95. Unpublished study prepared by EN-CAS Analytical Labs. 179 p.

The validation studies were conducted by EN-CAS Analytical Laboratories (Winston-Salem, NC). Samples of untreated whole milk and muscle (ground beef) purchased commercially were separately fortified with S-indoxacarb/R-indoxacarb and IN-JT333 at 0.01 and 0.02 ppm each and analyzed by the test laboratory using Method AMR 3337-95. The results of the ILV are presented in Table 25. Two trials were required for whole milk and only one trial was required for ground beef; only minor modifications were needed. The laboratory noted that recoveries from milk were improved by reconstituting the dried

extract in ACN prior to adding buffer instead of in a mixture of ACN and buffer; this modification was incorporated in the second validation trial. The milk extracts were subjected to C18 SPE clean up as described above. The laboratory indicated that 7.5 hours are needed to prepare six samples of milk and 6 hours are needed to prepare six samples of ground beef, with automated HPLC analysis conducted overnight. The ILV data indicate that HPLC/column switching/UV method AMR 3337-95 adequately recovers residues of S-indoxacarb/R-indoxacarb and IN-JT333 from whole milk and ground beef. The fortification levels for S-indoxacarb/R-indoxacarb and IN-JT333 used in the study represent the LOQ and 2x the LOQ for milk and ground beef, as well as the proposed tolerance for muscle.

Table 25. ILV of HPLC/column switching/UV method AMR 3337-95 using samples of milk and ground beef.

Commodity	Fortification Level, ppm	% Recovery	
		S-indoxacarb/R-indoxacarb	IN-JT333
Whole milk [a]	0.01	76, 85	86, 93
	0.02	80, 84	69, 74
Ground beef	0.01	111, 113	86, 89
	0.02	100, 106	82, 84

[a] Results are from the second trial.

PMV

A PMV was requested for the livestock method (Memo, D245242, N. Dodd, 4/27/98). The PMV has been completed (Memo, D257972, S. Chun, 10/05/99).

ACLB considered the method, AMR 3337-95, suitable for food tolerance enforcement. Revisions were recommended in an addendum to the ACLB results memo (Memo, P. Golden and P. Schermerhorn, 7/21/99). These recommendations should be incorporated in the method AMR 33337-95. ACLB estimated the LOD for DPX-MP062 to be 0.002 ppm in whole milk and liver. ACLB estimated the LOD for S-indoxacarb to be 0.003 ppm in both cattle fat and milk cream. ACLB estimated the LOD for IN-JT333 to be 0.003 ppm in cattle fat and 0.004 ppm in milk cream (milk fat). The livestock method and the EPA addendum will be forwarded to FDA for inclusion in PAM II. Any copy of the livestock method that is distributed prior to publication in PAM II should include the EPA addendum.

Conclusions on Analytical Enforcement Methods for Livestock Commodities: Samples of commodities from the submitted ruminant feeding study were analyzed for residues of S-indoxacarb/R-indoxacarb and the metabolite IN-JT333 using an HPLC/column switching/UV method (Method AMR 3337-95). This method is also proposed for the enforcement of tolerances for residues of S-indoxacarb/R-indoxacarb and IN-JT333 in milk and cow tissues. The validation and concurrent recovery data submitted with this petition indicate that method AMR 3337-95 adequately recovers residues of S-indoxacarb/R-indoxacarb and IN-JT333 from livestock commodities. The submitted radiovalidation as well as ILV data of the method are adequate. The method was forwarded to Beltsville, MD for a final petition method validation and was found acceptable. The livestock method and the EPA addendum will be forwarded to FDA for inclusion in PAM II.

OPPTS GLN 860.1360: Multiresidue Method

The petitioner submitted data, citation listed below, concerning the recovery of residues of S-indoxacarb/R-indoxacarb using FDA multi-residue method protocols (PAM Vol. I).

> 44477340 Fomenko, J. (1996) Evaluation of DPX-JW062 Through the FDA Multiresidue Methods: Lab Project Number: A022.007: AMR 3351-95. Unpublished study prepared by Maxim Technologies, Inc. 78 p.

The results of multiresidue testing of DPX-JW062 have been forwarded to FDA (Memo, D260955, S. Levy, 11/03/99). DPX-JW062 was tested through Protocols C, D, and E. DPX-JW062 was not evaluated through Protocol A because it does not possess an N-methylcarbamate structure. It was not tested through Protocol B because is does not possess a carboxylic acid or phenolic moiety. It was not tested through Protocol F because, DPX-JW062 is not recoverable from Florisil at a level ≥ 30%.

Protocol C: DPX-JW062 chromatographs adequately under certain conditions, columns, and detectors in Protocol C. In Protocol C, DPX-JW062 does well on nonpolar megabore columns at high temperatures, using an electron capture detector (ECD), and using a nitrogen-phosphorous detector (NPD); however, DPX-JW062 chromatographs poorly with more polar megabore columns and poor sensitivity using ELCD-X detection.

Protocol D: Average recoveries from lettuce were 118% and 110% for the 0.1 ppm and 0.05 ppm fortification levels, respectively. Average recoveries of DPX-JW062 in apples were 158% and 159% for the 0.1 ppm and 0.5 ppm fortification levels, respectively. Matrix interferences and/or enhancement effects were believed to have been a factor in the high recoveries. Therefore, the extraction procedure was repeated and modified to include a Florisil cleanup. This resulted in average recoveries in apples of 134% and 109% for the 0.1 ppm and 0.5 ppm fortification levels, respectively.

Protocol E: Recoveries of DPX-JW062 from Florisil were <10% using the mixed elution system. No recoveries were noted using the methylene chloride elution system. The average total recovery of DPX-JW062 from Florisil was 74% using the mixed ether elution system.

Comments: The petitioner has submitted data concerning the recovery of residues of S-indoxacarb/R-indoxacarb using FDA multiresidue method protocols (PAM Vol. I). The results of multiresidue testing of DPX-JW062 have been forwarded to FDA (Memo, D260955, S. Levy, 11/03/99). DPX-JW062 was tested through Protocols C, D, and E.

OPPTS GLN 860.1380: Storage Stability Data

Plant commodities

The RAC samples from associated studies pertaining to magnitude of the residue in plants were frozen promptly (within 1.5-4 hours) after harvest, shipped frozen to the respective analytical laboratories, and remained under frozen storage conditions until residue analysis. The processed commodity samples from the submitted processing studies were also stored frozen prior to residue analysis. The total storage intervals between harvest and analysis for the RAC and processed samples are presented in Table 26.

Included in the residue field trial data submitted for corn (sweet), cottonseed, peppers, and tomatoes are concurrent storage stability data generated by the petitioner to support the storage intervals and conditions of harvested samples. Untreated samples obtained from the respective field trials were separately fortified with S-indoxacarb/R-indoxacarb and stored frozen. Subsamples were then analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described GC/MSD method (Du Pont Report No. AMR-3493-95, Supplement No. 1). This method is adequate for data collection based on concurrent method recoveries. The results of the concurrent storage stability studies are presented in Table 27.

Table 26. Frozen storage intervals (from harvest to residue analysis) of various RAC and processed commodities.

Crop Commodity	MRID	Storage Interval
Apple	44477343	~ 6-11 months
	44477344	~ 6-7 months
	44477415	~ 2 months
Apple juice	44477415	~ 2 months
Apple pomace, wet	44477415	~ 2 months
Broccoli	44477401	~ 2-10 months
	44477402	~ 4-7 months
Cabbage	44477403	~ 2-8 months
	44477404	~ 2-10 months
Corn, sweet (K+CWHR)	44477405	~ 15-17 months
	44477406	~ 10-12 months
Corn, sweet, forage	44477405	~ 16-21 months
	44477406	~ 10-12 months
Corn, sweet, stover	44477405	~ 16-25 months
	44477406	~ 9-11 months
Cottonseed, undelinted	44477407	~ 4-9 months
	44477408	~ 9-13 months
	44477416	~ 11-12 months
Cotton gin byproducts	44477407	~ 7-11 months
Cotton hulls	44477416	~ 10 months
Cotton meal	44477416	~ 10 months
Cotton oil, refined	44477416	~ 10 months
Lettuce, head	44477409	~ 1-3 months
	44477410	~ 2-15 months
Lettuce, leaf	44477409	~ 2-17 months
	44477410	~ 1-3 months
Pear	44477411	~ 8-10 months

Crop Commodity	MRID	Storage Interval
Peppers (bell and non-bell)	44477412	~ 2-7 months
Tomatoes	44477413	~2-11 months
	44477414	~3-6 months
	44477417	~1-5 months
Tomato, paste	44477417	~1.5 months
Tomato, puree	44477417	~1.5 months

Table 27. Storage stability and concurrent method recoveries (fresh fortification recovery) of residues of S-indoxacarb/R-indoxacarb from various RAC samples fortified with S-indoxacarb/R-indoxacarb and stored frozen (temperature unspecified).

Storage Period (Months)	Fortification Level (ppm)	Fresh Fortification Recovery (%) [a]	Apparent Recovery in Stored Samples (%) [a]	Corrected Recovery in Stored Samples (%) [b]
Apple				
MRID: 44477344				
0	0.10 [c]	85, 87, 88, 90 (88)	--	--
0	0.10 [d]	88, 95, 96, 110 (97)	--	--
7	0.10 [c]	95, 96 (96)	86, 87 (87)	90, 91
Corn, sweet (K+CWHR)				
MRID: 44477405				
0	0.10 [c]	89, 95, 100, 100 (96)	--	--
0	0.10 [d]	87, 87, 96, 96 (92)	--	--
0	0.10	82, 88, 89, 92 (88)	--	--
1	0.10	93, 95 (94)	89, 96 (93)	95, 102
3	0.10	79, 86 (83)	89, 90 (90)	107, 108
6	0.10	80, 85 (83)	79, 79 (79)	95, 95
9	0.10	75, 76 (76)	68, 68 (68)	89, 89
MRID: 44815802				
0	0.10	88, 89 (89)	92, 82, (87)	98
1	0.10	95, 93 (94)	96, 89 (93)	99
3	0.10	86, 79 (83)	89, 90 (90)	108
6	0.10	80, 85 (83)	79, 79 (79)	95
9	0.10	75, 76 (76)	68, 68 (69)	91
23	0.10	89, 89 (89)	79, 72 (76)	85
MRID: 44815806				
0	0.10	100, 100 (100)	95, 89 (92)	92
15	0.10	83, 83 (83)	87, 90 (88)	106
Corn, sweet, forage				
MRID: 44477405				
0	0.10 [c]	78, 84, 80, 80 (81)	--	--

Storage Period (Months)	Fortification Level (ppm)	Fresh Fortification Recovery (%) [a]	Apparent Recovery in Stored Samples (%) [a]	Corrected Recovery in Stored Samples (%) [b]
0	0.10 [d]	95, 96, 99, 104 (99)	--	--
0	0.10	82, 85, 86, 86 (85)	--	--
1	0.10	64, 74 (69)	78, 79 (79)	113, 114
3	0.10	100, 110 (105)	96, 98 (97)	91, 93
6	0.10	80, 112 (96)	98, 107 (103)	102, 111
MRID: 44815802				
0	0.10	85, 86 (86)	86, 82 (84)	98
1	0.10	74, 64 (69)	79, 78 (79)	114
3	0.10	100, 110 (110)	98, 96 (97)	88
6	0.10	80, 112 (95)	107, 98 (104)	109
20	0.10	111, 117 (114)	113, 118 (116)	102
MRID: 44815806				
0	0.10	80, 80 (80)	84, 78, (81)	101
13	0.10	100, 92 (96)	88, 80 (84)	88
Corn, sweet, stover				
MRID: 44477405				
0	0.50 [c]	74, 91, 92, 92 (88)	--	--
0	0.50 [d]	92, 93, 93, 95 (93)	--	--
0	0.50	95, 97, 99, 109 (100)	--	--
1	0.50	92, 99 (96)	60, 76 (68)	63, 79
1[e]	0.50	79, 105 (92)	60, 78 (69)	65, 85
3	0.50	77, 85 (81)	79, 91 (85)	98, 112
4	0.50	91, 94 (93)	56, 72 (64)	60, 77
MRID: 44815802				
0	0.5	109, 95 (102)	99, 97 (98)	96
1	0.5	92, 99 (96)	76, 60 (68)	71
1	0.5	105, 79 (94)	78, 60 (70)	74
3	0.5	85, 77 (82)	79, 81 (80)	98
4	0.5	94, 91 (92)	56, 72 (64)	70
10	0.5	79, 79 (79)	80, 80 (80)	101
19	0.5	83, 77 (80)	82, 76 (80)	100
MRID: 44815806				
0	0.5	92, 91 (92)	92, 74, (83)	90
10	0.5	80, 80 (80)	83, 72 (78)	98
14	0.5	92, 93 (93)	80, 80, (80)	87

Storage Period (Months)	Fortification Level (ppm)	Fresh Fortification Recovery (%) [a]	Apparent Recovery in Stored Samples (%) [a]	Corrected Recovery in Stored Samples (%) [b]
Cottonseed, undelinted				
MRID: 44477408				
0	0.10 [c]	72, 76, 84, 87 (80)	--	--
0	0.10 [d]	76, 78, 79, 79 (78)	--	--
0	0.10	91, 95, 95, 96 (94)	--	--
1.5	0.10	90, 95 (93)	89, 92 (91)	96, 99
3	0.10	94, 94 (94)	91, 93 (92)	97, 99
6	0.10	91, 98 (95)	87, 90 (89)	92, 95
9	0.10	85, 89 (87)	80, 81 (81)	92, 93
MRID: 44815801 [d]				
0	0.10	95, 95 (95)	91, 96 (94)	99
1.5	0.10	90, 95 (93)	89, 92 (91)	98
3	0.10	94, 94 (94)	91, 93 (92)	98
6	0.10	91, 98 (95)	90, 87 (89)	94
9	0.10	89, 85 (87)	80, 81 (81)	93
MRID: 44815807				
0	0.10 [c]	72, 87 (80)	84, 76 (80)	100
0	0.10 [d]	79, 79 (79)	78, 76 (77)	97
9.5	0.10 [c]	78, 78 (78)	70, 72 (71)	91
9	0.10 [d]	84, 79 (82)	75, 71 (73)	89
Cotton Gin Byproducts				
MRID: 44815807				
0	0.50 [c]	89, 85 (87)	83, 87 (85)	98
7.5	0.50 [c]	83, 65 (73)	75, 75 (75)	103
15	0.50 [c]	83, 88 (86)	85, 91 (88)	102
Lettuce				
MRID: 44477409, 44477410				
0	0.10	86, 88, 88, 91 (88)	--	--
0	0.5	76, 80 (78)	120 [f]	154
1	0.5	88	102 [g]	116
3	0.5	103	166 [g]	161
6	0.5	110	162 [g]	147
12	0.5	96	106 [g]	110
MRID: 44815803				
0	0.10	91, 88 (90)	88, 86 (87)	97
14	0.10	84, 76 (80)	78, 64 (71)	89

Storage Period (Months)	Fortification Level (ppm)	Fresh Fortification Recovery (%) [a]	Apparent Recovery in Stored Samples (%) [a]	Corrected Recovery in Stored Samples (%) [b]
Pepper				
MRID: 44477412				
0	0.10	95, 105 (103)	94, 98 (96)	93
11	0.10	87, 94 (90)	87, 110 (98)	108
Tomato				
MRIDs: 44477413, 44477414				
0	0.10	92, 97, 99, 126 (104)	--	--
0	0.2	85	105 [h]	124
1	0.2	110	115 [h]	105
3	0.2	110	105 [h]	95
6	0.2	90	110 [h]	122
12	0.10	79, 80 (80)	100, 110	125, 138
12	0.2	100	80 [h]	80

[a] Average recovery in parentheses.
[b] Apparent recoveries in stored samples were corrected by dividing by average recovery in fresh fortification samples.
[c] DPX-MP062 from MRIDs 44477344, 44477406, 44477407 and 44815807.
[d] DPX-JW062 from MRIDs 44477344, 44477406, 44477407, 44815801 and 44815807.
[e] Samples in this set were reanalyzed for confirmation.
[f] Average recovery of ten replicate samples.
[g] Average recovery of three replicate samples.
[h] Average recovery of six replicate samples.

The petitioner, E.I. du Pont de Nemours and Company, additionally submitted the results of a separate study (citation listed below) investigating the frozen storage stability of fortified and weathered residues of S-indoxacarb/R-indoxacarb in/on various crop commodities.

> 44477341 Desmond, P. (1997) A Study of the Recovery of Residues of DPX-KN128/IN-KN127 (Formulated as Either DPX-JW062 or DPX-MP062) after Frozen Storage on: Grapes, Grape Wet Pomace, Wine, Apples, Lettuce, Tomatoes, Apple Juice and Soil; and Incurred Residue Studies on Tomatoes, Lettuce, and Wet Apple Pomace: Lab Project Number: AMR 3778-96: AMR 3178-94: AMR3493-95. Unpublished study prepared by Du Pont Agricultural Products. 95 p.

Samples of untreated apples, grapes, wine, lettuce, and tomatoes were purchased commercially. Untreated processed fractions of apple juice and grape wet pomace were obtained from the respective processing studies. All samples were fortified with S-indoxacarb/R-indoxacarb (DPX-JW062, 50:50 racemic formulation) at 0.20 ppm and stored frozen (~-20°C) in sealed glass bottles. Samples of lettuce were also stored in polypropylene bottles. Samples were analyzed at various intervals during storage for up to 9 months for grape wet pomace and wine, and 28 months for apples, grapes, lettuce, and tomatoes. Control samples were fortified at the time of analysis for concurrent recoveries.

Samples of apple wet pomace, lettuce, and tomatoes bearing weathered residues from the respective field and processing studies were stored frozen (~-20°C) in plastic-lined bags and analyzed for residues of S-indoxacarb/R-indoxacarb at various intervals for up to 12 months for lettuce and tomatoes, and ~7 months for apple wet pomace. Control samples were fortified with S-indoxacarb/R-indoxacarb at 5.0 ppm (lettuce) or 0.20 ppm (tomatoes) at the time of analysis for concurrent recoveries.

The RAC and processed commodities were analyzed for residues of S-indoxacarb/R-indoxacarb using the GC/MS method AMR 3493-95, Supplement 1 described under "OPPTS GLN 860.1340: Residue Analytical Methods" section. It is noted that some initial analyses (5 of 10 apple, 5 of 12 grape, and 2 of 8 tomato interval analyses) were performed according to the alternate procedure described above using a second ethyl acetate extraction and clean-up by silica/gel-permeation (GPC) rather than silica/carbon SPE; however this modification did not affect recoveries. The method LOQ was reported as 0.01 ppm for all crop matrices, except apple juice, and apple wet pomace, lettuce, and tomatoes with incurred residues, for which the reported LOQ was 0.02 ppm.

Apparent residues of S-indoxacarb/R-indoxacarb were each less than the respective LOQ in/on 12 untreated samples of grapes (<0.01 ppm); 10 untreated samples of apples (<0.01 ppm); eight untreated samples each of tomatoes, grape wet pomace, and wine (<0.01 ppm); seven untreated samples of lettuce (<0.01 ppm) stored in polypropylene; six untreated samples of lettuce (<0.01 ppm) stored in glass; five untreated samples each of lettuce, tomatoes, and apple wet pomace (<0.02 ppm); and four untreated samples of apple juice (<0.02 ppm). The results of storage stability studies, summarized from MRID 44477341, are presented in Tables 28a and 28b for fortified and weathered residues, respectively.

Table 28a. Storage stability and concurrent method recoveries (fresh fortification recovery) of residues of S-indoxacarb/R-indoxacarb from various RAC and processed samples fortified with DPX-JW062 and stored frozen (-20°C).				
Storage Period, Days (Months)	Fortification Level (ppm) [a]	Fresh Fortification Recovery (%) [b]	Apparent Recovery in Stored Samples (%)	Corrected Recovery in Stored Samples (%) [c]
Apple				
0	**0.20**	66, 68, 80 (71)	--	--
1	**0.20**	90	80, 85	89, 94
7	**0.20**	76	68; 72	89, 95
22	**0.20**	69	90, 91	130, 132
30 (1)	**0.20**	69	60, 72	87, 104
148 (4.9)	0.20	99	94, 99	95, 100
172 (5.7)	0.20	75	98, 100	131, 133
379 (12.5)	0.20	94 [d]	100, 107 [d]	106, 114
441 (14.6)	0.20	96	89, 97	93, 101
530 (17.5)	0.20	84 [d]	73 [d], 85 [d]	87, 101
Apple juice				
0	0.20	86, 88, 108 (94)	--	--
36 (1.2)	0.20	95	88, 103	93, 108
63 (2.1)	0.20	111	97, 109	87, 98
186 (6.2)	0.20	94	87, 88 [d]	93, 94
Grape				
0	**0.20**	92 [d], 101, 109 (100)	--	--
1	**0.20**	82	89, 92	109, 112
7	**0.20**	114	82, 83	72, 73
15 (0.5)	**0.20**	68	66, 84	97, 124
32 (1.1)	**0.20**	64	53, 69	83, 108
78 (2.6)	0.20	83 [d]	54 [d], 75 [d]	65, 90
193 (6.4)	0.20	89	67 [e], 80	75, 90
362 (12)	0.20	88	71, 77	81, 88
417 (13.8)	0.20	100 [d]	71 [d], 76 [d]	71, 76
418 (13.8)	0.20	94	89, 90	95, 96
458 (15.1)	0.20	93	74, 94 [d]	80, 101
553 (18.2)	0.20	106 [e]	73 [e], 104 [e]	69, 98
Grape pomace, wet				
0	0.20	105 [e]	103 [e], 115 [e]	--
1	0.20	104	90, 107	98, 103
7	0.20	100	101, 103	101, 103
15 (0.5)	0.20	103	101, 110	98, 107

Storage Period, Days (Months)	Fortification Level (ppm) [a]	Fresh Fortification Recovery (%) [b]	Apparent Recovery in Stored Samples (%)	Corrected Recovery in Stored Samples (%) [c]
36 (1.2)	0.20	104 [d]	90 [d], 106 [d]	87, 102
63 (2.1)	0.20	88	103, 107	117, 122
90 (3)	0.20	106	94, 98	89, 92
301 (10)	0.20	116	110, 114	95, 98
Grape, wine				
0	0.20	93, 106, 120 [f] (106)	--	--
1	0.20	100	85, 94	85, 94
7	0.20	101	89, 104	88, 103
15 (0.5)	0.20	105	96, 96	91, 91
36 (1.2)	0.20	100 [d]	83 [d], 102 [d]	83, 102
63 (2.1)	0.20	91	80, 85 [d]	88, 93
90 (3)	0.20	88	80, 81	91, 92
301 (10)	0.20	120	86, 102	72, 85
Lettuce				
0	0.20	73 [d], 80 [d], 101 [d] (85)	--	--
1	0.20	97	77 [e], 98	79, 101
6	0.20	65 [e]	63 [e], 85	97, 131
11	0.20	97	75, 86	77, 89
117 (3.8)	0.20	91 [d]	76 [d], 91 [d]	84, 100
340 (11.3)	0.20	75 [d]	70 [d], 78 [d]	93, 104
Lettuce (stored in polypropylene bottles)				
0	0.20	93, 98, 103 [g] (98)	--	--
1	0.20	84 [d]	90, 91	107, 108
7	0.20	92	88, 91	96, 99
50 (1.7)	0.20	89	65 [e], 86	73, 97
59 (2)	0.20	87 [e]	72 [e], 72	83, 83
99 (3.3)	0.20	82	66 [g], 82	80, 100
321 (10.6)	0.20	99	67, 74	68, 75
Tomatoes				
0	**0.20**	75, 77, 80 (77)	--	--
1	**0.20**	63	85, 87	135, 138
7	0.20	102	96, 106	94, 104
65 (2.2)	0.20	110	100, 119	91, 108
107 (3.5)	0.20	91	80, 85	88, 93
206 (6.8)	0.20	90 [h]	101 [d], 102 [h]	112, 113
272 (8.9)	0.20	95	81, 101	85, 106
366 (12.1)	0.20	91	71, 72	78, 79

[a] **Bolded** fortified samples were cleaned up by the alternate procedure; all other samples were cleaned up by silica/carbon SPE.
[b] Average recovery is reported in parentheses.
[c] Apparent recoveries in stored samples were corrected by dividing by average recovery in fresh fortification samples.
[d] Average of duplicate analyses.
[e] Average of triplicate analyses.
[f] Average of 6 replicate analyses.
[g] Average of 5 replicate analyses.
[h] Average of 4 replicate analyses.

Table 28b. Storage stability and concurrent method recoveries (fresh fortification recovery) of residues of S-indoxacarb/R-indoxacarb from lettuce and tomato RACs and processed apple wet pomace bearing weathered residues and stored frozen (-20°C).

Storage Period, Days (Months)	Fresh Fortification Recovery (%)	Apparent Recovery in Stored Samples (ppm) [a]	% Decline [b]
Apple pomace, wet			
0	78, 106 (92)	2.3, 2.7 (2.5)	--
9	84, 90 (87)	2.1, 2.5 (2.4)	No decline
52 (1.7)	96, 97 (97)	2.9 [c]	No decline
111 (3.7)	84, 95 (90)	2.7 [c]	No decline
202 (6.7)	81, 83 (80)	2.3 [c]	No decline
Lettuce			
0	76, 80 (78)	6.0 [d]	--
36 (1.2)	88	4.9 [e]	18%
91 (3)	103	8.3 [e]	No decline
183 (6.1)	110	8.1 [e]	No decline
365 (12)	96	5.3 [e]	12%
Tomatoes			
0	85	0.21 [e]	--
29 (1)	110	0.23 [e]	No decline
90 (3)	110	0.21 [e]	No decline
182 (6)	90	0.22 [e]	No decline
365 (12)	100	0.16 [e]	24%

[a] Average residue values of multiple determinations are reported in parentheses.
[b] Uncorrected percent decline was determined using the average 0-day residue value; only declines >10% were considered significant.
[c] Average of 6 replicate analyses.
[d] Average of 10 replicate analyses.
[e] Average of triplicate analyses.

Summary of storage stability data - plant commodities: The available storage stability data demonstrate that residues of S-indoxacarb/R-indoxacarb are relatively stable in/on various RACs and processed commodities when they are stored under frozen conditions. Fortified residues of S-indoxacarb/R-indoxacarb are stable in/on (maximum storage stability interval in parentheses): apples (18 months); apple juice (6 months); corn, sweet (K+CWHR, 9 months); corn, sweet, forage (3 months); corn, sweet, stover (4 months); cottonseed, undelinted (9 months); grapes (18 months); grape, wet pomace (10

months); grape, wine (10 months); lettuce (12 months); peppers (11 months); and tomatoes (12 months). Weathered residues of S-indoxacarb/R-indoxacarb are stable in/on: apple, wet pomace (12 months); lettuce (6 months but with a 12% residue decline after 12 months), and tomatoes (6 months but with a 24% residue decline after 12 months).

The maximum storage intervals (from harvest to residue analysis) of samples collected from the field and processing studies are as follows: apples (11 months); apple processed fractions (2 months); broccoli (10 months); cabbage (10 months); corn, sweet (K+CWHR; 17 months); corn, sweet, forage (21 months); corn, sweet, stover (25 months); cottonseed (13 months); cotton gin byproducts (11 months); cotton processed fractions (10 months); lettuce, leaf (17 months); lettuce, head (15 months); pears (10 months); peppers (7 months); tomatoes (11 months); and tomato processed fractions (2 months).

The available frozen storage stability data adequately support the storage intervals of the submitted field and processing studies for pome fruits (apples and pears) and fruiting vegetables (peppers and tomatoes). **However, additional storage stability data, reflecting the maximum frozen storage intervals of samples, are required for broccoli (or cabbage); corn, sweet (K+CWHR); cotton gin byproducts; and cotton processed commodities.** Because of translation applicability, additional data are not required for lettuce (leaf or head). The petitioner has indicated that additional storage stability data, which will cover the maximum storage interval for cabbage, will be submitted as a supplemental report.

Livestock commodities

Milk samples from the cattle feeding study (MRID 44477342) were stored on cold packs during transfer from the Randy Taylor Farm to Covance Laboratories where they remained under frozen storage conditions until analysis. All tissue samples were stored on ice immediately after animal sacrifice until they were homogenized. The homogenized samples were stored frozen (-20 ± 10°C) until shipment on dry ice overnight via FedEx to Du Pont for analysis. The samples remained frozen at Du Pont Experimental Station until analysis. All milk and tissue samples were analyzed within 77 days (2.5 months) of collection.

Included in the cattle feeding study are concurrent storage stability data for milk and tissue samples. Untreated samples of milk, muscle, fat, and liver were fortified with S-indoxacarb/R-indoxacarb at 0.10 ppm and analyzed following frozen storage (~-20°C) at selected intervals. In addition, whole milk and fat samples bearing weathered residues of S-indoxacarb/R-indoxacarb and/or IN-JT333 at concentrations of ≥0.10 ppm were reanalyzed following frozen storage (~-20°C) at selected intervals. The results of the storage stability study are presented in Tables 29a and 29b for fortified and weathered residues, respectively.

Table 29a.	Storage stability and concurrent method recoveries (fresh fortification recovery) of residues of S-indoxacarb/R-indoxacarb and IN-JT333 from cow milk and tissue samples fortified with each analyte at 0.1 ppm and stored frozen (-20°C).			
Analyte	Storage Period (Days)	Fresh Fortification Recovery (%) [a]	Apparent Recovery in Stored Samples (%)	Corrected % Recovery [b]
Whole milk				
S-indoxacarb/ R-indoxacarb	0	74, 86 (80)	--	--
	15	70, 78 (74)	71, 78	96, 105
	30	92, 96 (94)	91, 99	97, 105
	60	101, 101 (101)	91, 99	90, 98
IN-JT333	0	74, 85 (80)	--	--
	15	71, 77 (74)	68, 78	92, 105
	30	85, 87 (86)	86, 91	100, 106
	60	90, 90 (90)	87, 97	97, 108
Fat				
S-indoxacarb/ R-indoxacarb	0	96, 96, 97, 97 (97)	--	--
	15	94, 95 (95)	91, 95	96, 100
	30	98, 104 (101)	115, 120	114, 119
	90	77, 79 (78)	85, 90	109, 115
IN-JT333	0	93, 94, 95, 95 (94)	--	--
	15	81, 85 (83)	79, 86	95, 104
	30	89, 96 (93)	91, 98	98, 105
	90	70, 74 (72)	72, 79	100, 110
Liver				
S-indoxacarb/ R-indoxacarb	0	94, 95, 95, 95 (95)	--	--
	15	100, 105 (103)	89, 96	86, 93
	35	96, 104 (100)	109, 110	109, 110
	90	86, 90 (88)	89, 92	101, 105
IN-JT333	0	87, 89, 89, 90 (89)	--	--
	15	84, 85 (85)	74, 80	87, 94
	35	81, 88 (85)	76, 79	89, 93
	90	75, 82 (79)	76, 77	96, 97
Muscle				
S-indoxacarb/ R-indoxacarb	0	93, 95, 97, 102 (97)	--	--
	15	103, 104 (104)	110, 112	106, 108
	32	97, 99 (98)	104, 111	106, 113
	82	77, 83 (80)	76, 78	95, 98
IN-JT333	0	99, 100, 103, 109 (103)	--	--
	15	108, 109 (109)	102, 103	94, 94
	32	98, 101 (100)	94, 99	94, 99

Analyte	Storage Period (Days)	Fresh Fortification Recovery (%) [a]	Apparent Recovery in Stored Samples (%)	Corrected % Recovery [b]
	82	80, 84 (82)	80, 80	98, 98

[a] Average recovery is reported in parentheses.
[b] Apparent recoveries in stored samples were corrected by dividing by average recovery in fresh fortification samples.

Table 29b. Storage stability and concurrent method recoveries (fresh fortification recovery) of residues of S-indoxacarb/R-indoxacarb and IN-JT333 from cattle matrices bearing weathered residues and stored frozen (-20°C).

Analyte	Storage Period, Days (Months)	Fresh Fortification Recovery (%) [a]	Apparent Recovery in Stored Samples (ppm)	% Decline [b]
Whole milk				
S-indoxacarb/ R-indoxacarb	0	--	0.20	--
	26	98, 101 (100)	0.19 [c]	No Decline
	55	100	0.15, 0.15	25
	77	88	0.14, 0.17	15, 30
IN-JT333	0	--	ND [d]	--
	26	92, 95 (94)	ND	--
	55	102	ND	--
	77	87	ND	--
Fat				
S-indoxacarb/ R-indoxacarb	0	96, 96 (96)	0.23, 0.24, 0.23, 0.25, 0.28, 0.28 (0.25)	
	15	94, 95 (95)	0.24, 0.24	No Decline
	30	98, 104 (101)	0.29, 0.31	No Decline
	90	77, 79 (78)	0.22, 0.22	12
IN-JT333	0	95, 95 (95)	0.010, 0.011, 0.012, 0.012, 0.013, 0.013 (0.012)	--
	15	81, 85 (83)	0.009, 0.010	17, 25
	30	89, 96 (93)	0.010, 0.011	8, 17
	90	70, 74 (72)	0.009, 0.010	17, 25

[a] Average recovery is reported in parentheses.
[b] Uncorrected percent decline was determined using the average 0-day residue value.
[c] Average of six replicate analyses.
[d] ND = not detected.

Summary of storage stability data - livestock commodities: The available storage stability data demonstrate that fortified residues of S-indoxacarb/R-indoxacarb and the metabolite IN-JT333 are relatively stable under frozen storage conditions in whole milk for up to 60 days, and in the fat, muscle, and liver of cows for up to 90 days. Additionally, weathered residues of S-indoxacarb/R-indoxacarb are relatively stable in whole milk for 26 days but declined by 15-30% after 77 days of storage. Weathered residues of S-indoxacarb/R-indoxacarb are relatively stable in fat for 90 days with only 12% decline. Weathered residues of IN-JT333 exhibited 17-25% decline of residues after 90 days. Assuming that the residues of concern in milk and tissues are those proposed by the petitioner, these data adequately validate the storage intervals and conditions of samples collected from the cattle feeding study.

OPPTS GLN.860.1500: Crop Field Trials

Field trials were conducted with test substances formulated from DPX-MP062 (75:25 S-indoxacarb:R-indoxacarb) and/or DPX-JW062 (50:50 S-indoxacarb:R-indoxacarb); formulation percentages reflect the amount of active enantiomer, S-indoxacarb. Because the insecticidal efficacy of the test substances is based on the concentration of S-indoxacarb, application rates for all studies were normalized by the petitioner on a S-indoxacarb basis. The highest residue value for each crop commodity is bolded in each of the respective tables.

Corn, sweet

E.I. du Pont de Nemours and Company submitted four volumes (including two supplemental volumes) of sweet corn field trial data to support the establishment of proposed tolerances for residues of DPX-MP062 in/on sweet corn kernel, forage, and stover at 0.02 ppm, 20.0 ppm, and 25.0 ppm, respectively. The citations are listed below.

44477405 Klemens, F. (1997) Magnitude of Residues of DPX-JW062 (Racemic Mixture of DPX-KN128 and IN-KN127) in Sweet Corn Following Application of DPX-JW062 Experimental Insecticide at Maximum Label Rates: Lab Project Number: AMR 3291-95: 95-0096. Unpublished study prepared by Du Pont Agricultural Products and En-Cas Analytical Labs. 266 p.

44477406 Klemens, F. (1997) Magnitude and Decline of Residues of DPX-KN128 and IN-KN127 in Sweet Corn Following Application of DPX-MP062 and DPX-JW062 Experimental Insecticides at Maximum Label Rates: Lab Project Number: AMR 3737-96: 96-0091. Unpublished study prepared by Du Pont Agricultural Products and En-Cas Analytical Labs. 242 p.

44815802 Guinivan, R. (1999) Magnitude and Residues of DPX-JW062 (Racemic Mixture of DPX-KN128 and IN-KN127) in Sweet Corn Following Application of DPX-JW062 Experimental Insecticide at Maximum Label Rates: Supplement No. 1: Lab Project Number: AMR 3291-95: 95-0096. Unpublished study prepared by Du Pont Agricultural Products and En-Cas Analytical Labs. 29 p.

44815806 Guinivan, R. (1999) Magnitude and Decline of Residues of DPX-KN128 and IN-KN127 in Sweet Corn Following Application of DPX-MP062 and DPX-JW062 Experimental Insecticides at Maximum Label Rates: Supplement No. 2: Lab Project Number: AMR 3737-96: 96-0091. Unpublished study prepared by Du Pont Agricultural Products and En-Cas Analytical Labs. 32 p.

A total of 47 field trials were conducted during the 1995 and 1996 growing seasons in CA(8), FL(5), IL(8), IN(2), MD(6), MN(6), NY(3), OR(3), WA(3), and WI(3) depicting the magnitude and decline of S-indoxacarb/R-indoxacarb residues in/on sweet corn (K+CWHR), forage, and stover. Seventeen field trials each were conducted for sweet corn (K+CWHR) and forage in CA(3), FL(2), IL(3), IN(1), MD(2), MN(2), NY(1), OR(1), WA(1), and WI(1). Thirteen field trials were conducted in CA(2), FL(1), IL(2), MD(2), MN(2), NY(1), OR(1), WA(1), and WI(1) for sweet corn stover. The test substance was a water-dispersible granular (WDG) formulation containing 30% S-indoxacarb from either DPX-JW062 or DPX-MP062. Side-by-side trials were conducted concurrently at selected trial sites to compare residues of S-indoxacarb/R-indoxacarb following application of DPX-JW062 and DPX-MP062.

Samples of mature sweet corn (K+CWHR) and forage were harvested 0, 1, 3, 7, 14, and 21 days, and samples of sweet corn stover were harvested 28-66 days following the last of four foliar applications of the test formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate). The proposed PHIs for sweet corn (K+CWHR), forage, and stover are 3, 3, and 35 days, respectively; samples reflecting other PHIs were collected to generate residue decline data. The test formulation was mixed with a non-ionic surfactant (0.25% v:v) for some test sites. Applications were made in 7-67 gallons of water per acre using CO_2 tractor-mounted, backpack, or plot spray equipment. Each test site consisted of control and treatment plots. Although certain sites received treatments at a 2x rate, these samples were not analyzed.

Following harvest, the sweet corn RAC samples were promptly frozen (within 10 minutes to 3.5 hours). Some samples of sweet corn grain and stover were dried prior to freezing. Samples were subsequently shipped frozen by ACDS freezer truck or Federal Express to the Du Pont Experimental Station (Wilmington, DE) and then to En-Cas Analytical Laboratories (Winston-Salem, NC) or directly to the analytical laboratory, where samples remained under frozen storage conditions (-17 C) until residue analysis. The storage intervals of samples from the sweet corn field trials are presented in Table 26.

Samples were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described HPLC/Column Switching/UV method (Du Pont Report No. AMR-2712-93) with an LOQ of 0.010 ppm for sweet corn (K+CWHR) and forage and 0.050 ppm for stover. This method is adequate for data collection based on concurrent method recoveries (see Table 16). Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.010 ppm) in/on 31 untreated samples of sweet corn (K+CWHR) and 19 untreated samples of sweet corn forage; 12 untreated samples of forage bore residues of 0.011-0.045 ppm. Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.050 ppm) in/on 13 untreated samples of sweet corn stover; one sample bore residues of 0.34 ppm. The results of the sweet corn (K+CWHR), forage, and stover field trials are presented in Tables 30a, 30b, and 30c, respectively.

Table 30a. Residues of S-indoxacarb/R-indoxacarb in/on **sweet corn (K+CWHR)** harvested at various posttreatment intervals following the last of four foliar applications of a 30% WDG formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate).

Test Location (City, State)	Form of 30% WDG Used		Posttreatment Interval (Days)	Residues S-indoxacarb/ R-indoxacarb (ppm)
	DPX-JW062	DPX-MP062		
MRID 44477405				
Waterloo, NY	X		3	<0.010, **0.012**
Elkton, MD	X		3	<0.010, <0.010
Bradenton, FL	X		3	<0.010, <0.010
Paynesville, MN	X		3	<0.010, <0.010
Rochelle, IL	X		3	<0.010, <0.010
Madera, CA	X		3	<0.010, <0.010
Hillsboro, OR	X		3	<0.010, <0.010
Moses Lake, WA	X		3	<0.010, <0.010

Table 30a. Residues of S-indoxacarb/R-indoxacarb in/on **sweet corn (K+CWHR)** harvested at various posttreatment intervals following the last of four foliar applications of a 30% WDG formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate).

Test Location (City, State)	Form of 30% WDG Used		Posttreatment Interval (Days)	Residues S-indoxacarb/ R-indoxacarb (ppm)
	DPX-JW062	DPX-MP062		
Bradenton, FL (decline study)	X		0	<0.010, 0.013
	X		1	<0.010, <0.010
	X		3	<0.010, <0.010
	X		7	<0.010, <0.010
	X		14	<0.010, <0.010
	X		21	<0.010, <0.010
Madera, CA (decline study)	X		0	<0.010, <0.010
	X		1	<0.010, <0.010
	X		3	<0.010, <0.010
	X		7	<0.010, <0.010
	X		14	<0.010, <0.010
	X		21	<0.010, <0.010
MRID 44477406				
Elkton, MD		X	3	<0.010, <0.010
Rochelle, IL (side-by-side)		X	3	<0.010, <0.010
	X			<0.010, <0.010
Paynesville, MN (side-by-side)		X	3	<0.010, <0.010
	X			<0.010, <0.010
Sheridan, IN (side-by-side)		X	3	<0.010
	X			<0.010
Verona, WI (side-by-side)		X	3	<0.010, <0.010
	X			<0.010, <0.010
Madera, CA		X	3	<0.010, <0.010
Rochelle, IL (decline study)		X	0	<0.010, <0.010
		X	1	<0.010, <0.010
		X	3	<0.010, <0.010
		X	7	<0.010, <0.010
		X	14	<0.010, <0.010

Table 30b. Residues of S-indoxacarb/R-indoxacarb in/on **sweet corn forage** harvested at various posttreatment intervals following the last of four foliar applications of a 30% WDG formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate).

Test Location (City, State)	Form of 30% WDG Used		Posttreatment Interval (Days)	Residues S-indoxacarb/ R-indoxacarb (ppm)
	DPX-JW062	DPX-MP062		
MRID 44477405				
Waterloo, NY	X		3	6.0, 7.0
Elkton, MD	X		3	7.0, 7.0
Bradenton, FL	X		3	4.0, 6.5
Paynesville, MN	X		3	4.7, 6.1
Rochelle, IL	X		3	6.5, 7.6
Madera, CA	X		3	1.8, 6.2
Hillsboro, OR	X		3	1.7, 4.3
Moses Lake, WA	X		3	7.0, **13**
Bradenton, FL (decline study)	X		0	5.6, 11
	X		1	4.4, 9.4
	X		3	4.0, 6.5
	X		7	5.2, 5.3
	X		14	4.1, 4.6
	X		21	4.2, 5.3
Madera, CA (decline study)	X		0	7.9, 9.9
	X		1	1.7, 4.7
	X		3	1.8, 6.2
	X		7	7.1, 9.6
	X		14	2.1, 11
	X		21	7.4, 12
MRID 44477406				
Elkton, MD		X	3	2.7, 2.9
Rochelle, IL (side-by-side)		X	3	1.9, 2.8
	X			4.8, 6.4
Paynesville, MN (side-by-side)		X	3	0.95, 1.1
	X			5.2, 10
Sheridan, IN (side-by-side)		X	3	2.2
	X			5.6
Verona, WI (side-by-side)		X	3	4.4, 4.5
	X			4.8, 8.1
Madera, CA		X	3	1.7, 1.9

Table 30b. Residues of S-indoxacarb/R-indoxacarb in/on **sweet corn forage** harvested at various posttreatment intervals following the last of four foliar applications of a 30% WDG formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate).

Test Location (City, State)	Form of 30% WDG Used		Posttreatment Interval (Days)	Residues S-indoxacarb/ R-indoxacarb (ppm)
	DPX-JW062	DPX-MP062		
Rochelle, IL (decline study)		X	0	5.3, 10
		X	1	2.5, 3.2
		X	3	1.9, 2.8
		X	7	3.4, 3.5
		X	14	4.0, 4.7

Table 30c. Residues of S-indoxacarb/R-indoxacarb in/on **sweet corn stover** harvested at various posttreatment intervals following the last of four foliar applications of a 30% WDG formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate).

Test Location (City, State)	Form of 30% WDG Used		Posttreatment Interval (Days)	Residues S-indoxacarb/ R-indoxacarb (ppm)
	DPX-JW062	DPX-MP062		
MRID 44477405				
Waterloo, NY	X		35	1.8, 2.8
Elkton, MD	X		35	6.3, 11
Bradenton, FL	X		33	8.2, 17
Paynesville, MN	X		35	11, **20**
Rochelle, IL	X		38	3.5, 7.2
Madera, CA	X		35	0.86, 1.4
Hillsboro, OR	X		56	2.4, 3.2
Moses Lake, WA	X		47	3.1, 6.6
MRID 44477406				
Elkton, MD		X	28	6.6, 13
Rochelle, IL (side-by-side)		X	48	3.4, 4.0
	X			6.3, 8.6
Paynesville, MN (side-by-side)		X	49	1.5, 1.7
	X			3.6, 5.8
Verona, WI (side-by-side)		X	66	5.2, 5.4
	X			7.9, 9.9
Madera, CA		X	35	1.6, 2.2

Geographic representation of data for sweet corn is adequate. According to Table 5 of OPPTS GLN 860.1500, a total of 12 trials are suggested for sweet corn. Seventeen field trials each for sweet corn (K+CWHR) and forage were conducted in Regions 1 (1 trial), 2 (2 trials), 3 (2 trials), 5 (7 trials), 10 (3 trials), 11 (1 trial), and 12 (1 trial). Thirteen sweet corn stover field trials were conducted in Regions 1 (1 trial), 2 (2 trials), 3 (1 trial), 5 (5 trials), 10 (2 trials), 11 (1 trial), and 12 (1 trial).

Conclusions

Corn, sweet (K+CWHR): The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 0.02 ppm in/on sweet corn (K+CWHR) harvested 3 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use pattern, residues of S-indoxacarb/R-indoxacarb in/on sweet corn (K+CWHR) ranged from nondetectable (<0.010) to 0.012 ppm from treatments with the DPX-JW062 formulation; residues were all nondetectable (<0.010 ppm) from treatments with the DPX-MP062 formulation. The majority of treated sweet corn samples collected for the residue decline study bore nondetectable (<0.010 ppm) residues at various sampling intervals. The proposed tolerance for sweet corn (K+CWHR) by the petitioner is 0.02 ppm. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062) the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 0.012 ppm x 0.67 = 0.008 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship. The adjusted residue value is comparable to the proposed tolerance. However, the correct terminology is "corn, sweet, kernel plus cob with husk removed". **A revised Section F is required.**

Corn, Sweet, Forage: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 20.0 ppm in/on sweet corn forage harvested 3 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use pattern, residues of S-indoxacarb/R-indoxacarb in/on sweet corn forage ranged 1.7-13 ppm from treatments with the DPX-JW062 formulation, and 0.95-4.5 ppm from treatments with the DPX-MP062 formulation. The residue decline data from the FL site indicate that residues of S-indoxacarb/R-indoxacarb dissipate slightly in/on sweet corn forage over time; however, residue decline data from the CA and IL sites were too variable to make a conclusion concerning residue dissipation over time. The proposed tolerance for sweet corn forage by the petitioner is 20.0 ppm. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 13 ppm x 0.67 = 8.7 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship. Therefore, the data suggest that the proposed tolerance for corn, sweet, forage should be lowered from 20.0 ppm to 10.0 ppm. Also, the correct terminology is "corn, sweet, forage". **A revised Section F is required.**

Corn, Sweet, Stover: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 25.0 ppm in/on sweet corn stover harvested 28-66 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb in/on sweet corn stover ranged 0.86-20 ppm from treatments with the DPX-JW062 formulation, and 1.5-13 ppm from treatments with the DPX-MP062 formulation. The proposed tolerance for sweet corn stover by the petitioner is 25.0 ppm. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted

to reflect the application at an exaggerated rate (i.e., 20 ppm x 0.67 = 13.4 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship. Therefore, the data suggest that the proposed tolerance for corn, sweet, stover should be lowered from 25.0 ppm to 15.0 ppm. Also, the correct terminology is "corn, sweet, stover". **A revised Section F is required.**

Cotton

Cottonseed

E.I. du Pont de Nemours and Company submitted two volumes (including one supplemental volume) of cottonseed field trial data to support the establishment of a proposed tolerance for residues of DPX-MP062 in/on cottonseed at 3.0 ppm. The citations are listed below.

> 44477408 Klemens, F. (1997) Magnitude of Residues of DPX-JW062 (Racemic Mixture of DPX-KN128 and IN-KN127) in Cotton Following Application of DPX-JW062 Experimental SE Insecticide at Maximum Label Rates: Lab Project Number: AMR 3284-95: 95-0095. Unpublished study prepared by Du Pont Agricultural Products and En-Cas Analytical Labs. 250 p.
>
> 44815801 Guinivan, R. (1999) Magnitude of Residues of DPX-JW062 (Racemic Mixture of DPX-KN128 and IN-KN127) in Cotton Following Application of DPX-JW062 Experimental SE Insecticide at Maximum Label Rates: Supplement No. 1: Lab Project Number: AMR 3284-95: 95-0095. Unpublished study prepared by Du Pont Agricultural Products and En-Cas Analytical Labs. 23 p.

Eight field trials were conducted during the 1995 growing season in AR(1), AZ(1), CA(1), MS(1), NC(1), OK(1), and TX(2) depicting the magnitude and decline of S-indoxacarb/R-indoxacarb residues in/on undelinted cottonseed. The petitioner defined undelinted cottonseed as cotton that was ginned prior to analysis. The test substance was a 17.5% suspension emulsion formulation of DPX-JW062. Samples of undelinted cottonseed were harvested 0, 7, 14, 21, and 28 days following the last of four broadcast applications of the test formulation at 0.133 lb ai/A/application for a total application rate of 0.532 lb ai/A (1.2x the maximum proposed seasonal rate). The proposed PHI for cottonseed is 14 days; samples reflecting other PHIs were collected to generate residue decline data. Applications were made in 6-20 gallons of water per acre using ATV-mounted, tractor-mounted or hand-held spray equipment. Each test site consisted of control and treatment plots. Although certain sites received treatments at a 0.5x rate, these samples were not analyzed.

Following harvest, cottonseed samples were promptly frozen (within 4.5 hours) and shipped frozen by ACDS freezer truck or Federal Express to the Du Pont Experimental Station (Wilmington, DE) for ginning. The storage intervals for samples from the cotton field trials are presented in Table 26.

Samples were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described HPLC/Column Switching/UV method (Du Pont Study No. AMR-2712-93) with an LOQ of 0.010 ppm. This method is adequate for data collection based on concurrent method recoveries (see Table 16). Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.010 ppm) in/on 14 untreated samples; the maximum residue detected in the treated samples was 1.9 ppm at 14 day PHI. The results of the cotton field trials are presented in Table 31.

Table 31. Residues of S-indoxacarb/R-indoxacarb[a] in/on **undelinted cottonseed** harvested at various posttreatment intervals following the last of four broadcast applications of a 17.5% suspension emulsion formulation of DPX-JW062 at 0.133 lb ai/A/application for a total application rate of 0.532 lb ai/A (1.2x the maximum proposed seasonal rate)[b]. Data are from MRID 44477408.

Test Location (City, State)	Posttreatment Interval (Days)	Residues S-indoxacarb/ R-indoxacarb (ppm)
Seven Springs, NC	14	0.28, 0.30
Greenville, MS	14	0.92, 1.3
England, AR	14	0.13, 0.17
Donna, TX	14	0.34, 0.43
Dill City, OK	14	0.87, 1.6
Maricopa, AZ	14	0.82, 1.2
Madera, CA	14	15, 1.6
Halfway, TX (decline study)	0	2.8, 2.9
	7	1.1, 1.3
	14	1.7, **1.9**
	21	1.4, 2.0
	28	1.4, 2.1
Madera, CA (decline study)	0	0.97, 2.3
	7	0.90, 0.92
	14	1.5, 1.6
	20	1.3, 2.0
	28	1.2, 1.2

[a] DPX-JW062 is a formulation containing a racemic mixture (50:50) of S-indoxacarb (insecticidally active enantiomer) and R-indoxacarb (insecticidally inactive enantiomer).

[b] Since the insecticidal efficacy is based on the concentration of S-indoxacarb, the application rates were normalized by the petitioner on a S-indoxacarb basis.

Cotton gin byproducts

E.I. du Pont de Nemours and Company submitted two volumes (including one supplemental volume) of undelinted cottonseed and cotton gin byproducts field trial data to support the establishment of proposed tolerances for residues of DPX-MP062 in/on cottonseed at 3.0 ppm and cotton gin byproducts at 15.0 ppm. The citations are listed below.

44477407 Klemens, F. (1997) Magnitude and Decline of Residues of DPX-KN128 and IN-KN127 in Cotton Following Application of DPX-MP062 and DPX-JW062 Experimental Insecticides at Maximum Label Rates: Lab Project Number: AMR 3949-96: 96-0092. Unpublished study prepared by Du Pont Agricultural Products and En-Cas Analytical Labs. 276 p.

44815807 Guinivan, R. (1999) Magnitude and Decline of Residues of DPX-KN128 and IN-KN127 in Cotton Following Application of DPX-MP062 and DPX-JW062 Experimental Insecticides at Maximum Label Rates: Lab Project Number: AMR 3949-96: 96-0092. Unpublished study prepared by Du Pont Agricultural Products and En-Cas Analytical Labs. 25 p.

Seven field trials were conducted during the 1996 growing season in CA(1), GA(1), MS(1), OK(1), and TX(3) depicting the magnitude and decline of S-indoxacarb/R-indoxacarb residues in/on undelinted cottonseed and cotton gin byproducts. The petitioner defined cotton gin byproducts as plant residues (burrs, leaves, sticks, and other plant parts) removed during stick extraction--the first procedure in the ginning process. The test substance was either a 15% liquid formulation of DPX-MP062 or 17.5% suspension emulsion formulation of DPX-JW062. Side-by-side trials were conducted concurrently at selected trial sites to compare residues of S-indoxacarb/R-indoxacarb following application of DPX-JW062 and DPX-MP062. Samples of undelinted cottonseed and cotton gin byproducts were harvested at 0, 7, 13-17, 21, and 28 days following the last of four broadcast applications of the test formulation at 0.133 lb ai/A/application for a total application rate of 0.532-0.535 lb ai/A (1.2x the maximum proposed seasonal rate). The proposed PHI for cottonseed and cotton gin byproducts is 14 days; samples reflecting other PHIs were collected to generate residue decline data. Applications were made in 8-21 gallons of water per acre using ATV-mounted, tractor-mounted or hand-held spray equipment. Each test site consisted of control and treatment plots. Although certain sites received treatments at a 0.5x rate, these samples were not analyzed.

Following harvest, cottonseed samples were promptly frozen (within 4.5 hours). Samples were shipped frozen by ACDS freezer truck or Federal Express to the Du Pont Experimental Station (Wilmington, DE) for ginning. Ginned samples were then shipped frozen by ACDS freezer truck to EN-CAS Analytical Laboratories (Winston-Salem, NC), where samples were stored frozen (-17 C) until residue analysis. The storage intervals of samples from the cotton field trials are presented in Table 26.

Samples were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described HPLC/Column Switching/UV method (Du Pont Study No. AMR-2712-93) with LOQs of 0.050 ppm for cotton gin byproducts and 0.010 ppm for undelinted cottonseed. This method is adequate for data collection based on concurrent method recoveries (see Table 16). Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.010 ppm) in/on 11 untreated cottonseed samples and were below the LOQ (<0.050 ppm) in/on seven untreated cotton gin byproducts samples; one control sample of undelinted cottonseed from the decline study bore residues of 0.11 ppm. The results of the cotton field trials are presented in Table 32.

Table 32. Residues of S-indoxacarb/R-indoxacarb in/on **undelinted cottonseed** and **cotton gin byproducts** harvested at various posttreatment intervals following the last of four broadcast applications of either a 15% liquid formulation of DPX-MP062 or a 17.5% suspension emulsion formulation of DPX-JW062 at 0.133 lb ai/A/application for a total application rate of 0.532-0.535 lb ai/A (1.2x the maximum proposed seasonal rate). Data are from MRID 44477407.

Test Location (City, State)	Form used		Posttreatment Interval (Days)	Residues S-indoxacarb/R-indoxacarb (ppm)
	DPX-JW062	DPX-MP062		
Undelinted Cottonseed				
Montezuma, GA		X	13	0.22, 0.26
Greenville, MS (side by side study)		X	13	0.27, 0.47
	X		13	0.30, 0.38
Donna, TX (side by side study)		X	14	0.22, 0.31
	X		14	0.59, 0.60
Dill City, OK		X	14	0.033, 0.061
Edmonson, TX		X	14	0.91, 0.92
Woodville, CA (side by side study)		X	17	0.58, 0.72
	X		17	0.54, 0.62
Plainview, TX (side by side and decline study)		X	0	0.61, 0.62
		X	7	0.46, 0.53
		X	14	0.35, 0.36
	X		14	0.51, 1.0
		X	21	0.33, 0.33
		X	28	0.30, 0.41
Cotton Gin Byproducts				
Montezuma, GA		X	13	8.4, 8.4
Greenville, MS		X	13	9.1, 12
Donna, TX		X	14	6.8, **10**
Dill City, OK		X	14	2.9, 4.2
Edmonson, TX		X	14	4.6, 8.8
Woodville, CA		X	17	6.0, 10
Plainview, TX (decline study)		X	0	4.1, 9.8
		X	7	4.9, 7.5
		X	14	3.4, 7.2
		X	21	0.43, 4.2
		X	28	6.0, 7.1

Geographic representation of data for cotton is adequate. According to Table 5 of OPPTS GLN 860.1500, a total of 12 trials are required for cotton. Fifteen cotton field trials were conducted in Regions 2 (2 trials), 4 (3 trials), 6 (2 trials), 8 (5 trials), and 10 (3 trials).

Conclusions

The submitted data (MRID 44477408) indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 3.0 ppm in/on cottonseed harvested 14 days following the last of four broadcast applications of a 17.5% suspension emulsion formulation of DPX-JW062. Following applications according to the above maximum proposed use pattern, residues of S-indoxacarb/R-indoxacarb ranged 0.13-1.9 ppm in/on undelinted cottonseed treated with the DPX-JW062 formulation. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on undelinted cottonseed over time.

Cotton, undelinted seed: The submitted data (MRID 44477407) indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 3.0 ppm in/on cottonseed harvested 13-17 days following the last of four broadcast applications of either a 17.5% suspension emulsion formulation of DPX-JW062 or a 15% liquid formulation of DPX-MP062. Following applications according to the above maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 0.30-1.0 ppm in/on undelinted cottonseed treated with the DPX-JW062 formulation, and 0.033-0.92 ppm in/on undelinted cottonseed treated with the DPX-MP062 formulation. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on undelinted cottonseed over time. However, as the application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 1.9 ppm x 0.67 = 1.3 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship. The data suggest that the proposed tolerance for cottonseed should be lowered from 3.0 ppm to 2.0 ppm. Also, the correct terminology is "cotton, undelinted seed". **A revised Section F is required.**

Cotton Gin Byproducts: The submitted data (MRID 44477407) indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 15.0 ppm in/on cotton gin byproducts harvested 13-17 days following the last of four broadcast applications of a 15% liquid formulation of DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 2.9-12 ppm in/on cotton gin byproducts treated with the DPX-MP062 formulation. The residue decline data for cotton gin byproducts were too variable to make a conclusion with regards to residue dissipation over time. Applications were made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062); therefore, the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 10 ppm x 0.67 = 6.7 ppm). The data from side-by-side trials with DPX-JW062 DPX=MP062 generally confirm this relationship. Therefore, the data suggest that the proposed tolerance for cotton gin byproducts should be lowered from 15.0 ppm to 10.0 ppm. Also, the correct terminology is "cotton gin byproducts". **A revised Section F is required.**

Fruiting Vegetables (except Cucurbits)

Peppers

E.I. du Pont de Nemours and Company submitted one volume of pepper (bell and non-bell) field trial data to support the establishment of a proposed tolerance for residues of DPX-MP062 in/on fruiting vegetables at 0.70 ppm. The citation is listed below.

> 44477412 Adams, G.; Klemens, F. (1997) Magnitude and Decline of Residues of DPX-KN128 and IN-KN127 in Peppers Following Application of DPX-MP062 Experimental Insecticide at Maximum Label Rates: Lab Project Number: AMR 3735-96. Unpublished study prepared by McKenzie Labs., Inc. 143 p.

Nine field trials were conducted during the 1996 and 1997 growing seasons in CA(2), FL(4), NC(1), OH(1), and TX(1) depicting the magnitude and decline of S-indoxacarb/R-indoxacarb residues in/on bell peppers (6 trials) and non-bell peppers (3 trials). The test substance was a 30% WDG formulation of DPX-MP062. Samples of mature peppers were harvested 0, 2 or 3, 7, 14 and 21 days following the last of four broadcast applications of the test formulation at 0.0669 lb ai/A/application for a total application rate of 0.268 lb ai/A (1x the maximum proposed seasonal rate). The proposed PHI for peppers is 3 days; samples reflecting other PHIs were collected to generate residue decline data. Applications were made in 5-68 gallons of water per acre using CO_2 backpack spray equipment. Each test site consisted of control and treatment plots.

Following harvest, samples were promptly frozen (within 1-1.5 hours) and then shipped frozen by ACDS freezer truck or Federal Express to McKenzie Laboratories, Inc. (Phoenix, AZ). Samples remained frozen (-29 to -15 C) until residue analysis. The storage intervals of samples from the pepper field trials are presented in Table 26.

Samples were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described GC/MSD method (Du Pont Report No. AMR-3493-95, Supplement No. 1) with an LOQ of 0.020 ppm. This method is adequate for data collection based on concurrent method recoveries (see Table 16). Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.020 ppm) in/on nine untreated pepper samples. The results of the pepper field trials are presented in Table 33.

Table 33.	Residues of S-indoxacarb/R-indoxacarb in/on **peppers (bell and non-bell)** harvested at various posttreatment intervals following the last of four broadcast applications of a 30% WDG formulation of DPX-MP062 at 0.0669 lb ai/A/application for a total application rate of 0.268 lb ai/A (1x the maximum proposed seasonal rate). Data are from MRID 44477412.	
Test Location (City, State)	Posttreatment Interval (Days)	Residues S-indoxacarb/R-indoxacarb (ppm)
Bell pepper		
Porterville, CA	3	0.072, 0.079
Bradenton, FL	3	<0.020, <0.020
Bradenton, FL	3	<0.020, 0.020
Seven Springs, NC	3	<0.020, 0.021
Genoa, OH	3	<0.020, <0.020
San Ardo, CA (decline study)	0	0.062, 0.090
	2	0.021, 0.026
	7	0.056, 0.077
	14	0.048, 0.065
	21	0.030, 0.039
Non-bell pepper		
Bradenton, FL	3	<0.020, <0.020
Bradenton, FL	3	0.093, **0.099**
Donna, TX	3	0.039, 0.041

Geographic representation of data, for the establishment of a tolerance for fruiting vegetables (except cucurbits) group (Crop Group 8), is adequate. According to Table 2 of OPPTS GLN 860.1500, a total of 21 trials are recommended for this group. Nine pepper field trials (6 bell and 3 non-bell) were conducted in Regions 2 (1 trial), 3 (4 trials), 5 (1 trial), 6 (1 trial), and 10 (2 trials). Sixteen tomato field trials (see "Tomato" section) were conducted in Regions 1 (1 trial), 2 (1 trial), 3 (3 trials), 5 (2 trials), and 10 (9 trials).

Tomatoes

E.I. du Pont de Nemours and Company submitted two volumes of tomato field trial data to support the establishment of a proposed tolerance for residues of DPX-MP062 in/on fruiting vegetables at 0.70 ppm. The citations are listed below.

> 44477413 Adams, G.; Klemens, F. (1997) Magnitude of Residues of DPX-JW062 (Racemic Mixture of DPX-KN128 and IN-KN127) in Tomato Following Application of DPX-JW062 Experimental Insecticide at Maximum Label Rates: Lab Project Number: AMR 3289-95. Unpublished study prepared by McKenzie Labs., Inc. 204 p.

44477414 Adams, G.; Klemens, F. (1997) Magnitude and Decline of Residues of DPX-KN128 and IN-KN127 in Tomatoes Following Application of DPX-MP062 and DPX-JW062 Experimental Insecticides at Maximum Label Rates: Lab Project Number: AMR 3733-96. Unpublished study prepared by McKenzie Labs., Inc. 136 p.

Sixteen field trials were conducted during the 1995 and 1996 growing seasons in CA(9), FL(3), IN(2), MD(1), and PA(1) depicting the magnitude and decline of S-indoxacarb/R-indoxacarb residues in/on tomatoes. The test substance was a 30% WDG formulation of DPX-JW062 or DPX-MP062. Side-by-side trials were conducted concurrently at selected trial sites to compare residues of S-indoxacarb/R-indoxacarb following application of DPX-JW062 and DPX-MP062. Samples of mature tomatoes were harvested at various PHI intervals following the last of four broadcast applications of the test formulation at 0.0665-0.669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate). The proposed PHI for tomatoes is 3 days; samples reflecting other PHIs were collected to generate residue decline data. Applications were made in 12-94 gallons of water per acre using tractor-mounted or hand-held spray equipment. Each test site consisted of control and treatment plots. One site received application of the wrong formulation; samples collected from this site were not analyzed.

Following harvest, samples were promptly frozen (within 1-1.5 hours) and then shipped frozen by ACDS freezer truck or Federal Express to McKenzie Laboratories, Inc. (Phoenix, AZ). Samples remained frozen (-29 to -15 C) until residue analysis. The storage intervals of samples from the tomato field trials are presented in Table 26.

Samples were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described GC/MSD method (Du Pont Report No. AMR-3493-95, Supplement No. 1) with an LOQ of 0.020 ppm. This method is adequate for data collection based on concurrent method recoveries (see Table 16). Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.020 ppm) in/on 56 untreated tomato samples. The results of the tomato field trials are presented in Table 34.

Table 34. Residues of S-indoxacarb/R-indoxacarb in/on **tomatoes** harvested at various posttreatment intervals following the last of four broadcast applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062 at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate).

Test Location (City, State)	Form of 30% WDG Used		Posttreatment Interval (Days)	Residues S-indoxacarb/ R-indoxacarb (ppm)
	DPX-JW062	DPX-MP062		
MRID 44477413				
Cantua Creek, CA	X		3	0.14, 0.16
Chico, CA	X		3	0.060, 0.14
Davis, CA	X		3	0.059, 0.087
Porterville, CA	X		3	0.17, 0.20
Tranquility, CA	X		3	0.054, 0.064
Bradenton, FL	X		3	0.079, 0.14

Table 34.	Residues of S-indoxacarb/R-indoxacarb in/on **tomatoes** harvested at various posttreatment intervals following the last of four broadcast applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062 at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate).			
Test Location (City, State)	Form of 30% WDG Used		Posttreatment Interval (Days)	Residues S-indoxacarb/ R-indoxacarb (ppm)
	DPX-JW062	DPX-MP062		
Tipton, IN	X		4	0.22, 0.43 HAFT=0.33 [a]
Elkton, MD	X		3	0.19, **0.41**
Germansville, PA	X		3	0.18, 0.18
Madera, CA (decline study)	X		0	0.45, 0.47
	X		1	0.15, 0.22
	X		3	0.27, 0.35
	X		5	0.36, 0.42
	X		7	0.16, 0.31
	X		14	0.38, 0.44
	X		21	0.19, 0.19
	X		0	0.088, 0.21
	X		1	0.25, 0.36
	X		3	0.061, 0.17
	X		5	0.072, 0.15
	X		7	0.11, 0.34
	X		14	0.24, 0.36
	X		21	0.22, 0.27
Bradenton, FL (decline study)	X		0	0.051, 0.10
	X		1	0.028, 0.035
	X		3	0.033, 0.041
	X		5	<0.020, 0.045
	X		7	<0.020, 0.030
	X		14	<0.020, <0.020
	X		24	<0.020, 0.032
MRID 44477414				
Chico, CA (side-by-side study)		X	3	0.038, 0.067
	X		3	<0.020, <0.020

Table 34.	Residues of S-indoxacarb/R-indoxacarb in/on **tomatoes** harvested at various posttreatment intervals following the last of four broadcast applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062 at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate).			
Test Location (City, State)	Form of 30% WDG Used		Posttreatment Interval (Days)	Residues S-indoxacarb/ R-indoxacarb (ppm)
	DPX-JW062	DPX-MP062		
Hobbs, IN (side-by-side study)		X	3	0.035, 0.045
	X		3	0.072, 0.081
Bradenton, FL (decline study)		X	0	0.024, 0.052
		X	3	<0.020, 0.020
		X	7	<0.020, 0.021
		X	14	<0.020, <0.020
		X	22	<0.020, <0.020
Madera, CA (decline and side-by-side study)		X	0	0.11, 0.11
	X			<0.020, 0.16
		X	3	0.13, 0.13
	X			0.12, 0.16
		X	7	0.030, 0.038
	X			<0.020, 0.092
		X	14	0.073, 0.10
	X			<0.020, <0.020
		X	21	0.032, 0.050
	X			<0.020, 0.036

[a] HAFT=highest average field trial.

Geographic representation of data, for the establishment of a tolerance for fruiting vegetables (except cucurbits) group (Crop Group 8), is adequate. According to Table 2 of OPPTS GLN 860.1500, a total of 21 trials are recommended for this group. Sixteen tomato field trials were conducted in Regions 1 (1 trial), 2 (1 trial), 3 (3 trials), 5 (2 trials), and 10 (9 trials). Nine pepper (6 bell and 3 non-bell) field trials (see "Peppers" section) were conducted in Regions 2 (1 trial), 3 (4 trials), 5 (1 trial), 6 (1 trial), and 10 (2 trials).

Conclusions

Peppers: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level for the fruiting vegetable group of 0.70 ppm in/on peppers harvested 3 days following the last of four broadcast applications of a 30% WDG formulation of DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb

ranged <0.020-0.079 ppm in/on bell peppers and <0.020-0.099 ppm in/on non-bell peppers treated with the DPX-MP062 formulation. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 0.099 ppm x 0.67 = 0.067 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on peppers over time.

Tomatoes: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed fruiting vegetable group tolerance level of 0.70 ppm in/on tomatoes harvested 3 days following the last of four broadcast applications of a 30% WDG formulation of DPX-MP062 or DPX-JW062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged <0.020-0.13 ppm in/on tomatoes treated with the DPX-MP062 formulation and <0.020-0.43 ppm in/on tomatoes treated with the DPX-JW062 formulation. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on tomatoes over time. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 0.41 ppm x 0.67 = 0.27 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship.

Fruiting Vegetable (except Cucurbits): The proposed tolerance for the crop group fruiting vegetable (except cucurbits) is 0.70 ppm. However, after the pepper and tomato data were adjusted for the exaggerated application rates, the data suggest that the proposed tolerance for the crop group fruiting vegetable (except cucurbits) should be lowered from 0.70 ppm to 0.50 ppm. Also, the correct terminology is "vegetables, fruiting, group". **A revised Section F is required.**

Head and Stem Brassica Subgroup

Broccoli

E.I. du Pont de Nemours and Company submitted two volumes of broccoli field trial data to support the establishment of a proposed tolerance for residues of DPX-MP062 in/on "Brassica, Head and Stem, Subgroup" at 10.0 ppm. The citations are listed below.

> MRID 44477401 Klemens, F.; Kennedy, C. (1997) Magnitude of DPX-JW062 (Racemic Mixture of DPX-KN128 and IN-KN127) in Broccoli Following Application of DPX-JW062 Experimental Insecticide at Maximum Label Rates. Du Pont Project ID No. AMR 3288-95. Unpublished study prepared and submitted by E.I. du Pont de Nemours and Company (Wilmington, DE). 129 p.
>
> MRID 44477402 McVicker, J.; Kennedy, C. (1997) Magnitude and Decline of DPX-KN128 and IN-KN127 in Broccoli Following Application of DPX-MP062 and DPX-JW062 Experimental Insecticide at Maximum Label Rates. Du Pont Project ID No. AMR 3732-96. Unpublished study prepared and submitted by E.I. du Pont de Nemours and Company (Wilmington, DE). 107 p.

MRID 44815805 McVicker, J. (1998) Magnitude and Decline of DPX-KN128 and IN-KN127 in Broccoli Following Application of DPX-MP062 and DPX-JW062 Experimental Insecticide at Maximum Label Rates. Du Pont Project ID No. AMR 3732-96. Unpublished study prepared and submitted by E.I. du Pont de Nemours and Company (Wilmington, DE). 21 p.

Eight field trials were conducted during the 1995-1997 growing seasons in AZ(1), CA(4), OR(1), and TX(2) depicting the magnitude and decline of S-indoxacarb/R-indoxacarb residues in/on broccoli. The test substance was a 30% WDG formulation of DPX-JW062 or DPX-MP062. Side-by-side trials were conducted concurrently at selected trial sites to compare residues of S-indoxacarb/R-indoxacarb following applications of DPX-JW062 and DPX-MP062. Samples of mature broccoli were harvested 0, 3, 7, 14, and 21 days following the last of four foliar applications of the test formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate). The proposed PHI for broccoli is 3 days; samples reflecting other PHIs were collected to generate residue decline data. The test formulation was mixed with a non-ionic surfactant (0.25% v:v) for some test sites. Applications were made in 20-40 gallons of water per acre using tractor-mounted or hand-held spray equipment. Each test site consisted of control and treatment plots. Although certain sites received treatments at a 2x rate, these samples were not analyzed.

Following harvest, samples were stored frozen prior to residue analysis. The storage intervals of samples from the broccoli field trials are presented in Table 26.

Samples were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described GC/MSD method (Du Pont Report No. AMR-3493-95, Supplement No. 1) with an LOQ of 0.020 ppm. This method is adequate for data collection based on concurrent method recoveries (see Table 16). Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.020 ppm) in/on 14 untreated broccoli samples. The results of the broccoli field trials are presented in Table 35.

Table 35. Residues of S-indoxacarb/R-indoxacarb in/on **broccoli** harvested at various posttreatment intervals following the last of four foliar applications of a 30% WDG formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate).

Test Location (City, State)	Form of 30% WDG Used		Posttreatment Interval (Days)	Residues S-indoxacarb/ R-indoxacarb (ppm)
	DPX-JW062	DPX-MP062		
MRID 44477401				
Corvallis, OR	X		3	0.28, 0.35
Madera, CA	X		3	2.0, 2.3
Huron, CA	X		3	0.85, 0.93
Yuma, AZ	X		3	0.38, 0.67
Poplar, CA	X		3	2.0, **2.5**
Donna, TX (Decline Study)	X		0	4.1, 5.0
	X		3	1.2, 1.4
	X		7	0.25, 0.49
	X		14	0.096, 0.096
	X		21	<0.020, <0.020
MRID 44477402				
Donna, TX (side-by-side)		X	3	0.26, 0.52
	X			0.53, 0.73
Watsonville, CA (side-by-side and decline study)		X	0	0.22, 0.45
	X			0.49, 0.80
		X	3	0.23, 0.26
	X			0.57, 0.80
		X	7	0.17, 0.25
	X			0.14, 0.24
		X	14	0.076, 0.16
	X			0.29, 0.30
		X	21	0.062, 0.092
	X			0.18, 0.21

Geographic representation of data, for the establishment of a tolerance for head and stem *Brassica* subgroup (Crop Subgroup 5-A), is adequate. According to Table 3 of OPPTS GLN 860.1500, a total of 12 trials are recommended for this subgroup. Eight broccoli field trials were conducted in Regions 6 (2 trials), 10 (5 trials), and 12 (1 trial). Ten cabbage field trials (see "Cabbage" section) were conducted in Regions 1 (1 trial), 2 (1 trial), 3 (3 trials) 5 (2 trials), 6 (1 trial), and 10 (2 trials).

Cabbage

E.I. du Pont de Nemours and Company submitted three volumes (including one supplemental volume) of cabbage field trial data to support the establishment of a proposed tolerance for residues of DPX-MP062 in/on "head & stem *Brassicas*" at 10.0 ppm. The citations are listed below.

> 44477403 Klemens, F.; Kennedy, C. (1997) Magnitude of Residues of DPX-JW062 (Racemic Mixture of DPX-KN128 and IN-KN127) in Cabbage Following Application of DPX-JW062 Experimental Insecticide at Maximum Label Rates: Lab Project Number: AMR 3287-95. Unpublished study prepared by Du Pont Agricultural Products and McKenzie Labs., Inc. 158 p. {OPPTS 860.1500, 860.1380}
>
> 44477404 Adams, G.; Klemens, F. (1997) Magnitude and Decline of Residues of DPX-KN128 and IN-KN127 in Cabbage Following Application of DPX-MP062 and DPX-JW062 Experimental Insecticides at Maximum Label Rates: Lab Project Number: AMR 3731-96. Unpublished study prepared by McKenzie Labs., Inc. 157 p.
>
> 44815204 Guinivan, R. (1999) Magnitude and Decline of Residues of DPX-KN128 and IN-KN127 in Cabbage Following Application of DPX-MP062 and DPX-JW062 Experimental Insecticides at Maximum Label Rates: Supplement No. 1: Lab Project Number: AMR 3731-96. Unpublished study prepared by McKenzie Labs., Inc. 24 p.

Ten field trials were conducted during the 1995-1997 growing seasons in CA(2), FL(3), MD (1), NY (1), TX (1), and WI (2) depicting the magnitude and decline of S-indoxacarb/R-indoxacarb residues in/on cabbage. The test substance was a 30% WDG formulation of DPX-JW062 and DPX-MP062. Side-by-side trials were conducted concurrently at selected trial sites to compare residues of S-indoxacarb/R-indoxacarb following application of DPX-JW062 and DPX-MP062. Samples of mature cabbage (without wrapper leaves and with wrapper leaves) were harvested 0, 3, 4, 7, 14, and 21 days following the last of four foliar applications of the test formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate). The proposed PHI for cabbage is 3 days; samples reflecting other PHIs were collected to generate residue decline data. The test formulation was mixed with a non-ionic surfactant (0.25% v:v) for some test sites. Applications were made in 20-47 gallons of water per acre using tractor-mounted or hand-held spray equipment. Each test site consisted of control and treatment plots. Although certain sites received treatments at a 2x rate, these samples were not analyzed.

Following harvest, samples were stored frozen prior to residue analysis. The storage intervals of samples from the cabbage field trials are presented in Table 26. Samples of cabbage were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described GC/MSD method (Du Pont Report No. AMR-3493-95, Supplement No. 1) with an LOQ of 0.020 ppm. This method is adequate for data collection based on concurrent method recoveries (see Table 16). Apparent combined residues of S-indoxacarb and R-indoxacarb were each below (<0.020 ppm) the LOQ in/on 12 untreated cabbage samples except for two samples which bore residues of 0.020 and 0.030 ppm. The results of the cabbage field trials are presented in Table 36.

Geographic representation of data, for the establishment of a tolerance for head and stem *Brassica* subgroup (Crop Subgroup 5-A), is adequate. According to Table 3 of OPPTS GLN 860.1500, a total of 12 trials are recommended for this subgroup. Ten cabbage field trials were conducted in Regions 1 (1 trial), 2 (1 trial), 3 (3 trials) 5 (2 trials), 6 (1 trial), 10 (2 trials). Eight broccoli field trials (see "Broccoli" section were conducted in Regions 6 (2 trials), 10 (5 trials), and 12 (1 trial).

Table 36. Residues of S-indoxacarb/R-indoxacarb in/on **cabbage** harvested at various posttreatment intervals following the last of four foliar applications of a 30% WDG formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate).

Test Location (City, State)	Form of 30% WDG Used		Posttreatment Interval (Days)	Residues S-indoxacarb/ R-indoxacarb (ppm)	
	DPX-JW062	DPX-MP062		Without Wrapper Leaves	With Wrapper Leaves
MRID 44477403					
Bradenton, FL	X		3	0.032, 0.059	2.0, 2.3
Donna, TX	X		3	<0.020, 0.043	1.8, 1.9
Waterloo, NY	X		3	0.12, 0.16	1.0, 1.3
Verona, WI	X		3	0.071, 0.076	0.60, 1.5
Elkton, MD	X		4	0.038, 0.10	1.7, (0.87, 4.0) [a]
Madera, CA (Decline Study)	X		0	0.030, 0.12	0.50, 1.1
	X		3	0.089, 0.15	0.71, 3.8
	X		7	0.056, 0.086	1.1, 1.7
	X		14	<0.020, <0.020	0.19, 0.64
	X		21	<0.020, <0.020	0.67, 0.82
MRID 44477404					
Bradenton, FL (side-by-side)		X	3	0.020, 0.028, 0.030, 0.040	0.27, 0.30, 0.40, 0.45
	X			<0.020, 0 034	0.43, 0.50
Verona, WI		X	3	<0.020, <0.020	0.14, 0.27
Madera, CA (side-by-side and decline study)		X	0	0.054, 0.39	2.1, 2.1
	X			0.090, 0.44	1.9, 3.4
		X	3	0.032, 0.076	1.3, 4.0
	X			0.16, 0.32	3.9, **6.4**
		X	7	<0.020, 0.19	0.54, 1.6
	X			0.12, 0.28	3.4, 4.0
		X	14	<0.020, 0.065	0.44, 1.1
	X			0.078, 0.098	3.0, 3.1
		X	21	0.022, 0.098	0.69, 2.6
	X			0.096, 0.18	1.8, 2.3

[a] The 4.0-ppm value represents the higher of duplicate analyses of a single field sample.

Conclusions

Broccoli: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed head and stem *Brassica* subgroup tolerance level of 10.0 ppm in/on broccoli harvested 3 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 0.28-2.5 ppm in/on broccoli treated with the DPX-JW062 formulation, and 0.23-0.52 ppm in/on broccoli treated with the DPX-MP062 formulation. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on broccoli over time. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 2.5 ppm x 0.67 = 1.7 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship.

Cabbage: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed head and stem *Brassica* subgroup tolerance level of 10.0 ppm in/on cabbage harvested 3 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 0.60-6.4 ppm in/on cabbage (with wrapper leaves) treated with the DPX-JW062 formulation, and 0.14-4.0 ppm in/on cabbage (with wrapper leaves) treated with the DPX-MP062 formulation. The additional residue data submitted for cabbage without wrapper leaves indicate that residues were substantially lower than for cabbage with wrapper leaves; the submitted data for cabbage without wrapper leaves may be used for a more accurate assessment of dietary exposure, if necessary. Residue decline cabbage data were too variable to make a conclusion concerning residue dissipation over time. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 6.4 ppm x 0.67 = 4.3 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship.

Head and Stem Brassica Subgroup: The proposed tolerance for the head and stem brassica subgroup is 10.0 ppm. However, after the broccoli and cabbage data were adjusted for the exaggerated application rates, the data suggest that the proposed tolerance for the head and stem brassica subgroup should be lowered from 10.0 ppm to 5.0 ppm. Also, the correct terminology is "brassica, head and stem, subgroup". **A revised Section F is required.**

Leafy Vegetables (Except Brassica Vegetables)

Lettuce (leaf and head)

E.I. du Pont de Nemours and Company submitted three volumes (including one supplemental volume) of lettuce field trial data to support the establishment of proposed tolerances for residues of DPX-MP062 in/on leaf lettuce at 20.0 ppm and head lettuce at 7.0 ppm. The citations are listed below.

> 44477409 Klemens, F.; Kennedy, C. (1997) Magnitude of Residues of DPX-JW062 (Racemic Mixture of DPX-KN128 and IN-KN127) in Lettuce Following Application of DPX-JW062 Experimental Insecticide at Maximum Label Rates: Lab Project Number: AMR 3286-95. Unpublished study prepared by Du Pont Agricultural Products and McKenzie Labs., Inc. 195 p.
>
> 44477410 Behmke, F.; Klemens, F. (1997) Magnitude and Decline of Residues of DPX-KN128 and IN-KN127 in Lettuce Following Application of DPX-MP062 and DPX-JW062 Experimental Insecticides at Maximum Label Rates: Lab Project Number: AMR 3728-96. Unpublished study prepared by Du Pont Agricultural Products and McKenzie Labs., Inc. 200 p.
>
> 44815803 Behmke, F. (1999) Magnitude and Decline of Residues of DPX-KN128 and IN-KN127 in Lettuce Following Application of DPX-MP062 and DPX-JW062 Experimental Insecticides at Maximum Label Rates: Supplement 1: Lab Project Number: AMR 3728-96. Unpublished study prepared by Du Pont Agricultural Products and McKenzie Labs., Inc. 24 p.

Leaf lettuce

Six field trials were conducted during the 1995-1997 growing seasons in AZ(1), CA(2), FL(2), and MD(1) depicting the magnitude and decline of S-indoxacarb/R-indoxacarb residues in/on leaf lettuce. The test substance was a 30% WDG formulation of DPX-JW062 or DPX-MP062. Side-by-side trials were conducted concurrently at selected trial sites to compare residues of S-indoxacarb/R-indoxacarb following application of DPX-JW062 and DPX-MP062. Samples of mature leaf lettuce were harvested 0, 3, 7, 14, and 21 days following the last of four foliar applications of the test formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate). The proposed PHI for leaf lettuce is 3 days; samples reflecting other PHIs were collected to generate residue decline data. Applications were made in 15-48 gallons of water per acre using tractor-mounted, plot, or hand-held spray equipment. Each test site consisted of control and treatment plots. Although certain sites received treatments at a 2x rate, these samples were not analyzed.

Following harvest, samples were promptly frozen (within 3-4 hours). Samples were then shipped frozen by ACDS freezer truck, Federal Express, or Arid Ag-Research to McKenzie Laboratories, Inc. (Phoenix, AZ) where samples were stored frozen (-29 to -15 C) until residue analysis. The storage intervals of samples are presented in Table 26.

Samples were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described GC/MSD method (Du Pont Report No. AMR-3493-95, Supplement No. 1) with an LOQ of 0.020 ppm. This method is adequate for data collection based on concurrent method recoveries (see Table 16). Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.020 ppm) in/on 12 untreated leaf lettuce samples; one sample bore residues of 0.047 ppm. The results of the leaf lettuce field trials are presented in Table 37a.

Geographic representation of data for leaf lettuce is not fully adequate when the data are evaluated in accordance to the current guidance. According to Table 5 of OPPTS GLN 860.1500, a total of 8 trials are recommended for leaf lettuce. Only six leaf lettuce field trials were conducted in Regions 2 (1 trial), 3 (2 trials), and 10 (3 trials). HED will not, however, request additional field trial data for leaf lettuce in consideration of the submitted decline and side-by-side data.

Table 37a.	Residues of S-indoxacarb/R-indoxacarb in/on **leaf lettuce** harvested at various posttreatment intervals following the last of four foliar applications of a 30% WDG formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate).			
Test Location (City, State)	Form of 30% WDG Used		Posttreatment Interval (Days)	Residues S-indoxacarb/ R-indoxacarb (ppm)
	DPX-JW062	DPX-MP062		
MRID 44477409				
Bradenton, FL	X		3	3.9, **13**
King City, CA	X		3	3.2, 3.4
Elkton, MD	X		3	3.2, 3.3
Madera, CA (decline study)	X		0	8.5, 13
	X		3	4.8, 5.9
	X		7	1.2, 1.5
	X		14	0.96, 2.2
	X		21	0.067, 0.10
MRID 44477410				
Maricopa, AZ (side-by-side)		X	3	2.8, 3.6
	X			6.0, 7.1
Bradenton, FL (side-by-side and decline study)		X	0	4.6, 5.2
	X			8.2, 10
		X	3	3.4, 4.2
	X			7.2, 7.9
		X	7	3.5, 3.6
	X			4.8, 6.3
		X	14	0.062, 0.10
	X			0.097, 0.14
		X	21	<0.020, 0.032
	X			0.059, 0.063

Conclusions

Lettuce, leaf: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 20.0 ppm in/on leaf lettuce harvested 3 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 3.2-13 ppm in/on leaf lettuce treated with the DPX-JW062 formulation, and 2.8-4.2 ppm in/on leaf lettuce treated with the DPX-MP062 formulation. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on leaf lettuce over time. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can

be adjusted to reflect the application at an exaggerated rate (i.e., 13 ppm x 0.67 = 8.7 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship. Therefore, the data suggest that the proposed tolerance for lettuce, leaf should be lowered from 20.0 ppm to 10.0 ppm. Also, the correct terminology is "lettuce, leaf". **A revised Section F is required.**

Head lettuce

Nine field trials were conducted during the 1995-1997 growing seasons in AZ(2), CA(4), FL(2), and MD(1) depicting the magnitude and decline of S-indoxacarb/R-indoxacarb residues in/on head lettuce. The test substance was a 30% WDG formulation of DPX-JW062 or DPX-MP062. Side-by-side trials were conducted concurrently at selected trial sites to compare residues of S-indoxacarb/R-indoxacarb following application of DPX-JW062 and DPX-MP062. Samples of mature head lettuce (without wrapper leaves and with wrapper leaves) were harvested 0, 3, 7, 14, and 21 days following the last of four foliar applications of the test formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate). The proposed PHI for head lettuce is 3 days; samples reflecting other PHIs were collected to generate residue decline data. Applications were made in 10-51 gallons of water per acre using tractor-mounted, plot, or hand-held spray equipment. Each test site consisted of control and treatment plots. Although certain sites received treatments at a 2x rate, these samples were not analyzed.

Following harvest, samples were promptly frozen (within 3-4 hours). Samples were then shipped frozen by ACDS freezer truck, Federal Express, or Arid Ag-Research to McKenzie Laboratories, Inc. (Phoenix, AZ) where samples were stored frozen (-29 to -15 C) until residue analysis. The storage intervals of samples are presented in Table 26.

Samples were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described GC/MSD method (Du Pont Report No. AMR-3493-95, Supplement No. 1) with an LOQ of 0.020 ppm. This method is adequate for data collection based on concurrent method recoveries (see Table 16). Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.020 ppm) in/on 35 untreated head lettuce samples; one sample bore residues of 0.083 ppm. The results of the head lettuce field trials are presented in Table 37b.

Table 37b. Residues of S-indoxacarb/R-indoxacarb in/on **head lettuce** harvested at various posttreatment intervals following the last of four foliar applications of a 30% WDG formulation at 0.0665-0.0669 lb ai/A/application for a total application rate of 0.266-0.268 lb ai/A (1x the maximum proposed seasonal rate).

Test Location (City, State)	Form of 30% WDG Used		Posttreatment Interval (Days)	Residues S-indoxacarb/ R-indoxacarb (ppm)	
	DPX-JW062	DPX-MP062		Without Wrapper Leaves	With Wrapper Leaves
MRID 44477409					
Bradenton, FL	X		3	0.69, 2.1	2.7, 3.4
Maricopa, AZ	X		3	0.17, 0.72	4.6, **4.7**
Huron, CA	X		3	0.32, 0.92	3.6, 4.1
Watsonville, CA	X		3	0.15, 0.26	0.62, 0.68
Madera, CA (decline study)	X		0	0.058, (0.056, 0.068) [a]	0.66, 0.87
	X		3	0.022, 0.13	0.59, 1.2
	X		7	<0.020, 0.031	2.6, 3.4
	X		14	<0.020, 0.063	0.23, 0.26
	X		21	<0.020, <0.020	0.21, 0.68
MRID 44477410					
Bradenton, FL		X	3	0.30, 0.55	1.6, 2.1
Yuma, AZ (side-by-side)		X	3	0.25, 0.29	1.5, 1.7
	X		3	0.15, 0.74	2.2, 2.6
Watsonville, CA (side-by-side)		X	3	<0.020, <0.020	0.18, 0.22
	X		3	0.029, 0.033	0.25, 0.40
Elkton, MD (side-by-side and decline study)		X	0	0.15, 0.23	2.7, 2.9
	X			0.10, 0.16	3.5, 3.5
		X	3	<0.020, <0.020	1.7, 2.2
	X			<0.020, 0.034	2.7, 3.7
		X	7	<0.020, <0.020	0.83, 0.97
	X			<0.020, <0.020	2.3, 2.8
		X	14	<0.020, <0.020	0.38, 0.74
	X			<0.020, <0.020	1.0, 1.7
		X	21	<0.020, <0.020	0.21, 0.26
	X			<0.020, <0.020	0.60, 0.66

[a] The 0.068-ppm value represents the higher of duplicate analyses of a single field sample.

Geographic representation of data for head lettuce is adequate. According to Table 5 of OPPTS GLN 860.1500, a total of 8 trials are recommended for head lettuce. Nine head lettuce field trials were conducted in Regions 2 (1 trial), 3 (2 trials), and 10 (6 trials).

Conclusions

Lettuce, head: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level of 7.0 ppm in/on head lettuce harvested 3 days following the last of four foliar applications of a 30% WDG formulation of DPX-JW062 or DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 0.25-4.7 ppm in/on head lettuce (with wrapper leaves) treated with the DPX-JW062 formulation, and from 0.18 to 2.1 ppm in/on head lettuce (with wrapper leaves) treated with the DPX-MP062 formulation. The additional residue data submitted for head lettuce without wrapper leaves indicate that residues were substantially lower than head lettuce with wrapper leaves; the submitted data for head lettuce without wrapper leaves may be used for a more accurate assessment of dietary exposure, if necessary. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on head lettuce over time. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 4.7 ppm x 0.67 = 3.1 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship. Therefore, the data suggest that the proposed tolerance for lettuce, head should be lowered from 7.0 ppm to 4.0 ppm. Also, the correct terminology is "lettuce, head ". **A revised Section F is required.**

Pome Fruits Group

Apples

E.I. du Pont de Nemours and Company submitted two volumes of apple field trial data to support the establishment of a proposed tolerance for residues of DPX-MP062 in/on pome fruit at 2.0 ppm. The citations are listed below.

> 44477343 Gagnon, M.; Klemens, F. (1997) Magnitude of Residues of DPX-JW062 (Racemic Mixture of DPX-KN128 and IN-KN127) in Apples Following Application of DPX-JW062 Experimental Insecticide at Maximum Label Rates: Lab Project Number: AMR 3292-95: AMR 3493-95. Unpublished study prepared by Du Pont Agricultural Products and McKenzie Labs., Inc. 228 p.
>
> 44477344 Gagnon, M.; Klemens, F. (1997) Magnitude and Decline of Residues of DPX-KN128 and IN-KN127 in Apples Following Application of DPX-MP062 and DPX-JW062 Experimental Insecticides at Maximum Label Rates: Lab Project Number: AMR 3950-96: AMR 3292-95. Unpublished study prepared by Du Pont Agricultural Products and McKenzie Labs., Inc. 173 p.

Seventeen field trials were conducted during the 1995 and 1996 growing seasons in CA(2), MI(3), NC(1), NY(2), OR(1), PA(2), UT(1), and WA(5) depicting the magnitude and decline of S-indoxacarb/R-indoxacarb residues in/on apples. The test substance was a 30% WDG formulation of DPX-JW062 or DPX-MP062. Side-by-side trials were conducted concurrently at selected trial sites to compare residues of S-indoxacarb/R-indoxacarb following application of DPX-JW062 and DPX-MP062. Samples of mature apples were harvested 0, 3, 7, 14, 21, and 28 days following the last of four foliar applications of the test formulation at 0.133 lb ai/A/application for a total application rate of 0.532-0.535 lb ai/A (1x the maximum proposed seasonal rate). The proposed PHI for apples is 28 days; samples reflecting other

PHIs were collected to generate residue decline data. Applications were made in 49-204 gallons of water per acre using airblast spray equipment. Each test site consisted of control and treatment plots. Certain sites received treatments at a 0.5x rate; samples were analyzed, however, no data were reported.

Following harvest, apples were promptly frozen (within 1.5-4 hours). Samples (except apple samples from the NC test site) were shipped frozen by ACDS freezer truck to McKenzie Laboratories, Inc. (Phoenix, AZ) where samples were stored frozen (-29 to -15 C) until residue analysis. Apple samples from the NC test site were shipped first to the Du Pont Experimental Station (Wilmington, DE) by ACDS freezer truck and then to McKenzie Laboratories by Federal Express.

Samples were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described GC/MSD method (Du Pont Report No. AMR-3493-95, Supplement No. 1) with an LOQ of 0.020 ppm. This method is adequate for data collection based on concurrent method recoveries (see Table 16.) Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.020 ppm) in/on 36 untreated apple samples. The results of the apple field trials are presented in Table 38.

Geographic representation of data, for the establishment of a tolerance for the pome fruits group (Crop Group 11), is adequate. According to Table 2 of OPPTS GLN 860.1500, a total of 18 trials are recommended for this group, 12 trials for apple and 6 trials for pear. Seventeen apple field trials were conducted in Regions 1 (4 trials), 2 (1 trial), 5 (3 trials), 9 (1 trial), 10 (2 trials), 11 (4 trials), and 12 (2 trials). Six pear field trials (see "Pear" section) were conducted in Regions 1 (1 trial), 10 (2 trials), and 11 (3 trials).

Pears

E.I. du Pont de Nemours and Company submitted two volumes (including one supplemental study) of pear field trial data to support the establishment of a proposed tolerance for residues of DPX-MP062 in/on pome fruit at 2.0 ppm. The citation is listed below.

> 44477411 Gagnon, M.; Klemens, F. (1997) Magnitude and Decline of Residues of DPX-KN128 and IN-KN127 in Pears Following Application of DPX-MP062 Experimental Insecticide at Maximum Label Rates: Lab Project Number: AMR 3951-96. Unpublished study prepared by Du Pont Agricultural Products and McKenzie Labs., Inc. 138 p.
>
> 44815808 Gagnon, M.. (1998) Magnitude and Decline of Residues of DPX-KN128 and IN-KN127 in Pears Following Application of DPX-MP062 Experimental Insecticide at Maximum Label Rates: Supplement No.1: Lab Project Number: AMR 3951-96. Unpublished study prepared by Du Pont Agricultural Products and McKenzie Labs., Inc. 21 p.

Six field trials were conducted during the 1996 growing season in CA(2), NY(1), and WA(3) depicting the magnitude and decline of S-indoxacarb/R-indoxacarb residues in/on pears. The test substance was a 30% WDG formulation of DPX-MP062. Samples of mature pears were harvested at various PHI intervals following the last of four broadcast applications of the test formulation at 0.133lb ai/A/application for a total application rate of 0.535 lb ai/A (1.2x the maximum proposed seasonal rate). The proposed PHI for pears is 28 days; samples reflecting other PHIs were collected to generate residue decline data. Applications were made in 60-151 gallons of water per acre using air blast spray

equipment. Each test site consisted of control and treatment plots. Certain sites received treatments at a 0.5x rate; samples were analyzed, however, no data were reported.

Following harvest, pears were promptly frozen (within 1.5-4 hours). The storage intervals of samples are presented in Table 26. Samples were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described GC/MSD method (Du Pont Report No. AMR-3493-95, Supplement No. 1) with an LOQ of 0.020 ppm. This method is adequate for data collection based on concurrent method recoveries (see Table 16). Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.020 ppm) in/on 10 untreated pear samples. The results of the pear field trials are presented in Table 36.

Table 36. Residues of S-indoxacarb/R-indoxacarb in/on **pears** harvested at various posttreatment intervals following the last of four broadcast applications of a 30% WDG formulation of DPX-MP062 at 0.133 lb ai/A/application for a total application rate of 0.535 lb ai/A (1x the maximum proposed seasonal rate). Data are from MRID 44477411.

Test Location (City, State)	Posttreatment Interval (Days)	Residues S-indoxacarb/R-indoxacarb (ppm)
Lyons, NY	28	0.049, 0.081
Rio Vista, CA	28	0.035, 0.049
Buena, WA	28	0.060, 0.074
Royal City, WA	28	0.10, **0.12**
White Salmon, WA	28	0.051, 0.051
Orosi, CA (Decline study)	0	0.24, 0.27
	7	0.023, 0.050
	14	0.078, 0.12
	21	0.067, 0.095
	28	0.045, 0.056

Geographic representation of data, for the establishment of a tolerance for pome fruits group (Crop Group 11), is adequate. According to Table 2 of OPPTS GLN 860.1500, a total of 18 trials are recommended for this group, 12 trials for apple and 6 trials for pear. Six pear field trials were conducted in Regions 1 (1 trial), 10 (2 trials), and 11 (3 trials). Seventeen apple field trials (see "Apple" section) were conducted in Regions 1 (4 trials), 2 (1 trial), 5 (3 trials), 9 (1 trial), 10 (2 trials), 11 (4 trials), and 12 (2 trials).

Conclusions

Apples: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level for the pome fruits group of 2.0 ppm in/on apples harvested 28 days following the last of four broadcast applications of a 30% WDG formulation of DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 0.21-1.1 ppm in/on apples treated with the DPX-JW062 formulation, and 0.084-0.44 ppm in/on apples treated with the DPX-MP062 formulation. The residue decline data for apples were too variable and indeterminate to make a conclusion with regards to residue dissipation over time. Because

application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 1.1 ppm x 0.67 = 0.74 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship.

Pears: The submitted data indicate that residues of S-indoxacarb/R-indoxacarb will not exceed the proposed tolerance level for the pome fruits group of 2.0 ppm in/on pears harvested 28 days following the last of four broadcast applications of a 30% WDG formulation of DPX-MP062. Following applications according to the maximum proposed use patterns, residues of S-indoxacarb/R-indoxacarb ranged 0.035-0.12 ppm in/on pears treated with the DPX-MP062 formulation. The residue decline data indicate that residues of S-indoxacarb/R-indoxacarb dissipate in/on pears over time. Because application was made with the DPX-JW062 formulation (1.5x rate compared to 1x rate of DPX-MP062), the highest field trial result can be adjusted to reflect the application at an exaggerated rate (i.e., 0.12 ppm x 0.67 = 0.08 ppm). The data from side-by-side trials with DPX-JW062 and DPX-MP062 generally confirm this relationship.

Pome Fruits Group: The apple data suggest that the proposed tolerance for pome fruits should be lowered from 2.0 ppm to 1.0 ppm. The pear data suggest that the proposed tolerance for pome fruits group should be lowered from 2.0 ppm to 0.1 ppm. Because there is more than a five-fold difference between the maximum residue in apples (1.1 ppm) and pears (0.12 ppm), **HED is not recommending for a pome fruits group tolerance. A revised Section F should be submitted with individual tolerances for apple (1.0 ppm) and pear (0.1 ppm).** If the petitioner wishes to establish additional tolerances for other crops in this group, then additional data must be submitted.

OPPTS GLN 860.1520: Processed Food/Feed

Processing studies were conducted with test substances formulated from DPX-MP062 (75:25 S-indoxacarb:R-indoxacarb); formulation percentages reflect % of the active enantiomer, S-indoxacarb. Because the insecticidal efficacy of the test substances is based on the concentration of S-indoxacarb, application rates for all studies were normalized by the petitioner on a S-indoxacarb basis.

Apples

E.I. du Pont de Nemours and Company submitted the following data from a single trial depicting the potential for concentration of residues of DPX-MP062 in the processed commodities of apples:

> 44477415 Gagnon, M.; Klemens, F. (1997) Magnitude of Residues of DPX-KN128 and IN-KN127 in Apple and Its Processed Fractions Following Application of DPX-MP062 Experimental Insecticide: Lab Project Number: AMR 3952-96: PG8157. Unpublished study prepared by Du Pont Agricultural Products and The National Food Lab., Inc. 81 p.

In one trial conducted in CA, mature apples were harvested 7 days following the last of four foliar applications of the 30% WDG formulation of DPX-MP062 at either 0.0669, 0.01338, 0.334, or 0.6695 lb ai/A/application (0.5x, 1x, 2.5x, and 5x, respectively, the maximum proposed seasonal application rate). Applications were made in 200 gallons of water per acre using airblast spray equipment with a 7-day retreatment interval. The test site consisted of one control and four treatment plots; data were reported

for the 1x and 5x treatment plots only.

Control and treated field samples were collected from the designated trial plots. The field samples were promptly frozen (within 4 hours) after harvest and shipped frozen by ACDS freezer truck to Du Pont Experimental Station (Wilmington, DE), where samples remained under frozen storage conditions (-20 ±5 C) until residue analysis. Samples for processing were shipped at ambient temperatures from the field to the National Food Laboratories (Dublin, CA) for processing. Samples were held at ambient temperatures (16-18 C) at the processing facility prior to processing. Processing was started one day after apples were harvested.

Samples were processed according to simulated commercial procedures into washed apples, apple juice, and apple wet pomace. A brief description of the processing procedure follows. Before processing, a whole unwashed apple sample was reserved as "processing unwashed RAC." The remaining whole apples were washed and a subsample was reserved as "processing washed RAC." The remaining washed apples were cut, ground, and pressed into two fractions: unclarified juice and wet pomace. The unclarified juice was heated and treated with pectic enzyme. After depectinization, the juice was filtered, heated to 92 C, and canned as clarified juice. Processed commodities were then frozen (-23 C) following processing and were shipped frozen by ACDS freezer truck to Du Pont Experimental Station for analysis.

Samples were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described GC/MSD method (Du Pont Report No. AMR-3493-95, Supplement No. 1) with an LOQ of 0.020 ppm. This method is adequate for data collection based on concurrent method recoveries (see Table 16). Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.020 ppm) in/on two untreated samples of unwashed apples (field), and one untreated sample each of unwashed apples (processing), washed apples, juice, and wet apple pomace. The results of the apple processing study are presented in Table 37.

Table 37. Residues of S-indoxacarb/R-indoxacarb in the processed commodities of **apples** harvested 7 days following four foliar applications of a 30% WDG formulation of DPX-MP062 at either 0.1338 lb ai/A/application (0.535 lb ai/A/season; 1x the maximum proposed seasonal rate) or 0.6695 lb ai/A/application (2.68 lb ai/A/season; 5x the maximum proposed seasonal rate).

Substrate	Residues of S-indoxacarb/ R-indoxacarb (ppm)	Processing Factor [a] (Concentration or Reduction)
Apple, unwashed (field; 1x)	0.22, 0.34	--
Apple, unwashed (field; 5x)	0.74, 0.98	--
Apple, unwashed (processor; 5x)	1.5, 1.9 average = 1.7	--
Apple, washed (processor; 5x)	0.91, 1.0	--
Juice	<0.02, <0.02 average = <0.02	0.01x
Wet pomace	4.3, 4.5 average = 4.4	2.6x

[a] Processing factors were calculated using the average of the unwashed apple processor residues.

Conclusions

Study summary: The submitted apple processing data are adequate. The data indicate that residues of S-indoxacarb/R-indoxacarb concentrate 2.6x in wet pomace and reduce 0.01x in juice processed from apples bearing detectable residues.

The highest average field trial (HAFT) residues of S-indoxacarb/R-indoxacarb in/on apples harvested 28 days following treatment at 1.2x the maximum proposed seasonal application rate (0.44 lb ai/A; see apple field trial data) is 1.02 ppm. The maximum S-indoxacarb/R-indoxacarb residues expected in wet apple pomace, based on the HAFT (1.02 ppm) and the observed concentration factor (2.6x), would be 2.7 ppm. These data suggest that the proposed tolerance for wet apple pomace should be lowered from 6.0 ppm to 3.0 ppm. **A revised section F should be submitted.** Because residues in the treated apples were reduced when processed into juice, the apple juice tolerance is covered by the recommended RAC tolerance.

Cotton

E.I. du Pont de Nemours and Company submitted the following data from a single trial depicting the potential for concentration of residues of DPX-MP062 in the processed commodities of cotton:

> 44477416 Klemens, F. (1997) Magnitude of Residues of S-indoxacarb and R-indoxacarb in Cotton and Its Processed Fractions Following Application of DPX-MP062 Experimental Insecticide: Lab Project Number: AMR 3948-96. Unpublished study prepared by Du Pont Agricultural Products and Food Protein Research and Development Center, Inc. 97 p.

In one trial conducted in MS, mature cotton was harvested 13 days following the last of four foliar applications of a 15% liquid formulation of DPX-MP062 at either 0.0669, 0.1338, 0.334, or 0.669 lb ai/A/application (0.5x, 1x, 2.5x, and 5x, respectively, the maximum proposed seasonal application rate). Applications were made in 10 gallons of water per acre using tractor-mounted spray equipment with a 5-day retreatment interval. The test site consisted of one control and four treatment plots; data were reported for the 1x and 5x treatment plots only.

Control and treated field samples of cottonseed were collected from the designated trial plots. The field samples were promptly frozen (within 0.5 hour) after harvest and shipped frozen by ACDS freezer truck to Du Pont Experimental Station (Wilmington, DE) where samples remained under frozen (-20 ±5 C) storage conditions until residue analysis. Samples for processing were shipped at ambient temperatures via Federal Express from the field to the Food Protein Research and Development Center at Texas A&M University (Bryan, TX) for processing. Samples were held frozen (temperature unspecified) at the processing facility prior to processing. Processing was started 143-155 days after seed cotton was harvested.

Samples were processed according to simulated commercial procedures into undelinted cottonseed, gin byproducts, delinted cottonseed, lint, linters, linter motes, hulls, kernels, meal (solvent-extracted collets), crude oil, refined oil, and soapstock. A brief description of the processing procedure follows. The harvested seed cotton samples were passed through a stick extractor to remove cotton gin byproducts

(burrs, leaves, sticks, and other plant parts). The undelinted cottonseed was saw-ginned to remove the majority of the lint. The ginned cottonseed was delinted, hulled, and separated into kernels and hulls. The kernel material with some hull material was heated, flaked, expanded to form "collets". Crude oil was extracted from the collets with hot hexane. The extracted collets were toasted for desolventization and a sample of cottonseed meal was taken from the desolventized collets. The crude oil content of the miscella was determined, and the oil:hexane ratio was reduced to 60:40 by rotary evaporation to remove the hexane, yielding crude cottonseed oil. The crude oil was then mixed with sodium hydroxide, heated, cooled, and filtered resulting in refined oil and soapstock.

Samples of undelinted cottonseed (field and processed) and the processed commodities hulls, meal, and refined oil were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described HPLC/Column Switching/UV method (Du Pont Study No. AMR-2712-93) with an LOQ of 0.010 ppm. This method is adequate for data collection based on concurrent method recoveries (see Table 16). Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.010 ppm) in/on two untreated samples of undelinted cottonseed (field), and one untreated sample each of cotton meal, hulls, and refined oil. The results of the cotton processing study are presented in Table 38.

Table 38. Residues of S-indoxacarb/R-indoxacarb in the processed commodities of **cottonseed** harvested 13 days following four foliar applications of a 15% liquid formulation of DPX-MP062 at either 0.133 lb ai/A/application (0.535 lb ai/A/season; 1x the maximum proposed seasonal rate) or 0.669 lb ai/A/application (2.68 lb ai/A/season; 5x the maximum proposed seasonal rate).

Substrate	Residues of S-indoxacarb/ R-indoxacarb (ppm)	Processing Factor [a] (Concentration or Reduction)
Cottonseed, undelinted (field; 1x)	0.33, 0.35	--
Cottonseed, undelinted (field; 5x)	6.6, 7.7 average=7.2	--
Hulls	0.16, 0.22 average=0.19	0.03x
Meal	<0.010, 0.011 average=<0.01	0.01x
Refined oil	0.25, 0.26 average=0.26	0.04x

[a] Processing factors were calculated using the average of the undelinted cottonseed field residues from the 5x treatment plot.

Conclusions

Study summary: The submitted cotton processing data are adequate. The data indicate that residues of S-indoxacarb/R-indoxacarb do not concentrate, but reduce by 0.03x, 0.01x and 0.04 x in cotton hulls, meal, and refined oil, respectively, when processed from undelinted cottonseed bearing detectable residues. Because residues in the treated cottonseed were reduced when processed, the processed commodities' (hulls, meal and refined oil) tolerance is covered by the recommended RAC tolerance.

Tomatoes

E.I. du Pont de Nemours and Company submitted the following data from a single trial depicting the potential for concentration of residues of DPX-MP062 in the processed commodities of tomatoes:

> 44477417 Adams, G.; Klemens, F. (1997) Magnitude of Residues of DPX-KN128 and IN-KN127 in Tomato and Its Processed Fractions Following Application of DPX-MP062 Experimental Insecticide: Lab Project Number: AMR 3734-96: PG8156. Unpublished study prepared by Du Pont Agricultural Products and National Food Lab., Inc. 87 p.

In one trial conducted in CA, mature tomatoes were harvested 3 days following the last of four foliar applications of the 30% WDG formulation of DPX-MP062 at either 0.0669 or 0.334 lb ai/A/application (1x and 5x, respectively, the maximum proposed seasonal application rate). Applications were made in 38-41 gallons of water per acre using tractor-mounted spray equipment with a 5-day retreatment interval. The trial site consisted of one control and two treatment plots; processing data were reported for the 5x treatment plot only.

Control and treated field samples were collected from the designated trial plots; samples intended for processing were collected from the 5x treatment plot only. The field samples were promptly frozen (within 1.5 hours) after harvest and shipped frozen by ACDS freezer truck to Du Pont Experimental Station (Wilmington, DE) where samples remained under frozen (temperature unspecified) conditions until residue analysis. Samples for processing were shipped at ambient temperatures from the field to the National Food Laboratory (Dublin, CA) for processing. Samples were held at ambient temperatures (16-19 C) at the processing facility prior to processing. Processing was started one day after tomatoes were harvested.

Samples were processed according to simulated commercial procedures into washed tomatoes, tomato puree, and tomato paste. A brief description of the processing procedure follows. Before processing a whole unwashed tomato sample was reserved as "processing unwashed RAC". The remaining whole tomatoes were washed twice, first with municipal water, then with chlorinated water and a subsample was reserved as "processing washed RAC". The remaining washed tomatoes were crushed, heated to 96-98 C, and passed through a screen. The materials that did not pass through the screen were designated as wet pomace. The juice that passed through the screen was collected and sent to barrels. A portion of the tomato juice was concentrated by evaporation to generate puree; the puree was canned. A portion of tomato puree was concentrated under slight vacuum and then heated to 91-93 C to generate tomato paste; the paste was canned. Processed commodities were then frozen (-23 C) following processing and were shipped frozen on dry ice via Federal Express to Du Pont Experimental Station for analysis.

Samples of tomatoes (field and processed) and the processed commodities tomato puree and paste were analyzed for residues of S-indoxacarb/R-indoxacarb using the previously described GC/MSD method (Du Pont Report No. AMR-3493-95, Supplement No. 1) with an LOQ of 0.020 ppm. This method is adequate for data collection based on concurrent method recoveries (see Table 16). Apparent residues of S-indoxacarb/R-indoxacarb were below the LOQ (<0.020 ppm) in/on one untreated sample each of unwashed tomato (field), unwashed tomato (processing), washed tomato, puree, and paste. The results of the tomato processing study are presented in Table 39.

Table 39. Residues of S-indoxacarb/R-indoxacarb in the processed commodities of **tomatoes** harvested 3 days following four foliar applications of a 30% WDG formulation of DPX-MP062 at either 0.0669 lb ai/A/application (0.268 lb ai/A/season; 1x the maximum proposed seasonal rate) or 0.334 lb ai/A/application (1.34 lb ai/A/season; 5x the maximum proposed seasonal rate).

Substrate	Residues of S-indoxacarb/ R-indoxacarb (ppm) [a]	Concentration/Reduction Factor [b]
Tomato, unwashed (field; 1x)	(0.12, 0.12), (0.12, 0.15)	--
Tomato, unwashed (field; 5x)	(0.58, 0.79), (0.51, 0.53, 0.55, 0.56), (0.27, 0.30), (0.23, 0.25, 0.27, 0.28)	--
Tomato, unwashed (processor; 5x)	(0.12, 0.14, 0.15, 0.15, 0.16, 0.17) average=0.15	--
Tomato, washed (processor; 5x)	(0.057, 0.059, 0.073, 0.078, 0.078, 0.15) average=0.083	--
Puree	(0.056, 0.077, 0.081, 0.087, 0.087) average=0.078	0.52x
Paste	(0.19, 0.20, 0.21, 0.21, 0.22) average=0.21	1.4x

[a] Residues listed in parentheses represent duplicate or multiple analyses of a single sample.
[b] Concentration factors were calculated using the average of the unwashed tomato processor residues.

Conclusions

Study summary: The submitted tomato processing data are adequate. The data indicate that residues of S-indoxacarb/R-indoxacarb concentrate 1.4x in tomato paste and reduce 0.52x in puree processed from tomatoes bearing detectable residues.

The HAFT residues of S-indoxacarb/R-indoxacarb in/on tomatoes harvested 3 days following multiple foliar treatments at 1x the maximum proposed seasonal application rate (0.268 lb ai/A; see tomato field trial data) is 0.33 ppm. The maximum S-indoxacarb/R-indoxacarb residues expected in tomato paste, based on the HAFT (0.33 ppm) and the observed concentration factor (1.4x), would be 0.46 ppm. Based on the highest expected residues, no tolerance for residues of S-indoxacarb/R-indoxacarb in tomato paste is required because the recommended RAC tolerance of 0.50 ppm for the fruiting vegetables group will not be exceeded.

OPPTS GLN 860.1480: Meat, Milk, Poultry, Eggs

Eggs, and the Fat, Meat, and Meat Byproducts of Poultry

A poultry feeding study was not submitted with this petition. Except for cottonseed meal, there are no poultry feed items associated with this petition. Even though the cottonseed processing study indicate that residues of S-indoxacarb/R-indoxacarb do not concentrate in cottonseed meal processed from undelinted cottonseed bearing detectable residues, a poultry feeding study must be submitted. In the poultry metabolism the parent and the metabolite IN-JT333 were identified in most poultry matrices following oral administration of radiolabeled test substance at 10 ppm (25x the maximum expected dietary exposure of DPX-MP062). The required poultry feeding study should analyze for the parent and all metabolites of toxicological concern. The petitioner may also be required to propose tolerances for eggs and poultry tissues based on the results of an acceptable feeding study.

As there are no established permanent tolerances for DPX-MP062, the maximum dietary burden for poultry results from a diet comprised solely of cottonseed meal. The MTDB of DPX-MP062 to poultry is calculated to be 0.4 ppm, (used as 1x feeding level of comparison); the calculation of the dietary burden is presented below in Table 40.

Table 40. Calculation of the MTDB of DPX-MP062 to poultry.

Matrix (feed commodity)	Recommended Tolerance (ppm)	Poultry	
		% of Diet [a]	Burden [b] (ppm)
Cottonseed meal	2.0	20	0.4
	TOTAL	20	0.4

[a] Table 1. OPPTS 860 Guidelines (August 1996).
[b] Burden = [Recommended Tolerance x % of Diet].

Milk, and the Fat, Meat, and Meat Byproducts of Cattle, Goats, Hogs, Horses, and Sheep

E.I. du Pont de Nemours and Company submitted data (citation listed below) pertaining to the magnitude of residues of S-indoxacarb/R-indoxacarb and IN-JT333 in milk and edible tissues of dairy cattle following oral administration of DPX-MP062. The in-life portion of the study was conducted by Randy Taylor Farm (Waunakee, WI). The analytical phase of the study was performed Covance Laboratories (formerly Corning Hazleton, Inc.; Madison, WI) and Du Pont (Wilmington, DE).

44477342 Amoo, J. (1997) Magnitude of Residues of DPX-KN128 and IN-KN127 and IN-JT333 in Edible Tissues and Milk of Lactating Dairy Ruminants Following Dosing with DPX-MP062 Experimental Insecticide. Lab Project Number AMR 3820-96: CHW 6129-200: 6129-200. Unpublished study prepared by Du Pont Agricultural Products and Covance Labs., Inc. 405 p.

In-life phase

The in-life phase of the study consisted of an acclimation period of at least 14 days, a treatment (feeding) period of 28 days, and an interval of sacrifice and tissue collection. Ten Holstein dairy cows were orally dosed for 28 consecutive days with DPX-MP062 at levels equivalent to 7.5 ppm (three cows), 22.5 ppm (three cows), and 75 ppm (four cows) in the diet (mg/kg diet on a dry weight basis). One of the four cows treated at 75 ppm was randomly selected for a depuration study. Three additional cows were not treated and served as control animals. The encapsulated test substance was administered orally, by balling gun, twice daily (one-half of the daily dose after each milking). The first half of the dose was given after the a.m. milking, and the second half of the dose was given after the p.m. milking. A treatment day began when the first of two daily capsules containing DPX-MP062 was given, and ended immediately after the a.m. milking on the following day. A treatment day included two milkings, the first in the p.m. (after the a.m. dosing) and the second the following a.m. (before the next a.m. dose).

The livestock were fed a total mixed ration of 60.29% haylage, 33.28% high-moisture shell corn, and 5.88% dairy protein in accordance with the recommendations of the National Research Council for a cow producing milk at a level of 60 lb (27.22 kg) per day. Water was provided *ad libitum* throughout the study. The study submission provided adequate information pertaining to feed consumption, daily average milk production, and average body weights and general health status of test livestock.

Milk samples were collected daily from each p.m. and a.m. milking beginning on the day before the first dosing and continuing until the morning of sacrifice. Skim milk and cream samples were prepared from whole milk samples collected on Days 14, 21, and 28. Milk samples were stored on cold packs during transfer from the Randy Taylor Farm to Covance Laboratories. The milk samples were stored frozen at the laboratory until analysis.

The livestock were transported from Randy Taylor Farm to Covance Laboratories facility for sacrifice, tissue sampling, and tissue processing. Twelve treated livestock were sacrificed 14-22 hours after the last morning dose. The depuration animal was sacrificed on Day 43, 15 days after the last dose. The following whole organs and tissues were removed and/or sampled at sacrifice: liver, kidneys, omental fat, renal fat, subcutaneous fat, triceps muscle, *gracilis* muscle, and *longissimus dorsi* muscle. The different types of fat and muscles from each animal and from each dosing level were pooled to form a composite sample. All tissue samples were stored on ice until they were homogenized. The homogenized samples were stored frozen (-20 ± 10 C) until shipment on dry ice overnight via FedEx to Du Pont for analysis. The samples remained frozen at Du Pont Experimental Station until analysis.

Dietary Burden

As there are no established permanent tolerances for DPX-MP062, the maximum dietary burden for dairy and beef cattle results from a diet comprised solely of sweet corn stover, forage, cotton gin byproducts, and apple wet pomace. The MTDB of DPX-MP062 to beef and dairy cattle are calculated to be 21.9 and 22.6 ppm, respectively (used as 1x feeding level of comparison); the calculations of dietary burdens are presented below in Table 41. The dosing levels of 7.5, 22.5,

and 75 ppm represent 0.3x, 1x, and 3.4x, respectively, the MTDB to dairy cattle.

Table 41. Calculation of the MTDB of DPX-MP062 to beef and dairy cattle.

Matrix (feed commodity)	Recommended Tolerance (ppm)	% Dry Matter [a]	Beef Cattle		Dairy Cattle	
			% of Diet [a]	Burden [b] (ppm)	% of Diet [a]	Burden [b] (ppm)
Sweet corn stover	15	83	25	4.5	15	2.7
Sweet corn forage	10	48	40	8.3	50	10.4
Cotton gin byproducts	10	90	20	2.2	20	2.2
Apple wet pomace	3.0	40	15	1.1	15	1.1
		TOTAL	100	16.1	100	16.4

[a] Table 1. OPPTS 860 Guidelines (August 1996).
[b] Burden = [Tolerance / %DM] x % of Diet].

Method Validation

Milk and tissue samples were analyzed for residues of S-indoxacarb/R-indoxacarb and their metabolite IN-JT333 using the proposed enforcement method (Method No. AMR 3337-95 with minor modifications). The method is a reverse-phase HPLC/column switching method with UV detection at 310 nm. Complete descriptions of the method as well as supporting validation data are presented in "OPPTS GLN 860.1340: Residue Analytical Methods - Animal Commodities" section. Whole milk, skim milk, and cream samples were analyzed by Covance Laboratories. Tissue samples were analyzed by Du Pont Experimental Station. The LOQ for S-indoxacarb/R-indoxacarb and IN-JT333 in whole milk, skim milk, cream, fat, muscle, liver, and kidney was 0.010 ppm for each analyte. The LOD was 0.003 ppm for both analytes in all matrices.

The results of the feeding study are presented in Table 41. Residues of S-indoxacarb/R-indoxacarb and IN-JT333 were each nondetectable (<0.003 ppm) in/on untreated samples of whole milk (n=33 samples), skim milk (n=13), cream (n=12), composite muscle (n=3), composite fat (n=3), liver (n=3), and kidney (n=3).

In addition, Day 18 whole milk samples treated at 0.75 and 75 ppm were analyzed for the metabolite IN-MP819 which was detected in whole milk samples from the dairy cattle metabolism study). Residues of IN-MP819 were <0.010 ppm in the 0.75-ppm treated milk samples, and ranged 0.18-0.032 ppm in the 75-ppm treated milk samples.

Demonstration of depuration

To monitor the dissipation of residues in milk and tissues, one dairy cattle from the 75-ppm feeding level was not sacrificed. Whole milk samples were collected from the depuration animal on Days 29, 30, 32, 34, 36, and 40. Analysis of whole milk samples collected from this animal on the final day of dosing (Day 28) indicated S-indoxacarb/R-indoxacarb residues of 0.13 ppm and IN-JT333 residues of <0.010 ppm. The petitioner reported that residues declined rapidly during the following week, and by Day 40, residues of S-indoxacarb/R-indoxacarb and IN-JT333

were below the LOQ (<0.010 ppm).

The dairy cattle was sacrificed on Day 43 (15 days after the final dose), and tissue samples were collected. There were no detectable residues of either S-indoxacarb/R-indoxacarb or IN-JT333 in muscle, liver, and kidney samples. In fat, the S-indoxacarb/R-indoxacarb residue level was 0.079 ppm, and the IN-JT333 residue level was <0.010 ppm. For the livestock dosed at the 75-ppm feeding level and sacrificed on Day 29, the mean residues of S-indoxacarb/R-indoxacarb and IN-JT333 in fat were 1.9 ppm and 0.080 ppm. See Table 42 for details.

Table 42. Residues of S-indoxacarb/R-indoxacarb and the metabolite IN-JT333 in dairy cattle matrices following oral administration of DPX-MP062 at 7.5, 22.5, and 75 ppm for 28 consecutive days.

Dose Level	Dosing or Sampling Day	Number of Samples	Residues (ppm) [a]	
			S-indoxacarb/R-indoxacarb	IN-JT333
Whole Milk				
7.5 ppm	Day 1	3	0.010, 0.010, 0.010	all ND
	Day 4	3	0.017, 0.019, 0.019	all ND
	Day 7	3	0.012, 0.015, 0.019	all ND
	Day 10	3	0.012, 0.015, 0.016	all ND
	Day 14 p.m.	3	0.017, 0.021, 0.024	all ND
	Day 14 a.m.	3	0.015, 0.018, 0.026	all ND
	Day 18	3	0.016, 0.020, 0.022	all ND
	Day 21	3	0.018, 0.020, 0.021	all ND
	Day 24	3	0.015, 0.016, 0.019	all ND
	Day 28	3	0.017, 0.022, 0.025	all ND
22.5 ppm	Day 1	3	0.013, 0.014, 0.019	all ND
	Day 4	3	0.037, 0.045, 0.067	all ND
	Day 7	3	0.034, 0.037, 0.066	all ND
	Day 10	3	0.044, 0.047, 0.067	all ND
	Day 14 p.m.	3	0.045, 0.052, 0.075	all ND
	Day 14 a.m.	3	0.030, 0.032, **0.090**	all ND
	Day 18	3	0.042, 0.044, 0.058	all ND
	Day 21	3	0.041, 0.043, 0.072	ND, <0.010 , ND
	Day 24	3	0.048, 0.062, 0.064	<0.010, ND, ND
	Day 28	3	0.047, 0.056, 0.059	ND, <0.010, <0.010
75 ppm	Day 1	4	0.040, 0.063, 0.073, 0.10	all ND
	Day 4	4	0.11, 0.14, 0.17, 0.18	all ND
	Day 7	4	0.075, 0.13, 0.14, 0.015	all ND
	Day 10	4	0.10, 0.14, 0.14, 0.15	all ND
	Day 14 p.m.	4	0.12, 0.19, 0.20, 0.22	all ND
	Day 14 a.m.	4	0.15, 0.16, 0.20, 0.22	all ND
	Day 18	4	0.12, 0.15, 0.19, 0.23	all <0.010
	Day 21	4	0.10, 0.18, 0.21, 0.22	all <0.010

Table 42. Residues of S-indoxacarb/R-indoxacarb and the metabolite IN-JT333 in dairy cattle matrices following oral administration of DPX-MP062 at 7.5, 22.5, and 75 ppm for 28 consecutive days.

Dose Level	Dosing or Sampling Day	Number of Samples	Residues (ppm) [a]	
			S-indoxacarb/R-indoxacarb	IN-JT333
	Day 24	4	0.13, 0.17, 0.22, 0.22	0.010, <0.010, 0.010, <0.010,
	Day 28	4	0.13, 0.19, 0.21, **0.24**	all <0.010
Skim Milk				
7.5 ppm	Day 14 p.m.	3	<0.010, <0.010, 0.010	all ND
	Day 14 a.m.	3	all <0.010	all ND
	Day 21	3	all <0.010	all ND
	Day 28	3	<0.010, <0.010, 0.010	all ND
Skim Milk (*continued*)				
22.5 ppm	Day 14 p.m.	3	ND, 0.010, 0.020	all ND
	Day 14 a.m.	3	ND, <0.010, 0.034	all ND
	Day 21	3	0.018, 0.019, 0.038	all ND
	Day 28	3	0.017, 0.023, 0.027	all ND
75 ppm	Day 14 p.m.	4	<0.010, 0.031, 0.048, 0.052	all ND
	Day 14 a.m.	4	0.033, 0.033, 0.034, 0.063	all ND
	Day 21	4	0.027, 0.050, 0.055, 0.063	all ND
	Day 28	4	0.070, 0.073, 0.079, 0.089	<0.010, <0.010, 0.014, <0.010
Cream				
7.5 ppm	Day 14 p.m.	3	0.18, 0.21, 0.23	all <0.010
	Day 14 a.m.	3	0.20, 0.23, 0.25	all <0.010
	Day 21	3	0.19, 0.20, 0.21	0.011, <0.010, <0.010
	Day 28	3	0.20, 0.21, 0.23	0.014, 0.018, 0.022
22.5 ppm	Day 14 p.m.	3	0.44, 0.48, 0.89	0.017, 0.022, 0.024
	Day 14 a.m.	3	0.42, 0.51, 0.87	0.024, 0.022, 0.025
	Day 21	3	0.43, 0.48, 0.62	0.019, 0.020, 0.015
	Day 28	3	0.56, 0.57, 0.65	0.020, 0.031, 0.029
75 ppm	Day 14 p.m.	4	1.4, 1.6, 2.2, 2.3	0.063, 0.049, 0.064, 0.064
	Day 14 a.m.	4	1.8, 1.9, 2.2, 2.7	0.079, 0.057, 0.064, 0.080
	Day 21	4	1.3, 1.8, 2.0, 2.3	0.057, 0.059, 0.066, 0.060
	Day 28	4	1.7, 2.2, 2.4, 2.6	0.079, 0.077, 0.072, 0.072
Muscle				
7.5 ppm	Day 28	3	all <0.010	all ND

Table 42. Residues of S-indoxacarb/R-indoxacarb and the metabolite IN-JT333 in dairy cattle matrices following oral administration of DPX-MP062 at 7.5, 22.5, and 75 ppm for 28 consecutive days.

Dose Level	Dosing or Sampling Day	Number of Samples	Residues (ppm) [a]	
			S-indoxacarb/R-indoxacarb	IN-JT333
22.5 ppm	Day 28	3	all <0.010	all ND
75 ppm	Day 28	3	0.030, 0.076, **0.093**	ND, <0.010, <0.010
Fat				
7.5 ppm	Day 28	3	0.20, 0.22, 0.24	<0.010, 0.011, **0.013**
22.5 ppm	Day 28	3	0.30, 0.50, **0.54**	**0.035**, 0.027, 0.028
75 ppm	Day 28	3	1.8, 1.9, **1.9**	**0.090**, 0.070, 0.080
Liver				
7.5 ppm	Day 28	3	ND, <0.010, <0.010	all ND
22.5 ppm	Day 28	3	<0.010, <0.010, **0.013**	all ND
75 ppm	Day 28	3	0.017, 0.019, **0.019**	all <0.010
Kidney				
7.5 ppm	Day 28	3	all <0.010	all ND
22.5 ppm	Day 28	3	0.012, 0.018, **0.020**	all ND
75 ppm	Day 28	3	0.032, 0.036, **0.049**	all ND

[a] Residues equal to or greater than the LOQ (0.010 ppm) are reported to two significant figures. Residues detected between the LOD (0.003 ppm) and the LOQ are reported as <0.010. Residues less than the LOD are reported as ND (nondetectable).

Storage stability

All treated milk and tissue samples from this study were stored frozen for a maximum interval of 77 days between sampling and analysis. Concurrent storage stability studies were conducted to validate the storage intervals and conditions of samples. These data are presented under "OPPTS GLN 860.1380: Storage Stability Data." The results of the study indicate that fortified residues of indoxacarb and IN-JT333 are relatively stable under frozen conditions (-20 ± 10 C) in milk for up to 60 days and in tissues (muscle, fat, and liver) for up to 90 days. Additionally, weathered residues of indoxacarb are relatively stable under frozen conditions (-20 ± 10 C) in milk for 77 days, and weathered residues of Indoxacarb and IN-JT333 are relatively stable under frozen conditions in fat for 90 days.

Study summary:

The dairy cattle feeding study is acceptable. Dairy cattle were administered DPX-MP062 orally for 28 consecutive days at levels equivalent to 7.5, 22.5, and 75 ppm in the diet (mg/kg diet on a dry weight basis). The MTDB of DPX-MP062 to dairy cattle is tentatively calculated to be 22.2 ppm. The dosing levels of 7.5, 22.5, and 75 ppm represent 0.5x, 1.4x, and 4.6x, respectively, the MTDB of DPX-MP062 to dairy cattle. The proposed tolerances for milk and cattle tissues were

based by the petitioner on the 22.5-ppm feeding level. The conclusions listed below should be considered tentative until a final determination of the residues of concern in milk and cow tissues have been made by the HED MARC.

Milk and milk fat: The proposed tolerance for residues of S-indoxacarb/R-indoxacarb in milk at 0.10 ppm is appropriate. However, the proposed tolerance for the residues S-indoxacarb and its metabolite IN-JT333 in milk fat at 0.75 ppm is too low to adequately cover secondary transfer of residues as a result of the proposed uses. Furthermore, the tolerance should be for the combined residues of DPX-S-indoxacarb/R-indoxacarb and the metabolite IN-JT333 because the method detects both enantiomers. **The petitioner needs to submit a revised Section F and propose a tolerance of 3.0 for milk fat.**

The feeding data indicate that residues of S-indoxacarb/R-indoxacarb in whole milk plateaued by the fourteenth day of dosing. Residues of S-indoxacarb/R-indoxacarb in skim milk declined when compared to whole milk. Residues of S-indoxacarb/R-indoxacarb and IN-JT333 concentrated in cream at all treatment levels when compared to whole milk. A summary of the maximum theoretical residue at each treatment level for whole milk is presented below.

Matrix	Treatment Level (ppm)	Maximum Theoretical Residue (ppm)[a]	
		S-indoxacarb/ R-indoxacarb	IN-JT333
Whole milk (Days 13-28)	7.5	0.06	< 0.009
	22.5	0.07	< 0.01
	75	0.05	< 0.003

[a] Normalized to 1x.

Meat: The proposed tolerance for residues of S-indoxacarb/R-indoxacarb in cattle meat at 0.02 ppm is too low to adequately cover secondary transfer of residues as a result of the proposed uses. **The petitioner needs to submit a revised Section F and propose a tolerance of 0.03 ppm for meat.**

The feeding data indicate that residues of S-indoxacarb/R-indoxacarb in meat were below the LOQ (<0.010) at the 22.5-ppm feeding level. A summary of the maximum theoretical residue at each treatment level for cattle meat for which there were quantifiable residues is presented below.

Matrix	Treatment Level (ppm)	Maximum Theoretical Residue (ppm)[a]	
		S-indoxacarb/R-indoxacarb	IN-JT333
Cattle meat	75 ppm	0.02	< 0.003

[a] Normalized to 1x.

Fat: The proposed tolerance for the residues S-indoxacarb and its metabolite IN-JT333 in meat fat at 0.75 ppm is appropriate to cover secondary transfer of residues as a result of the proposed uses. However, the tolerance should be for the combined residues of DPX-S-indoxacarb/R-indoxacarb and the metabolite IN-JT333 because the method detects both enantiomers. **The**

petitioner needs to submit a revised Section F.

The feeding data indicate that the combined residues were below the proposed tolerance at the 22.5-ppm feeding level. A summary of the maximum theoretical residue at each treatment level for cattle fat is presented below.

Matrix	Treatment Level	Maximum Theoretical Residue (ppm)[a]	
		S-indoxacarb/R-indoxacarb	IN-JT333
Cattle fat	7.5 ppm	0.52	0.03
	22.5 ppm	0.39	0.03
	75 ppm	0.42	0.02

[a] Normalized to 1x.

Meat Byproducts

Kidney: A summary of the maximum theoretical residue at each treatment level for cattle kidney is presented below. The proposed tolerance for residues of S-indoxacarb/R-indoxacarb in cattle kidney is 0.02 ppm. The feeding data indicate that residues of S-indoxacarb/R-indoxacarb in kidney were below the proposed tolerance at the 7.5-ppm feeding level. A summary of the maximum theoretical residue at treatment levels for cattle liver where there were quantifiable residues is presented below.

Matrix	Treatment Level	Maximum Theoretical Residue (ppm)[a]	
		S-indoxacarb/R-indoxacarb	IN-JT333
Cattle kidney	22.5 ppm	0.01	< 0.003
	75 ppm	0.01	< 0.003

[a] Normalized to 1x.

Liver: The petitioner did not propose a tolerance for residues of S-indoxacarb/R-indoxacarb in cattle liver. The feeding data indicate that there is a potential for secondary transfer of residues in liver as a result of the proposed uses. A summary of the maximum theoretical residue at treatment levels for cattle liver where there were quantifiable residues is presented below.

Matrix	Treatment Level	Maximum Theoretical Residue (ppm)[a]	
		S-indoxacarb/R-indoxacarb	IN-JT333
Cattle liver	22.5 ppm	0.009	< 0.003
	75 ppm	0.004	< 0.0007

[a] Normalized to 1x.

Meat Byproducts Summary: As residue levels in cattle kidney and liver are similar, the tolerance for these commodities should be combined in a single tolerance for "meat byproducts". **The petitioner needs to submit a revised Section F and propose a tolerance of 0.02 ppm for meat byproducts, which would include the proposed tolerances for cattle, kidney and cattle,**

liver. The available data for the fat, milk, meat and meat byproducts of cattle may be translated to the fat, milk, meat and meat byproducts of goats, horses, sheep, and swine. **The petitioner should include these commodities in a revised Section F.**

OPPTS GLN 860.1850: Confined Accumulation in Rotational Crops

E.I. du Pont de Nemours and Company has submitted the following in-life and analytical phase data investigating the metabolism of [^{14}C]DPX-JW062 in rotational crops:

44477317 Freeman, C.; Terranova, A. (1997) Accumulation of Residues in Confined Rotational Crops (Carrots, Lettuce, Wheat, and Soybeans) Using Field-Aged Soil After Treatment with (carbon-14)DPX-JW062, a Racemic Mixture of DPX-KN128 and IN-KN127: Lab Project Number: AMR4029-96. Unpublished study prepared by E.I. du Pont de Menours and Company. 79 p.

44477318 Freeman, C.; Terranova, A. (1997) Supplement No. 1. Accumulation of Residues in Confined Rotational Crops (Carrots, Lettuce, Wheat, and Soybeans) Using Field-Aged Soil After Treatment with (carbon-14)DPX-JW062, a Racemic Mixture of DPX-KN128 and IN-KN127: Lab Project Number: AMR4029-96. Unpublished study prepared by E.I. du Pont de Menours and Company. 15 p.

In-Life Phase

As with the plant metabolism studies, [^{14}C]DPX-JW062 was separately labeled in the 1 position of the indanone ring (IND) or uniformly in the trifluoromethylphenyl ring (TMP). The test substance was prepared by formulating either [IND]DPX-JW062 (specific activity 52.0 μCi/mg, radiochemical purity >95%) or [TMP]DPX-JW062 (specific activity 51.7 μCi/mg, radiochemical purity >95%) with unlabeled DPX-JW062, and surfactant and dispersants to provide a suspension concentrate (SC) formulation. Application was applied to 5-gallon pots containing sandy loam soil (62.5% sand, 22.5% silt, and 15% clay) at a field equivalent rate of 0.536 lb ai/A (600 g ai/ha). Because DPX-JW062 is a racemic mixture of S-indoxacarb and R-indoxacarb (50:50), this rate is equivalent to 0.268 lb ai/A (300 g ai/ha). The applied rate is 1.0x the maximum proposed seasonal rate for *Brassica* vegetables, corn (sweet), lettuce, peppers, and tomatoes but only 0.6x the maximum proposed seasonal rate for cotton. Application of the test substances was made using a hand-held sprayer for uniform distribution over the soil surface. Carrots (a representative root crop), lettuce (a representative leafy vegetable), soybeans (a representative oil-producing crop), and wheat (a representative small grain) were planted in separate pots of treated soil 36, 90, and 125 days after treatment (DAT). A total of 48 pots were treated, 24 pots each for IND and TMP labels; 24 pots were treated with formulation blank for controls. Five to six days prior to planting, the pots were moved into a greenhouse to allow further drying of the soil. Crops at all planting intervals were grown to maturity under greenhouse conditions. Water, fertilizer, and maintenance insecticides were applied to the crops as necessary. Adequate information pertaining to the preparation of test substances, field conditions, and plant maintenance was provided.

Immature wheat and soybeans were collected for forage samples at 21-29 days after planting. All other crops were collected at maturity, 64-150 days after planting. Mature lettuce leaves were cut slightly above the soil surface. Mature wheat heads were removed from the plant by hand and threshed to remove the grain from the chaff, and wheat straw was cut slightly above the soil surface. Carrot tops and roots were separated upon harvest. All collected samples were placed in plastic bags and then stored frozen prior to analysis.

Total radioactive residues (TRR)

Frozen harvested samples were homogenized with liquid nitrogen or dry ice, combusted, and radioassayed by LSC. The TRR in/on rotational crop commodities are presented in Table 43; the LOD for TRR determinations was 0.005 ppm.

Table 43. Total radioactive residues in/on rotational crops resulting from an application of IND- and TMP- labeled DPX to soil at a rate of 0.268 lbs ai/A.

DAT	Crop	RAC	Label Position (TRR, ppm) [^{14}C]DPX-JW062 equivalents	
			IND Label	TMP Label
36	**Carrot**	Tops	0.03	0.07
		Roots	0.01	0.02
	Lettuce	Mature	0.01	0.03
	Soybean	Forage	0.06	0.13
		Straw	0.07	0.14
		Seed	0.03	0.08
	Wheat	Forage	0.14	0.14
		Grain	0.24	0.04
		Straw	0.49	0.43
90	**Carrot**	Tops	0.04	0.04
		Roots	NA [a]	NA [a]
	Lettuce	Mature	NA [a]	NA [a]
	Soybean	Forage	0.03	0.08
		Straw	0.06	0.16
		Seed	0.02	0.06
	Wheat	Forage	0.04	0.07
		Grain	0.04	0.01
		Straw	0.12	0.15

125	**Carrot**	Tops	NA [a]	NA [a]
		Roots	NA [a]	NA [a]
	Lettuce	Mature	NA [a]	NA [a]
	Soybean	Forage	0.02	0.05
		Straw	0.17	0.08
		Seed	0.02	0.03
	Wheat	Forage	0.02	0.05
		Grain	0.03	0.01
		Straw	0.12	0.15

[a] NA = Not analyzed.

Extraction and Hydrolysis

Crop commodities with total radioactivity greater than 0.01 ppm were subjected to extraction procedures. Radioactive residues samples were extracted three times with ACN:water (70:30, v:v). Each extract was centrifuged, and the supernatants were pooled for LSC analysis. The aqueous ACN extracts were diluted with water and cleaned-up on a Bond Elut column. Residues were eluted by draining the column to dryness upon loading (aqueous fraction) and then with ACN (organic fraction). The eluates were concentrated, analyzed by LSC, and reserved for HPLC analysis.

Characterization/identification of residues

The extracts were analyzed by HPLC System with a Zorbax® SB-C18 column and mobile phase gradient of ACN and 0.25 M acetic acid in water. Elution of radioactivity was quantified by fraction collection and LSC. The reported LOD for HPLC analysis was 0.002 ppm. Two additional HPLC systems with either a Hamilton PRP-1 or Phenomenex Ultracarb column and gradient mobile phases (same solvents as for HPLC System I) were used to further resolve polar peaks observed in the 36-DAT wheat straw, 36- and 125-DAT wheat grain, and 36-DAT soybean seed extracts.

The majority of the radioactivity was extractable and was characterized as more polar than DPX-JW062 or the metabolite IN-JT333 found in livestock metabolism studies. With the exception of wheat straw, HPLC analysis indicated that the extractable radioactivity consisted of one or more components each present at ≤0.01 ppm. DPX-JW062 and its metabolite IN-JT333 were not detected in any rotational crop fraction.

The organic extract following cleanup of the 36-DAT wheat straw (IND- and TMP-label) was subjected to enzyme hydrolysis (β-glucosidase). No components present at >0.01 ppm were observed in the TMP-label wheat straw following enzyme hydrolysis. HPLC of the IND-label wheat straw characterized a less polar peak present at 0.02 ppm. The non-extractable residues of the 36-DAT wheat straw (IND- and TMP-labeled) were subjected to sequential hydrolysis with

cellulase (0.1 M sodium acetate, pH 5, at 37°C for 3 days), 0.1 N NaOH (60°C for 6 hours), and 1 N HCl (60°C for 6 hours). Concentrations of each resulting aqueous fraction were low (<0.05 ppm).

The distribution of radioactivity in rotational crop commodities is presented in Tables 44A (IND label) and 44B (TMP label), respectively.

Storage stability

The maximum storage interval from crop sampling to initial extraction was 111 days (<4 months). No storage stability data are required to support the submitted confined rotational crop study because sample storage intervals were less than 6 months.

Proposed metabolic pathway

Since metabolites were not present in sufficient amounts for identification, no metabolic pathway was proposed for residues of DPX-JW062 in/on rotational crops.

Table 43A. Distribution and characterization of radioactive residues in/on rotational crops planted in sandy loam soil treated with [indanone-1-^{14}C]DPX-JW062 at 0.268 lb ai/A (300 g ai/ha).

Fraction	% TRR	ppm [a]	Characterization/Identification
36-DAT Carrot Tops (TRR = 0.03 ppm)			
ACN:Aqueous	72.2	0.02	Purified through a Bond Elut column. HPLC analysis resolved a single polar component (not well retained) present at ≤0.01 ppm.
Nonextractable	27.8	<0.01	Not further analyzed (N/A).
90-DAT Carrot Tops (TRR = 0.04 ppm)			
ACN:Aqueous	91.1	0.03	Purified through a Bond Elut column. HPLC analysis did not resolve any peaks >0.01 ppm.
Nonextractable	8.9	<0.01	N/A.
36-DAT Carrot Roots (TRR = 0.01 ppm)			
ACN:Aqueous	75.2	0.01	Purified through a Bond Elut column. HPLC analysis resolved a single polar component (not well retained) present at ≤0.01 ppm.
Nonextractable	24.8	<0.01	N/A.
36-DAT Lettuce (TRR = 0.01 ppm)			
ACN:Aqueous	75.5	0.01	Purified through a Bond Elut column. HPLC analysis did not resolve any peaks >0.01 ppm; all components were more polar than the parent compound.
Nonextractable	24.5	<0.01	N/A.
36-DAT Soybean Forage (TRR = 0.06 ppm)			
ACN:Aqueous	59.3	0.03	Purified through a Bond Elut column. HPLC analysis did not resolve any peaks >0.01 ppm
Nonextractable	40.7	0.02	N/A.

(*continued; footnotes follow*)

Table 43A (*IND label, continued*).

Table 43A. Distribution and characterization of radioactive residues in/on rotational crops planted in sandy loam soil treated with [indanone-1-^{14}C]DPX-JW062 at 0.268 lb ai/A (300 g ai/ha).			
Fraction	% TRR	ppm [a]	Characterization/Identification
90-DAT Soybean Forage (TRR = 0.03 ppm)			
ACN:Aqueous	63.8	0.02	Purified through a Bond Elut column. HPLC analysis did not resolve any peaks >0.01 ppm
Nonextractable	36.2	0.01	N/A.
125-DAT Soybean Forage (TRR = 0.02 ppm)			
ACN:Aqueous	59.1	0.01	Purified through a Bond Elut column. HPLC analysis did not resolve any peaks >0.01 ppm.
Nonextractable	40.9	0.01	N/A.
36-DAT Soybean Hay (TRR = 0.07 ppm)			
ACN:Aqueous	71.7	0.05	Purified through a Bond Elut column. HPLC analysis did not resolve any peaks >0.01 ppm.
Nonextractable	28.3	0.02	N/A.
90-DAT Soybean Hay (TRR = 0.06 ppm)			
ACN:Aqueous	62.4	0.04	Purified through a Bond Elut column. HPLC analysis did not resolve any peaks >0.01 ppm.
Nonextractable	37.6	0.02	N/A.
125-DAT Soybean Hay (TRR = 0.08 ppm)			
ACN:Aqueous	79.8	0.06	Purified through a Bond Elut column. HPLC analysis did not resolve any peaks >0.01 ppm.
Nonextractable	20.2	0.02	N/A.
36-DAT Soybean Seed (TRR = 0.03 ppm)			
ACN:Aqueous	64.3	0.02	Purified through a Bond Elut column. HPLC did not resolve any components ≥0.01 ppm; dissimilar profile from TMP labeled.
Nonextractable	35.7	0.01	N/A.
90-DAT Soybean Seed (TRR = 0.02 ppm)			
ACN:Aqueous	48.4	0.01	Purified through a Bond Elut column. HPLC analysis did not resolve any peaks >0.01 ppm.
Nonextractable	51.6	0.01	N/A.
125-DAT Soybean Seed (TRR = 0.02 ppm)			
ACN:Aqueous	56.0	0.01	Purified through a Bond Elut column. HPLC analysis did not resolve any peaks >0.01 ppm.
Nonextractable	44.0	0.01	N/A.
36-DAT Wheat Forage (TRR = 0.14 ppm)			
ACN:Aqueous	61.6	0.09	Purified through a Bond Elut column. HPLC analysis resolved multiple components, each present at <0.01 ppm.
Nonextractable	38.4	0.05	N/A.
90-DAT Wheat Forage (TRR = 0.04 ppm)			

(*continued; footnotes follow*)

Table 43A (*IND label, continued*).

Table 43A. Distribution and characterization of radioactive residues in/on rotational crops planted in sandy loam soil treated with [indanone-1-^{14}C]DPX-JW062 at 0.268 lb ai/A (300 g ai/ha).			
Fraction	% TRR	ppm [a]	Characterization/Identification
ACN:Aqueous	87.8	0.04	Purified through a Bond Elut column. HPLC analysis resolved components at the 0.01 ppm level.
Nonextractable	12.3	0.01	N/A.
125-DAT Wheat Forage (TRR = 0.02 ppm)			
ACN:Aqueous	82.9	0.02	Purified through a Bond Elut column. HPLC analysis did not resolve any peaks >0.01 ppm.
Nonextractable	17.1	<0.01	N/A.
36-DAT Wheat Straw (TRR = 0.49 ppm)			
ACN:Aqueous	70.0	0.34	Purified through a Bond Elut column.
Organic	NR	NR	HPLC analysis of the extract resolved a polar component present at 0.04 ppm. The extract was further subjected to enzyme hydrolysis (β-glucosidase), and HPLC analysis of the hydrolysate resolved a less polar component present at 0.02 ppm.
Aqueous	NR	NR	HPLC analysis resolved a major polar component present at ~0.11 ppm. The extract was further subjected to enzyme hydrolysis (β-glucosidase), and HPLC analysis of the hydrolysate resolved numerous polar components, each present at ≤0.05 ppm.
Nonextractable	30.0	0.15	Sequentially hydrolyzed with cellulase, 0.1 N NaOH, and 1 N HCl; each resulting aqueous extract contained <0.05 ppm and thus were not further analyzed.
Nonextractable	10.2	0.05	N/A.
90-DAT Wheat Straw (TRR = 0.12 ppm)			
ACN:Aqueous	57.3	0.07	Purified through a Bond Elut column. HPLC analysis did not resolve any peaks >0.01 ppm.
Nonextractable	42.7	0.05	N/A.
125-DAT Wheat Straw (TRR = 0.12 ppm)			
ACN:Aqueous	72.1	0.09	Purified through a Bond Elut column. HPLC analysis did not resolve any peaks >0.01 ppm
Nonextractable	27.9	0.03	N/A.
36-DAT Wheat Grain (TRR = 0.24 ppm)			
ACN:Aqueous	73.7	0.16	Purified through a Bond Elut column. HPLC analysis of the extract resolved a single polar component; further isolation by HPLC and analysis by LC/MS did not detect ions consistent with the parent compound and no unique structure could be assigned.
Nonextractable	26.3	0.06	N/A.
90-DAT Wheat Grain (TRR = 0.04 ppm)			
ACN:Aqueous	56.0	0.02	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm

(*continued; footnotes follow*)

soil treated with [indanone-1-^{14}C]DPX-JW062 at 0.268 lb ai/A (300 g ai/ha).			
Fraction	% TRR	ppm [a]	Characterization/Identification
Nonextractable	44.0	0.02	N/A.
125-DAT Wheat Grain (TRR = 0.03 ppm)			
ACN:Aqueous	62.6	0.02	Purified through a Bond Elut column. HPLC analysis of the extract resolved more than 7 components each present at ≤0.01 ppm.
Nonextractable	37.4	0.01	N/A.

[a] Expressed as [^{14}C]DPX-JW062 equivalents.

Table 43B. Distribution and characterization of radioactive residues in/on rotational crops planted in sandy loam soil treated with [trifluoromethoxyphenyl-U -^{14}C]DPX-JW062 at 0.268 lb ai/A (300 g ai/ha).

Fraction	% TRR	ppm [a]	Characterization/Identification
36-DAT Carrot Tops (TRR = 0.07 ppm)			
ACN:Aqueous	65.0	0.04	Purified through a Bond Elut column. HPLC analysis of the extract resolved a single polar component (not well retained) present at ≤0.01 ppm.
Nonextractable	35.0	0.02	Not further analyzed (N/A).
90-DAT Carrot Tops (TRR = 0.04 ppm)			
ACN:Aqueous	68.7	0.03	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm.
Nonextractable	31.3	0.01	N/A.
36-DAT Carrot Roots (TRR = 0.02 ppm)			
ACN:Aqueous	51.1	0.01	Purified through a Bond Elut column. HPLC analysis of the extract resolved a single polar component (not well retained) present at ≤0.01 ppm.
Nonextractable	48.9	0.01	N/A.
36-DAT Lettuce (TRR = 0.03 ppm)			
ACN:Aqueous	67.5	0.02	Purified through a Bond Elut column. HPLC analysis of the extract resolved seven major components each present at ≤0.01 ppm; all components were more polar than the parent compound.
Nonextractable	32.4	0.01	N/A.
36-DAT Soybean Forage (TRR = 0.13 ppm)			
ACN:Aqueous	71.3	0.09	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm
Nonextractable	28.7	0.04	N/A.
90-DAT Soybean Forage (TRR = 0.08 ppm)			
ACN:Aqueous	65.5	0.05	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm
Nonextractable	34.5	0.03	N/A.
125-DAT Soybean Forage (TRR = 0.05 ppm)			
ACN:Aqueous	59.9	0.03	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm.
Nonextractable	40.1	0.02	N/A.
36-DAT Soybean Hay (TRR = 0.14 ppm)			

(continued; footnotes follow)

Table 43B (*TMP label, continued*).

Table 43B. Distribution and characterization of radioactive residues in/on rotational crops planted in sandy loam soil treated with [trifluoromethoxyphenyl-U -^{14}C]DPX-JW062 at 0.268 lb ai/A (300 g ai/ha).			
Fraction	% TRR	ppm [a]	Characterization/Identification
ACN:Aqueous	71.2	0.10	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm.
Nonextractable	28.8	0.04	N/A.
90-DAT Soybean Hay (TRR = 0.16 ppm)			
ACN:Aqueous	68.2	0.11	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm.
Nonextractable	31.8	0.05	N/A.
125-DAT Soybean Hay (TRR = 0.17 ppm)			
ACN:Aqueous	80.9	0.14	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm.
Nonextractable	19.1	0.03	N/A.
36-DAT Soybean Seed (TRR = 0.08 ppm)			
ACN:Aqueous	64.3	0.02	Purified through a Bond Elut column. HPLC analysis of the extract resolved components ≥0.01 ppm; extensive attempts to isolate components with alternate HPLC systems were conducted; however, no known degradates were identified; dissimilar profile from IND labeled.
Nonextractable	35.7	0.01	N/A.
90-DAT Soybean Seed (TRR = 0.06 ppm)			
ACN:Aqueous	80.6	0.05	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm.
Nonextractable	19.4	0.01	N/A.
125-DAT Soybean Seed (TRR = 0.04 ppm)			
ACN:Aqueous	77.1	0.03	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm.
Nonextractable	22.9	0.02	N/A.
36-DAT Wheat Forage (TRR = 0.14 ppm)			
ACN:Aqueous	60.1	0.08	Purified through a Bond Elut column. HPLC analysis of the extract resolved multiple components, each present at <0.01 ppm.
Nonextractable	39.9	0.06	N/A.
90-DAT Wheat Forage (TRR = 0.07 ppm)			
ACN:Aqueous	78.0	0.05	Purified through a Bond Elut column. HPLC analysis of the extract resolved components at the 0.01 ppm level.
Nonextractable	22.0	0.02	N/A.
125-DAT Wheat Forage (TRR = 0.05 ppm)			
ACN:Aqueous	63.5	0.03	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm.

(*continued; footnotes follow*)

Table 43B (*TMP label, continued*).

Table 43B. Distribution and characterization of radioactive residues in/on rotational crops planted in sandy loam soil treated with [trifluoromethoxyphenyl-U -^{14}C]DPX-JW062 at 0.268 lb ai/A (300 g ai/ha).			
Fraction	% TRR	ppm [a]	Characterization/Identification
Nonextractable	36.5	0.02	N/A.
36-DAT Wheat Straw (TRR = 0.43 ppm)			
ACN:Aqueous	60.1	0.26	Purified through a Bond Elut column.
Organic	NR	NR	Initial HPLC analysis of the extract resolved a polar component present at 0.04 ppm. The extract was further subjected to enzyme hydrolysis (β-glucosidase), and HPLC analysis of the hydrolysate resolved numerous components each present at ≤0.01 ppm.
Aqueous	NR	NR	HPLC analysis of the extract resolved multiple components each present at <0.02 ppm.
Nonextractable	39.9	0.17	Sequentially hydrolyzed with cellulase, 0.1 N NaOH, and 1 N HCl; each resulting aqueous extract contained <0.05 ppm, and were not further analyzed.
Nonextractable	16.3	0.07	N/A.
90-DAT Wheat Straw (TRR = 0.15 ppm)			
ACN:Aqueous	48.2	0.07	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm.
Nonextractable	51.8	0.08	N/A.
125-DAT Wheat Straw (TRR = 0.15 ppm)			
ACN:Aqueous	69.2	0.11	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm
Nonextractable	30.8	0.05	N/A.
36-DAT Wheat Grain (TRR = 0.04 ppm)			
ACN:Aqueous	65.4	0.03	Purified through a Bond Elut column. HPLC analysis of the extract resolved a single polar component.
Nonextractable	34.6	0.01	N/A.
90-DAT Wheat Grain (TRR = 0.01 ppm)			
ACN:Aqueous	65.9	0.01	Purified through a Bond Elut column. HPLC analysis of the extract did not resolve any peaks >0.01 ppm
Nonextractable	34.1	<0.01	N/A.
125-DAT Wheat Grain (TRR = 0.01 ppm)			
ACN:Aqueous	74.4	0.01	Purified through a Bond Elut column. HPLC analysis of the extract resolved more than 7 components each present at ≤0.01 ppm.
Nonextractable	25.6	<0.01	N/A.

[a] Expressed as [^{14}C]DPX-JW062 equivalents.

Conclusions

The submitted confined rotational crop study is marginally adequate because the test substance was applied at 0.268 lb ai/A of the active isomer S-indoxacarb which is 1.0x the maximum proposed seasonal rate for *Brassica* vegetables, corn (sweet), lettuce, peppers, and tomatoes but only 0.6x the maximum proposed seasonal rate for cotton. Although marginal, HED will not request the petitioner to conduct another confined rotational crop study because the nature of the residue in confined rotational crops was adequately delineated. Limited trials depicting the field accumulation of DPX-MP062 residues in/on rotational crops (OPPTS GLN 860.1900) are not requested, and the the following proposed plantback restrictions are appropriate: crops that are registered under both labels may be planted immediately after harvest; root crops or leafy vegetables which are not registered for use with DPX-MP062 are not to be planted for 30 days after last use and crops not registered for use with DPX-MP062 are not to be planted for 120 days after last use.

The submitted study indicates that the TRR (expressed as DPX-JW062 equivalents) accumulated at levels greater than 0.01 ppm in/on the following RACs planted in sandy loam soil 36 days following application of [^{14}C]DPX-JW062 (IND or TMP label) at 0.268 lb ai/A: carrots (0.01-0.02 ppm), lettuce (0.01-0.03 ppm), soybean forage (0.06-0.13 ppm), soybean straw (0.07-0.16 ppm), soybean seed (0.03-0.08 ppm), wheat forage (0.13 ppm), wheat grain (0.01-0.24 ppm), and wheat straw (0.15-0.49 ppm). In general, the TRR declined at subsequent plantback intervals of 90 and 125 days.

Neither the parent compound, DPX-JW062, nor any structurally related metabolites were detected in any rotational crop commodity at any plantback intervals. With the exception of wheat straw, wheat grain, and soybean seed, chromatographic analysis of extracts showed that the extractable radioactivity in each commodity consisted of several components characterized as polar compounds, with no single component present at >0.01 ppm. For wheat straw, no single component was >0.05 ppm at the 36-day plantback interval, and no component was >0.01 ppm at the 90- and 125 day plantback intervals.

List of Attachments

I. IRLS Sheet
II. Review of Product Chemistry
IIa. Confidential Appendix A

Attachment 1 - IRLS Sheet

IRLS SHEET

CHEMICAL: DPX-MP062

CODEX NO. N/A

CODEX STATUS:

✓ No Codex Proposal Step 6 or above

Residue (if Step 8): _____

Crop(s)	Limit (mg/kg)

PROPOSED U.S. TOLERANCES:

Petition No. PP#8F04984

CB Reviewer Sarah J. Levy

Residue: DPX-MP062 = (R,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.

Commodity	Proposed Tolerance Level (ppm)
Apple, pomace (wet)	6.0 ppm
Pome fruit	2.0 ppm
Head & Stem *Brassicas*	10.0 ppm
Cottonseed	3.0 ppm
Cotton gin trash	15.0 ppm
Leaf lettuce	20.0 ppm
Head lettuce	7.0 ppm
Fruiting vegetables	0.70 ppm
Sweet corn kernel	0.02 ppm
Sweet corn forage	20.0 ppm
Sweet corn stover	25.0 ppm
Meat	0.02 ppm
Milk	0.10 ppm
Cattle kidney	0.05 ppm

Residue: The DPX-MP062 active ingredient, S-indoxacarb [(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] and its metabolite, IN-JT333, [methyl 7-chloro-2,5-dihydro-2-[[[4-(trifluoromethoxy)phenyl]amino]-carbonyl]indeno-[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate]

Commodity	Proposed Tolerance Level (ppm)
Milk fat	0.75 ppm
Cattle fat	0.75 ppm

CANADIAN LIMITS:

✓ No Canadian limit

Residue: _____

Commodity	Limit (mg/kg)

MEXICAN LIMITS:

✓ No Mexican limit

Residue: _____

Commodity	Limit (mg/kg)

NOTES:

Form revised 1994

DPX-MP062
(DP Barcodes D244253, D244460, D245424, and D248057)

PP#8F04948: Evaluation of Product Chemistry Data to Support Permanent Tolerances for Use of DPX-MP062 on *Brassica* (Head and Stem) Vegetables, Corn (Sweet), Cotton, Fruiting Vegetables, Lettuce (Head and Leaf), and Pome Fruits

Attachment II

May 26, 1998

Contract No. 68-D4-0010

Submitted to:
U.S. Environmental Protection Agency
Arlington, VA

Submitted by:
Dynamac Corporation
The Dynamac Building
2275 Research Boulevard
Rockville, MD 20850-3268

REVIEW OF PRODUCT CHEMISTRY, OPPTS 830 SERIES

Chemical Name (IUPAC, ANSI, etc.)	DPX-MP062 (proposed common name Indoxacarb); (R,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	
Chemical Number (CAS; PC Code)	CAS No. / PC Code DPX-KN128 173584-44-6 067710 (S-active enantiomer) IN-KN127 185608-75-7 (R-inactive enantiomer)	
Registration/Symbol No.	352-XXX	
Type of Product (T, FI, MP, EP)	52.7% FI	
DP Barcodes	D244253, D244460, D245424, and D248057	
Reviewer	Sarah Levy	
Approvals		
Section/Team	Team 1	
Branch Senior Scientist	Melba Morrow, DVM	
Branch Chief	Karen Whitby	

E. I. du Pont de Nemours and Company has submitted (1997; MRIDs 44477101-44477112) product chemistry data and a specimen product label for a 52.7% DPX-MP062 FI produced by an integrated system; data were submitted in support of a petition for the establishment of permanent tolerances in/on various crop commodities, meat, and milk (PP#8F04948). DPX-MP062 is a 75:25 mixture of two enantiomers: S-indoxacarb (insecticidally active) and R-indoxacarb (insecticidally inactive). Data submissions for physical/chemical properties include data for DPX-JW062, a related compound which contains a racemic mixture of S-indoxacarb and R-indoxacarb; these data are presented for informational purposes. Product chemistry data are now under the purview of the Registration Division (RD); all future submissions should be submitted directly to RD.

Attachment 2 - Review of Product Chemistry

Table 1: Manufacturing and Impurity Data for the Du Pont 52.7% FI.

GLN	Requirement	MRID	Status[1]	Details and/or Deficiency[2]
830.1550	Product Identity & Disclosure of Ingredients	CSF 12/19/97 44477101	N	Nominal concentrations must be identified for [redacted] impurities and [redacted] solvent listed on the CSF with upper certified limits; a revised CSF must be submitted on EPA Form 8570-4.
830.1600 830.1620 830.1650	Starting Materials & Manufacturing Process	44477101	N	A description of the type of production equipment used and the duration of individual steps and the entire process are required.
830.1670	Discussion of Impurities	44477101	N	A discussion of the possible formation of post-production impurities resulting from degradation of the product or migration of packaging material into the product is required.
830.1700	Preliminary Analysis	44477102 44477103	A	
830.1750	Certification of Limits	CSF 12/19/97 44477102	A	
830.1800	Analytical Methods	44477102 44477104 44583301 44583302	A	DPX-MP062 (S-indoxacarb and R-indoxacarb): Reversed-phase HPLC Method No. MP062.220.02.ES (internal standard) Optical purity for isomer ratio: Normal-phase HPLC Method No. MP062.220.05.ES Impurities: Reversed-phase HPLC Method No. MP062.220.03.ES Reversed-phase HPLC Method No. MP062.220.04.ES Gravimetric Method No. MP062.179.01.ES GC Method No. MP062.160.01.ES

[1] A = Acceptable; N = Unacceptable (see Deficiency); N/A = Not Applicable.
[2] Refer to CBI Appendix A for details.

Table 2: Physical and Chemical Properties for the Du Pont 52.7% FI.

GLN		MRID	Status[1]	Result[2] or Deficiency
830.6302	Color	44477106 44477107 44477105	A	White (99% S-indoxacarb PAI; 52.7% MP) Off white (DPX-JW062 TGAI)
830.6303	Physical State	44477106 44477107 44477105	A	Powdered solid (99% S-indoxacarb PAI; 52.7% MP) Solid (DPX-JW062 TGAI)
830.6304	Odor	44477106 44477107 44477105	A	Faint ethyl acetate (52.7% MP) Mild, innocuous (99% S-indoxacarb PAI) Odorless (DPX-JW062 TGAI) Sharp biting odor (DPX-JW062 MP)
830.6313	Stability	44477110	N	Data reflecting the stability of DPX-MP062 at normal and elevated temperatures and on exposure to metals and metal ions must be submitted. Stable stored at 27° C and 54° C for up to 14 days; stable in solution with iron or ferric chloride for 32 days in the dark at 27° C (DPX-JW062 TGAI).
830.7000	pH	44477108 44477105	A	4.2 (1% suspension; 52.7% MP; CIPAC MT 75) 5.32 ± 0.28 at 25° C (1% suspension; DPX-JW062 TGAI)
830.7050	UV/Visible Absorption	44477107	A	Molar absorptivities at 3 maximum absorbances ranging 0.5 to 1.5 absorbance units were affected by pH (pH 1.10, 7.02, and 12.19), but not over wavelengths of environmental significance (≥290 nm; 99% S-indoxacarb PAI).
830.7100	Viscosity		N/A	The 52.7% MP is a solid at room temperature.
830.7200	Melting Point/ Melting Range	44477107 44477105	A	88.1° C (99% S-indoxacarb PAI) 140-141° C (DPX-JW062 TGAI)
830.7220	Boiling Point/ Boiling Range		N/A	DPX-MP062 is a solid at room temperature.
830.7300	Density/ Relative Density/ Bulk Density	44477107 44477108 44477105	A	Relative density 1.44 at 20° C (99% S-indoxacarb PAI; displacement method) Tap bulk density 0.7 g/mL (52.7% MP; CIPAC Method MT 33) Relative density 1.34 ± 0.038 at 20° C (DPX-JW062 TGAI)

Table 2: Physical and Chemical Properties for the Du Pont 52.7% FI.

GLN		MRID	Status[1]	Result[2] or Deficiency
830.7370	Dissociation Constant in Water	44477107	A	No pK_a was evident at 284 and 310 nm over a pH range of 2.42 to 11.36. (99% S-indoxacarb PAI; UV-spectrophotometric method)
830.7550 830.7560 830.7570	Partition Coefficient (Octanol/Water)	44477107	A	log K_{ow} = 4.65 (99% S-indoxacarb PAI; shake-flask method)
830.7840 830.7860	Solubility	44477106	A	99% DPX-MP062 TGAI at 25° C 1.72 mg/mL in n-heptane 14.5 mg/mL in 1-octanol 103 mg/mL in methanol 117 mg/mL in o-xylene 139 mg/mL in acetonitrile 160 mg/mL in ethyl acetate >250 g/kg in dichloromethane, acetone, and dimethyl-formamide
		44477107		99% S-indoxacarb PAI (25° C) 0.20 ppm in distilled water (generator column) 9.49 mg/mL in n-octanol (shake-flask method)
830.7950	Vapor Pressure	44477109	A	7.3×10^{-11} torr at 20° C (9.8×10^{-9} Pa) 1.9×10^{-10} torr at 25° C (2.5×10^{-8} Pa) Henry's Law Constant at 25° C = 6×10^{-5} Pa m^3/mol (99% S-indoxacarb PAI; Knudsen-Effusion apparatus)

[1] A = Acceptable; N = Unacceptable (see Deficiency); N/A = Not applicable.
[2] For example, "brown" for 830.6302; "155° C" for 830.7200.

Attachment IIa: Confidential Appendix A

13544

002467

Chemical:	**Invalid PC Code**
PC Code:	**067710**
HED File Code	**11000 Chemistry Reviews**
Memo Date:	***01/19/2000***
File ID:	**DPD244253**
Accession Number:	***412-01-0084***

HED Records Reference Center
01/19/2001