

Spinetoram and Spinosad

Dietary Exposure and Risk Assessment

D380915

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

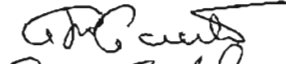
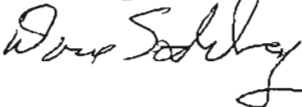
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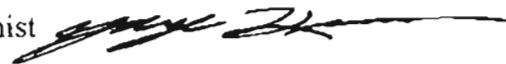

**OPP OFFICIAL RECORD
HEALTH EFFECTS DIVISION
SCIENTIFIC DATA REVIEWS
EPA SERIES 361**

 OFFICE OF
CHEMICAL SAFETY AND
POLLUTION PREVENTION
Date: 18-August-2010**Subject:** **Spinosad/Spinetoram.** Dietary Risk Assessment in Support of the Proposed Kitten/Cat Spot-on Use.

PC Code: 110003 and 110008	DP Barcode: D380915
Decision No.: 422561	Registration No.: 72642-O-L899 Insecticide
Registration No.: not applicable	Regulatory Action: Section 3
Risk Assessment Type: dietary	Case No.: 7448
TXR No.: not applicable	CAS No.: 187166-40-1 and 187166-15-0
MRID No: none	40 CFR: 180.495 and 180.635

Reviewer/To: Tom Bloem, Chemist 
 Risk Assessment Branch I/Health Effects Division (RABI/HED; 7509P)

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 RABI/HED (7509P)
Executive Summary

HED concluded that spinosad (PC code - 110003) and spinetoram (PC code - 110008) are toxicologically equivalent (see risk assessment D331741, P. Shah *et al.*, 20-Sep-2007); therefore, exposures to these compounds were combined. The proposed spinetoram kitten/cat spot-on use results in residential exposures which necessitate a refined dietary exposure analysis. The chronic dietary risk assessment was conducted using the Dietary Exposure Evaluation Model - Food Consumption Intake Database (DEEM-FCID™, ver. 2.03). DEEM-FCID™ incorporates food consumption data from the United States Department of Agriculture (USDA) Continuing Surveys of Food Intakes by Individuals (CSFII; 1994-1996 and 1998). Acute and cancer analyses were not conducted as toxicological effects attributable to a single dose were not identified and spinetoram and spinosad are classified as not likely to be carcinogens (cancer risk assessment is not required).

The chronic analysis assumed 100% crop treated for all food crop commodities; average field-trial residues, average USDA Pesticide Data Program (PDP) detected residue, or tolerance-level residues for crop commodities; spinosad residue estimates for fish/shellfish (residues of spinetoram in fish/shellfish are expected to be insignificant); experimental processing factors when available; refined milk, egg and ruminant/hog/poultry tissue residue estimates; and modeled drinking water estimates. The resulting chronic exposure estimates do not exceed HED's level of concern ($\leq 24\%$ chronic population-adjusted dose (cPAD); children 1-2 years old were the most highly exposed subpopulation).

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I. Introduction

Dietary risk assessment incorporates both exposure and toxicity of a given pesticide. For acute and chronic assessments, the risk is expressed as a percentage of a maximum acceptable dose (i.e., the dose which HED concluded will result in no unreasonable adverse health effects). This dose is referred to as the PAD. The PAD is equivalent to the point of departure (POD, NOAEL, LOAEL, e.g.) divided by the required uncertainty or safety factors. For acute and non-cancer chronic exposures, HED is concerned when estimated dietary risk exceeds 100% of the PAD. References which discuss the acute and chronic risk assessments in more detail are available on the EPA/pesticides web site: "Available Information on Assessing Exposure from Pesticides, A User's Guide," 21-Jun-2000, web link: <http://www.epa.gov/fedrgstr/EPA-PEST/2000/July/Day-12/6061.pdf>; or see SOP 99.6 (20-Aug-1999). The most recent spinosad/spinetoram dietary exposure analysis can be found in D375497 (T. Bloem, 6-Apr-2010).

II. Residue Information

Residues of Concern in Plants and Livestock: HED concluded that spinosad (consists of two related active ingredients: spinosyn A and spinosyn D; PC code 110003) and spinetoram (consists of two related active ingredients: XDE-175-J and XDE-175-L; PC code: 110008) are toxicologically equivalent (see risk assessment D331741, P. Shah *et al.*, 20-Sep-2007). The residues of concern in plants, livestock, and water following application of spinetoram or spinosad are as described in Tables 1 and 2, respectively.

Matrix	Residues Included in Risk Assessment	Residues Included in Tolerance Expression
Plants ¹	XDE-175-J, XDE-175-L, ND-J, and NF-J	XDE-175-J, XDE-175-L, ND-J, and NF-J
Ruminant ^{1,2}	XDE-175-J, XDE-175-L, ND-J, and NF-J	XDE-175-J, XDE-175-L, ND-J, and NF-J
Hen ^{1,3}	XDE-175-J, XDE-175-L, ND-J, NF-J, 3'-O-deethyl-175-J, 3'-O-deethyl-175-L, and O-demethyl-175-L ²	XDE-175-J, XDE-175-L, ND-J, and NF-J
Rotational Crops ¹	can not be determined from the available data	
Drinking Water ¹	since identified or partially identified degradates in the fate studies contained the major ring structures of the parent compound, a total residue method was used in modeling	--

¹ See risk assessment D331741 (P. Shah *et al.*, 20-Sep-2007) for more information.

² Feeding studies should dose with parent (XDE-175-J and XDE-175-L) and monitor for the residues of concern for risk assessment.

³ O-demethyl-175-L is either 2'-O-demethyl-175-L or 4'-O-demethyl-175-L or a mixture of both.

Matrix	Residues Included in Risk Assessment	Residues Included in Tolerance Expression
Plants ¹	spinosyn A and D	spinosyn A and D
Hog and Ruminants ¹	oral and dermal - spinosyn A and D	oral and dermal - spinosyn A and D
Poultry ^{1,2}	oral - spinosyn A and D; dermal (excluding liver) - spinosyn A and D; dermal (liver) - spinosyns A, B, D, J, N-demethyl D, and N-demethyl J	oral and dermal spinosyn A and D
Rotational Crops ¹	spinosyn A and D	spinosyn A and D
Drinking Water ³	total spinosad	--
Fish/Shellfish ⁴	adjustment of the TRRs in the edible tissues from the spinosyn A bioconcentration study (19 ppb data) for the water concentration resulting from the mosquito larvicide use	spinosyn A and D

¹ See D243816 (G. Herndon, 03-Mar-1998) and D264984 (W. Donovan, 14-Jun-2002) for more information.

² See D374794 (T. Bloem, 25-Mar-2010) for more information.

³ See D316077 (T. Bloem *et al.*, 02-Aug-2006) for more information.

⁴ HED notes that these conclusions are appropriate for this mosquito larvicide petition only and will be reevaluated if the petitioner alters the aquatic application scenario; see D316077 (T. Bloem *et al.*, 02-Aug-2006) for more information.

Tolerances Recommended as a Result of the Proposed Use: The petitioner requested the registration for cat/kitten spot-on use; therefore, tolerances are not required for the proposed use. However, the proposed use results in residential exposures which necessitate a refined dietary exposure analysis.

Food Residues used in the Chronic Analysis: HED concluded that spinosad and spinetoram are toxicologically equivalent and that exposures to these compounds should be combined (see risk assessment D331741, P. Shah *et al.*, 20-Sep-2007). HED notes that since the previous dietary exposure analysis (D375497, T. Bloem, 6-Apr-2010), the petitioner has discontinued by voluntary cancellation the spinosad cattle feed through and ear-tag registrations. The current analysis differs from the most recent in that these uses are not included in the cattle residue estimates, refined residues from the registered ruminant spinosad premise application scenario are calculated (see Table 5), refined poultry residues are calculated, and PDP data are included. The following paragraphs are summaries of the residue estimates used in the chronic analysis.

The current analysis assumed 100% crop treated for all food crop commodities; average spinosad field-trial residue, average spinosad USDA PDP detected residue, or spinosad tolerance-level residues for crop commodities (40 CFR 180.495; see Table 3 for refined residue estimates); spinosad residue estimates for fish/shellfish (see Table 3; residues of spinetoram in fish/shellfish are expected to be insignificant); experimental spinosad processing factors when available; and refined milk, egg and ruminant/hog/poultry tissue spinosad residue estimates (see Table 3). HED concludes that these assumptions are appropriate for combined spinosad and spinetoram residues for the following reasons:

(1) Spinosad is registered for application to all of the crops that spinetoram is registered for application to with similar preharvest and retreatment intervals and application rates \geq to the spinetoram application rates. Based on the spinosad and spinetoram application scenarios, the nearly identical structure for spinosad and spinetoram, and the side-by-side spinosad and spinetoram residue data which resulted in spinetoram residues \leq spinosad residues, HED concluded that translation of the spinosad residue data to spinetoram was acceptable (D325387, T. Bloem, 12-Sep-2007). Since both products control the same pest species, HED concludes that it is unlikely that spinetoram and spinosad will be applied to the same crop. Therefore, HED concludes that the spinosad residue data are an acceptable estimate for potential spinosad or spinetoram residues.

HED notes that limit of quantitation tolerances are established for sweet corn, cottonseed, cranberry, peanut, pineapple, and subgroups 6B and 6C (spinosad and spinetoram). Since spinetoram includes four compounds as residues of concern while spinosad includes two, the spinetoram tolerances set at the limit of quantitation (LOQ) are higher and were assumed in the exposure analysis. In addition, the currently established spinosad feijoa tolerance of 0.05 ppm is incorrect and should be 0.30 ppm (D252416, G. Herndon, 23-Feb-1999; D249374, M. Doherty, 20-Aug-1998)

(2) HED concluded that the spinosad processing factors are adequate for both spinosad and spinetoram (D357703, T. Bloem, 28-Apr-2009).

(3) Tables 6, 9, and 10 are summaries of the spinosad poultry residue estimates. HED notes that the spinosad poultry dietary burdens were calculated using average spinosad field trial residues, projected combined spinosad/spinetoram percent crop treated estimates, and spinosad SLUA

data; the commodities included in the poultry diet yield the highest dietary burden. The major contributors to the spinosad poultry residue estimates are the post-harvest cereal grain, direct dermal-spray, and mosquito larvicide (water) application scenarios. Since these uses are not registered for spinetoram and the metabolites included as spinetoram residues of concern in hen are likely to be significantly less than parent (based on the metabolism study), HED concludes that the spinosad residue estimates are an adequate estimate of combined spinosad and spinetoram residues in poultry commodities for a chronic analysis.

(4) Tables 5, 6, 7, and 8 are summaries of the spinosad hog and cattle residue estimates. As previously indicated, the petitioner has discontinued by voluntary cancellation the spinosad cattle feed through and ear-tag registrations; therefore, inclusion of these uses in the cattle residue estimates is unnecessary (these uses were not registered/proposed for spinetoram or for other livestock).

The spinosad hog and cattle dietary burdens were calculated using average spinosad field trial residues, projected combined spinosad/spinetoram percent crop treated estimates, and spinosad SLUA data. The commodities included in the hog dietary burden yield the highest dietary burden. The commodities included in the cattle dietary burdens were recommended by the HED Chemistry Science Advisory Council (ChemSAC) as part of the spinetoram residue chemistry review (D325387, T. Bloem, 12-Sep-2007) with substitution of corn forage for wheat hay in the beef cattle diet and for wheat forage and soybean forage in the dairy cattle diet; corn forage was included based on the 39% projected combined spinosad and spinetoram percent crop treated for sweet corn (projected combined percent crop treated for wheat and soybean are much lower; see attachment 2). The major contributors to the spinosad hog and cattle residue estimates are the post-harvest cereal grain, premise, and mosquito larvicide (water) application scenarios. Since these uses are not registered for spinetoram and the metabolites included as spinetoram residues of concern in hen are likely to be significantly less than parent (based on the metabolism study), HED concludes that the spinosad residue estimates are an adequate estimate of combined spinosad and spinetoram residues in hog and cattle commodities for a chronic analysis.

Table 3: Summary of Refined Combined Spinosyn A and D Residue Estimates Used in the Analysis.			
crop group/matrix	crop/commodity	residue (ppm)	reference
refined food crop residues			
root and tuber vegetables (group 1)	garden beet	0.032	average spinosad garden beet (translated to sugar beet), radish, and potato field trial residue (D279683, W. Donovan, 10-Jul-2002); radish residue translated to carrot based on D252416 (G. Herndon, 23-Feb-1999)
	radish and carrot	0.017	
	potato	0.005	
leafy vegetables (except <i>Brassica</i> ; group 4)	spinach	0.077	average detected spinosad spinach residue from 2006 PDP data (n=145); applied to the remaining crops in group 4 except celery and fennel based on HED SOP 99.3
	celery	0.008	average detected spinosad celery residue from 2007 PDP data (n=214); translated to fennel based on HED SOP 99.3;
head and stem <i>Brassica</i> (group 5a)	broccoli	0.313	average field trial residues (D228434, S. Willett, 23-Jan-1997); applied to the remaining crops in this crop group using SOP 2000.1
	cabbage w/o wrapper leaves	0.081	
leafy <i>Brassica</i> greens (group 5b)	kale	0.185	average detected spinosad kale residue from 2006 PDP data (n=61); translated to remaining crops in group 5b except collard greens
	collard greens	0.048	average detected spinosad collard green residue from 2007 PDP data (n=236)
edible podded legume vegetables (group 6a)	green beans	0.022	average detected spinosad green bean residue from 2007 PDP data (n=483); translated to all crops in 6a based on HED SOP 99.3
fruiting vegetable (group 8)	tomato	0.053	average field trial residues and tomato paste (2.1x), puree (0.7x), and juice (0.3x) processing factors (D232203, G. Herndon, 2-Mar-1998); applied to the remaining crops in this crop group using the Fruiting Vegetable 8-09 ChemSAC Review Summary
	pepper (bell)	0.054	
	pepper (nonbell)	0.110	

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Table 3: Summary of Refined Combined Spinosyn A and D Residue Estimates Used in the Analysis.

crop group/matrix	crop/commodity	residue (ppm)	reference
cucurbit vegetables (group 9)	cucumber	0.046	average field trial residues (D249374, M. Doherty, 24-Jun-1999); applied to the remaining crops in this crop group using SOP 2000.1
	muskmelon	0.094	
	summer squash	0.028	
citrus (group 10)	grapefruit	0.057	average field trial residues and orange juice (0.1x) processing factor applied to all citrus juice (D237752, G. Herndon, 2-Mar-1998); RAC residue applied to the remaining crops using SOP 2000.1
	lemon	0.068	
	orange	0.085	
pome fruit (group 11)	apple	0.028	average apple field trial residue and apple juice processing factor (0.1x; D228434, S. Willett, 23-Jan-1997) and average pear field trial residue (D272706, G. Herndon, 16-Feb-2001); applied to the remaining crops in this crop group using SOP 2000.1
	pear	0.029	
stone fruit (group 12)	peach	0.015	average detected spinosad peach residue from 2006 PDP data (n=19) ¹ ; translated to fennel based on HED SOP 99.3;
	cherry	0.009	average detected spinosad cherry residue from 2007 PDP data (n=122) ¹
cereal grain (group 15)	corn grain	0.510	Average residues following post-harvest spinosad treatment of the grain (D304201, W. Cutchin, 13-Oct-2004); HED notes that foliar application of spinosad to cereal grains is also registered resulting in <LOQ residues in grain; therefore, the average residues resulting from only the post harvest treatment are acceptable. The following corn and wheat processing factors were included (D304201, W. Cutchin, 13-Oct-2004): corn meal - 0.26x; corn flour - 0.22x, corn oil - 1.2x, corn starch - 0.01x (translated to corn syrup), wheat flour - 0.32x, and wheat germ - 0.54x.
	wheat grain	0.551	
	barley grain	0.652	
	oat grain	0.495	
	rice grain	0.664	
herbs (group 19a)	basil fresh	1.200	average field trial residues (D278777, W. Donovan, 10-Jul-2002; D312374, T. Bloem, 20-July-2005); basil residues translated to remaining herbs based on D252416 (G. Herndon, 23-Feb-1999)
	basil dried	13.920	
spices (except black pepper; group 19b)	dill seed	0.18	average field trial residue (D335084, B. Hanson, 17-Sep-2007); dill seed residue translated to remaining spices (except black pepper) based on D252416 (G. Herndon, 23-Feb-1999)
--	banana and plantain	0.084	average field trial residue (D312374, T. Bloem, 20-Jul-2005; D323723, T. Bloem, 2-Feb-2006)
--	strawberry	0.252	average field trial residue (45244701.der.wpd)
--	grape	0.15	average field trial residue and raisin (1.62x) processing factor (D281616, W. Donovan, 15-Aug-2002).
fish/shellfish			
--	fish/shellfish (excluding tuna)	1.24	see Table 4 below
poultry/hog/ruminant			
poultry	meat	0.085	See Tables 6, 9, and 10.
	fat	0.414	
	liver	0.255	
	eggs	0.103	
hog	kidney	0.032	See Tables 5, 6, 7, and 8.
	liver	0.015	
	muscle	0.003	
	fat	0.027	
ruminant	kidney	0.105	See Tables 5, 6, 7, and 8.
	liver	0.148	
	muscle	0.024	
	fat	0.424	
	whole milk	0.042	
	skim milk	0.012	
	milk fat	0.525	

¹ HED notes that PDP analyzed 151 peach samples in 2007 (average residue of 0.008 ppm) but the 2006 data were used as the average residue was higher.

Table 4: Residues in/on Fish/Shellfish from the Mosquito Larvicide Use.

EFED provided HED with the following total spinosad water concentrations resulting from the mosquito larvicide application of spinosad (20 x 0.10 lb ai/acre; RTI = 7 days; D331271, Ronald Parker, 28-July-2006): peak - 489 ppb; annual average 472 ppb. The water numbers were generated using the PRZM/EXAMS models and assumed a uniform 10 cm water column and static conditions (no flow through or dilution). HED concludes that these estimates are conservative for the following reasons: (1) mosquito larvae predominate in areas sheltered from wind and wave action; therefore treatment of an entire body of water is unlikely and dilution of treated with untreated water will likely occur; (2) static conditions (no inflow or outflow); and (3) uniform 10 cm water depth.

To estimate residue in fish/shellfish, HED concluded that a 1 meter water depth was more realistic; therefore, HED divided the 472 ppb annual average provided by EFED (uniform 10cm depth assumed) by 10 (47.2 ppb). Based on the total radioactive residue (TRRs) of ~0.50 ppm in the edible tissue from the spinosyn A 19-ppb fish bioconcentration study and the 47.2 ppb water estimate, a fish/shellfish residue estimate of 1.24 ppm was calculated ($0.50 \text{ ppm} \times 47.2 \text{ ppb} \div 19 \text{ ppb} = 1.24 \text{ ppm}$). HED concluded that residues in tuna were unlikely based on the areas where spinosad will be applied. See D316078 (T. Bloem, 2-Aug-2006) for further information on the fish bioconcentration study. HED notes that the 1.24 ppb residue estimate is very conservative in that it assumes that all consumed fish/shellfish (excluding tuna) live in 1 meter deep water that is treated at the maximum proposed mosquito larvicide application rate (no dilution with untreated water).

Table 5: Residues in/on Beef Cattle, Dairy Cattle, and Hog from Premise Treatment.

Residues following only premise application are not available; therefore, HED used the dermal pour-on residue data as a surrogate as follows.

Beef/Dairy Cattle - Premise label indicates that 1 gallon of 1600 ppm solution may be applied to 500 ft² (12.12 mg/ft²)¹. If the following are assumed, a dermal application rate of 485 mg/animal can be calculated: 10 applications, 10% of the spray solution reaches the cattle, and 40 ft²/animal.

The 485 mg/animal dermal dose as a result of the premise spray application represents 9.7%/8.2% the beef/dairy cattle application rate performed in the dermal magnitude of the residue study (see below). Multiplying the average residue from the dermal magnitude of the residue study by these factors yields the following residues: milk - 0.015 ppm, skim milk - 0.011 ppm, muscle - 0.014 ppm, kidney - 0.049 ppm, liver 0.072 ppm, and fat - 0.131 ppm.

Hog - Premise label indicates that 1 gallon of 1600 ppm solution may be applied to 500 ft² (12.12 mg/ft²)¹. If the following are assumed, a dermal application rate of 97 mg/animal can be calculated: 10 applications, 10% of the spray solution reaches the hogs, and 8 ft²/animal.

The 97 mg/animal represents 2% the beef cattle application rate performed in the dermal magnitude of the residue study (see below). Multiplying the average residue from the dermal magnitude of the residue study by these factors yields the following residues: muscle - 0.003 ppm, kidney - 0.010 ppm, liver 0.015 ppm, and fat - 0.027 ppm.

Summary of the Dermal Pour-on Magnitude of the Residue Data - Beef and dairy cattle were treated with 5 dermal pour-on applications of spinosad at 2 mg/ai/kg (retreatment interval (RTI) = 14 days; D264984, W. Donovan, 14-Jun-2002; 45080605). HED notes that the study included a premise application and that this contributed an unknown amount of spinosad to the total dose per animal (800 ppm solution applied every 7 days to the point of run-off). Based on the dermal application rate of 2 mg ai/kg and default beef/dairy cattle weights of 500/590 kg/animal (from B. Schneider HED; D334930, T. Bloem, 28-Feb-2007): beef - 5 apps x 2 mg ai/kg x 500 kg/animal = 5000 mg/animal; dairy - 5 apps x 2 mg ai/kg x 590 kg/animal = 5900 mg/animal.

The following average residues were observed: milk - 0.182 ppm, skim milk - 0.140 ppm, muscle - 0.144 ppm, kidney - 0.505 ppm, liver 0.743 ppm, and fat - 1.353 ppm. For derivation of the skim milk residue see D354053 (T. Bloem, 26-Jun-2008). HED notes that the study employed a 2-day interval from final application to sacrifice; however, HED concluded that these data were sufficient to represent residues in/on the day of final application (D321764, T. Bloem, 2-Feb-2006).

¹ HED notes that the premise label does not restrict the total number of applications. However, the 1 gallon of a 1600 ppm solution applied to 500 ft² is for severe infestations only (normal application is 1 gallon of 800 ppm solution applied to 500-1000 ft²).

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Table 6: Calculation of Reasonably Balanced Dietary Burdens.					
Feed Commodity ¹	% Dry Matter ²	% Diet ²	Residue (ppm) ³	% Crop ⁴	Dietary ⁵
Beef Cattle					
sweet corn forage (R) ⁶	48	10	0.62	39	0.050
aspirated grain fractions (CC)	85	5	7.54	100	0.444
sorghum grain (CC)	86	75	0.662	10	0.058
soybean seed meal (PC)	92	10	0.04	5	0.0002
water (from mosquito use) ⁷	$0.0472 \times 135 \div 9.1 \times 0.5$				0.350
dietary burden	--	--	--	--	0.902
Dairy Cattle					
sweet corn forage (R) ⁶	48	35	0.62	39	0.176
leaves of root and tuber vegetables (R) ⁸	30	10	1.468	50	0.245
sorghum grain (CC)	86	40	0.662	10	0.047
sugar beet molasses (CC)	75	5	0.75	100	0.050
cottonseed (PC)	88	10	0.04	100	0.005
water (from mosquito use) ⁷	$0.0472 \times 135 \div 24 \times 0.5$				0.133
dietary burden	--	--	--	--	0.655
Hog					
sorghum grain (CC)	--	80	0.664	10	0.053
wheat milled byproducts (CC)	--	5	0.887	10	0.004
alfalfa meal (PC)	--	5	7.355	5	0.018
flax meal (PC)	--	10	0.02	100	0.002
water (from mosquito use) ⁷	$0.0472 \times 0.23 \div 0.14 \times 0.5$				0.039
dietary burden	--	--	--	--	0.117
Poultry					
popcorn grain (CC)	--	75	0.51	39	0.149
alfalfa meal (PC)	--	5	7.355	5	0.018
flax meal (PC)	--	20	0.02	100	0.004
water (from mosquito use) ⁷	$0.0472 \times 9 \div 2 \times 0.5$				0.106
dietary burden	--	--	--	--	0.278

¹ R = roughage; CC = carbohydrate concentrate; PC = protein concentrate.

² OPPTS 860.1000 Table 1 (June 2008); commodities included in the beef/dairy cattle diet and their percent of the diet were recommended by ChemSAC; the commodities included in the poultry and hog diet yield the highest dietary burden.

³ Tolerance-level residues assumed for soybean seed meal, sugar beet molasses, flax meal, and cottonseed. Average spinosad residues assumed for leaves of root and tuber vegetables (D279683, W. Donovan, 10-Jul-2002), sweet corn forage (D312374, T. Bloem, 20-July-2005), sorghum grain (46248501.der.doc), popcorn grain (46248501.der.doc), and alfalfa meal (hay data; 46159801.der.doc); AGFs calculated assuming average sorghum grain, wheat grain, and field corn grain residues (46248501.der.doc); soybean tolerance; AGF concentrations factors (see D341762, W. Sproat, 13-Oct-2004) and projected percent crop treated estimates (see D304201, W. Sproat *et al.*, 21-Sep-2004).

⁴ Projected combined spinosad/spinetoram percent crop treated for sweet corn, soybean, and leaves of root and tuber vegetables (see attachment 3); spinosad SLUA data for alfalfa (see attachment 1).

⁵ dietary contribution = residues x % crop treated ÷ % dry matter x % diet (% dry matter not included in hog and poultry calculations).

⁶ HED previously agreed to translate the 3-day PHI grass forage and grass hay residue data to the forage, fodder, and/or hay commodities of corn (D312374, T. Bloem, 20-July-2005). However, the previous ruminant dietary exposure analyses incorrectly used the average 0-day grass forage residue (3.5 ppm) rather than the average 3-day grass forage residue (0.62 ppm).

⁷ Estimated concentration in livestock drinking water with spinosad residues at 0.0472 ppm from the mosquito larvicide use (see Table 4 for derivation of this residue); assumes that water are treated for only half the year (0.5 factor); assumes 135 kg of water consumed per day and 24/9.1 kg dry matter per day for dairy/beef cattle (from D334930, T. Bloem, 28-Feb-2007); assumes 0.23 kg of water consumed per day and 0.14 kg feed intake per day for poultry (from PP#1F03991, G. Otakie, 4-Aug-1992); assumes 9 kg of water consumed per day and 2 kg feed intake per day for hog (taken from <http://www.ofac.org/factsheets/fact13.html>)

⁸ HED notes that previous assessments used the average mustard green residues as a surrogate for leaves of root and tuber vegetables in the ruminant diets; HED as since found garden beet top data and used the average residue from these data (1.468 ppm; MRID 45285102; D279683, W. Donovan, 10-Jul-2002) rather than the average mustard green residue (3.1 ppm).

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Table 7: Summary of Ruminant Feeding Study and Projected Residues in Cattle and Hog Tissue and Milk.

	feeding level (ppm) ¹			linear regression ($r^2 = 0.999$)		projected residues (ppm) ²	
	1	3	10	slope	intercept	cattle	hog
	average combined spinosyn A and D residue (ppm)						
kidney	0.047	0.163	0.445	0.0432	0.0168	0.056	0.022
liver	0.095	0.273	0.981	0.0991	-0.0130	0.076	<0.0001
muscle	0.018	0.041	0.178	0.0182	-0.0062	0.010	<0.0001
fat	0.544	1.047	4.753	0.4838	-0.1431	0.293	<0.0001
whole milk	0.049	0.157	0.559	0.057	-0.010	0.027	--
skim milk	0.008	0.019	0.095	0.011	-0.0059	0.001	--

¹ D269680, M. Doherty, 14-Nov-2000.² projected residues in tissues based on dietary burdens (see Table 6).**Table 8: Calculation of Total Residues in Ruminant and Hog.**

Matrix	Ruminant (ppm)			Hog (ppm)		
	Residue from Diet	Residue from Premise ¹	Total Residue	Residue from Diet	Residue from Premise ¹	Total Residue
kidney	0.056	0.049	0.105	0.022	0.010	0.032
liver	0.076	0.072	0.148	<0.0001	0.015	0.015
muscle	0.010	0.014	0.024	<0.0001	0.003	0.003
fat	0.293	0.131	0.424	<0.0001	0.027	0.027
whole milk	0.027	0.015	0.042	--	--	--
skim milk	0.001	0.011	0.012	--	--	--
milk fat ²	--	--	0.525	--	--	--

¹ Since residues following only premise application are not available, HED used the average residues from the dermal pour-on magnitude of the residue study adjusted for a theoretical 10% dermal contact with the premise spray (see Table 5 for more information).² Residue in milk fat estimated as 12.5x the whole milk residue (D249374, M. Doherty, 14-Jun-1999)**Table 9: Summary of Poultry Feeding Study and Estimated Residues in Poultry Commodities.**

Commodity	Feeding Level (ppm) ¹				Projected Residue (ppm) ²
	0.1	0.3	1	5	
	Average combined Spinosyn A and D Residue (ppm)				
Muscle	<0.003	<0.003	<0.003	0.066	0.004
Fat	<0.03	0.04	0.14	1.23	0.068
Liver	<0.003	<0.003	0.01	0.09	0.005
Eggs	<0.003	<0.003	<0.003	0.242	0.013

¹ D249374, M. Doherty, 24-Jun-1999 Since detectable residues were generally only found at the highest dose tested (5.0 ppm), HED estimated residues in the poultry commodities using the following formula: residue = spinosad residue at the 5.0 ppm dosing level \times 0.278 (0.278 is the poultry dietary burden see Table 6).**Table 10: Total Residues in Poultry.**

Matrix	Residue from Diet (ppm)	Residue from Dermal/ Premise App. (ppm) ¹	Total Residue (ppm)
Muscle	0.004	0.081	0.085
Fat	0.068	0.346	0.414
Liver (meat byproduct)	0.005	0.250	0.255
Eggs	0.013	0.090	0.103

¹ See 47703001.der.doc for these estimates (average residues).

III. Water Data

Drinking water residues were incorporated directly into the chronic dietary analyses (“water, direct, all sources” and “water, indirect, all sources”) and were provided by the Environmental Fate and Effects Division (EFED). Since the proposed use is a pet car product, the previously provided spinetoram (D325409, L. Liu, 14-May-2007) and spinosad (D331271, R. Parker, 28-July-2006) estimates are acceptable for the current use. EFED generated the surface and ground water estimates using the FQPA Index Reservoir Screening Tool (FIRST) and Screening Concentration In Ground Water (SCIGROW) models, respectively. Table 11 is a summary of the modeled water concentrations. Based on these estimates, the chronic analysis assumed a water residue estimate of 10.5 ppb. The models and their description are available at the EPA internet site: <http://www.epa.gov/oppefed1/models/water/>.

	Acute	Chronic	Long-term average
spinosad (cur and/or pre-emptive application at 0.10 lbs/acre, 22 days, 87% of the watershed is treated)			
surface	34.5	10.5	--
ground	1.1	1.1	1.1
spinetoram (cur and/or pre-emptive application at 0.45 lbs/acre, 100% of the watershed is treated)			
surface	14.419	6.171	--
ground	0.072	0.072	0.072

IV. DEEM-FCID™ Program and Consumption Information

Chronic dietary exposure assessments were conducted using the DEEM-FCID™ (Ver. 2.03) which incorporates consumption data from USDA's CSFII (1994-1996 and 1998). The 1994-96, 1998 data are based on the reported consumption of more than 20,000 individuals over two non-consecutive survey days. Foods “as consumed” (e.g., apple pie) are linked to EPA-defined food commodities (e.g. apples, peeled fruit-cooked; fresh or N/S; baked; or wheat flour-cooked; fresh or N/S, baked) using publicly available recipe translation files developed jointly by USDA/ARS and EPA. For chronic exposure assessment, consumption data are averaged for the entire U.S. population and within population subgroups. Based on analysis of the 1994-96, 1998 CSFII consumption data, which took into account dietary patterns and survey respondents, HED concluded that it is most appropriate to report risk for the following population subgroups: the general U.S. population, all infants (<1 year old), children 1-2, children 3-5, children 6-12, youth 13-19, adults 20-49, females 13-49, and adults 50+ years old.

For chronic dietary exposure assessment, an estimate of the residue level in each food or food-form (e.g., orange or orange juice) on the food commodity residue list is multiplied by the average daily consumption estimate for that food/food form to produce a residue intake estimate. The resulting residue intake estimate for each food/food form is summed with the residue intake estimates for all other food/food forms on the commodity residue list to arrive at the total average estimated exposure. Exposure is expressed in mg/kg body weight/day and as a percent of the cPAD. This procedure is performed for each population subgroup.

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V. Toxicological Information

HED concluded that spinosad and spinetoram are toxicologically equivalent and that exposures to these compounds should be combined (see risk assessment D331741, P. Shah *et al.*, 20-Sep-2007). The following is a summary of the dietary endpoints chosen by HED for dietary risk assessment (see risk assessment for rationale; D331741, P. Shah *et al.*, 20-Sep-2007). Based on the toxicological databases, the acceptable residue chemistry and environmental fate databases, and the residue assumptions used in the current assessment, HED concluded that the FQPA safety factor (SF) may be reduced to 1x.

Table 12: Summary of Toxicological Doses and Endpoints for Spinetoram and Spinosad for Use in Dietary Human Health Risk Assessment¹.

Exposure/Scenario	Point of Departure	Uncertainty FQPA SF	RfD, PAD, LOC for Risk Assessment	Study and Toxicological Effects
Acute Dietary (All populations)	Toxicological effect attributable to a single dose was not identified in the spinosad and spinetoram databases. This risk assessment is not required.			
Chronic Dietary (All Populations)	NOAEL = 2.49 mg/kg/day	UF _A = 10x UF _H = 10x FQPA SF = 1x	cRfD = 0.0249 mg/kg/day cPAD = 0.0249 mg/kg/day	Chronic toxicity dog (spinetoram); LOAEL = 5.36 mg/kg/day in males/5.83 mg/kg/day in females based on arteritis and necrosis of the arterial walls of the epididymides in males, and the thymus, thyroid, larynx and urinary bladder in females.
Cancer (oral)	Classification: "Not likely to be Carcinogenic to Humans" based on the spinosad carcinogenicity studies. Based on the structural similarity of spinetoram and spinosad and the similarity of the toxicological database for the currently-available studies, HED concluded that in the interim, the conclusions concerning the spinosad chronic oral carcinogenicity studies will be translated to spinetoram (petitioner indicated they will be submitting spinetoram carcinogenicity studies in the fall of 2007).			

¹ NOAEL = no-observed adverse-effect level. LOAEL = lowest-observed adverse-effect level. UF = uncertainty factor. UF_A = extrapolation from animal to human (intraspecies). UF_H = potential variation in sensitivity among members of the human population (interspecies). FQPA SF = FQPA Safety Factor. PAD = population-adjusted dose (a = acute, c = chronic). RfD = reference dose (a = acute, c = chronic). MOE = margin of exposure. LOC = level of concern (r = residential, o = occupational). N/A = not applicable.

VI. Results/Discussion

The chronic dietary analysis resulted in exposure estimates of $\leq 24\%$ cPAD (children 1-2 years old were the most highly exposed population subgroup); therefore, chronic exposure to spinosad/spinetoram does not exceed HED's level of concern. Table 13 is a summary of the results of the chronic analysis.

Table 13: Summary of Chronic Dietary (food and water) Exposure and Risk for Spinosad/Spinetoram.

Population Subgroup	cPAD (mg/kg/day)	Chronic	
		Exposure (mg/kg/day)	%cPAD
General U.S. Population	0.0249	0.002430	10
All Infants (<1 year old)		0.003034	12
Children 1-2 years old		0.005915	24
Children 3-5 years old		0.004932	20
Children 6-12 years old		0.003119	12
Youth 13-19 years old		0.001922	7.7
Adults 20-49 years old		0.002184	8.8
Adults 50+ years old		0.001859	7.5
Females 13-49 years old		0.001848	7.4

VII. Characterization of Inputs/Outputs

The chronic analysis is refined in that it used average field trial residues, average detected PDP residue, experimental processing factors, and refined livestock residue estimates. Further refinement is possible as the chronic analysis also assumed 100% crop treated for all food commodities and modeled drinking water estimates which assumed 87% of the basin is treated.

HED notes that both spinosad and spinetoram may be used in organic farming. Since organic growers have fewer alternatives, HED determined that use of the SLUA data for food crops was inappropriate (SLUA may underestimate percent crop treated for organic crops). In addition, since PDP does not extensively sample organic commodities, HED determined that use of only the average detected PDP residue was appropriate (if all <LOD, then the PDP data were not used); the assumption being that if spinosad was detected, then spinosad was used on the crop and whether grown organically or conventionally is irrelevant.

HED notes that projected percent crop treated and SLUA data were used for determination of the livestock dietary burdens. HED concludes that the resulting livestock residue estimates are appropriate for all commodities including those labeled as organic for the following reasons: (1) the residue estimates incorporated the conservative water estimate derived from the spinosad mosquito larvicide use (entire body of water treated with no inflow or outflow); (2) all ruminant and hogs are exposed to the premise treatment with 10% of this premise spray solution reaching the livestock; and (3) all poultry receive dermal treatment and are exposed to the premise application.

VIII. Conclusions

HED concluded that spinosad and spinetoram are toxicologically equivalent (see risk assessment D331741, P. Shah *et al.*, 20-Sep-2007); therefore, exposures to these compounds were combined. The chronic dietary risk assessment was conducted using DEEM-FCID™ (ver. 2.03). DEEM-FCID™ incorporates the USDA CSFII (1994-1996 and 1998). Acute and cancer analyses were not conducted as toxicological effects attributable to a single dose were not identified and spinetoram and spinosad are classified as not likely to be carcinogens (cancer risk assessment is not required).

The chronic analysis assumed 100% crop treated for all food crop commodities; average field-trial residue, average USDA PDP detected residue, or tolerance-level residues for crop commodities; spinosad residue estimates for fish/shellfish (residues of spinetoram in fish/shellfish are expected to be insignificant); experimental processing factors when available; refined milk, egg and ruminant/hog/poultry tissue residue estimates; and modeled drinking water estimates. The resulting chronic exposure estimates do not exceed HED's level of concern ($\leq 24\%$ cPAD; children 1-2 years old were the most highly exposed subpopulation).

Attachment 1: Spinosad SLUA (D376617, A. Grube, 18-May-2010).

Attachment 2: Spinetoram SLUA (D376618, A. Grube, 20-May-2010).

Attachment 3: Projected Combined Spinosad/Spinetoram Percent Crop Treated (A. Halvorson, 21-Aug-2007).

Attachment 4: DEEM-FCID™ chronic residue file.

Attachment 5: DEEM-FCID™ chronic exposure estimates.

cc with all attachments: Mark Suarez /Samantha Hulkower (Registration Division; RM 11)
T. Bloem:S10945:PY1:(703)605-0217:7509P

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Attachment 1: Spinosad SLUA (D376617, A. Grube, 18-May-2010).

April 22, 2010
 Screening Level Estimates of Agricultural Uses of Spinosad (110003)
 Sorted Alphabetically

	Crop	Lbs. A.I.	Percent Crop Ttd.	
			Avg.	Max.
1	Alfalfa	1,000	<1	<2.5
2	Almonds	3,000	5	10
3	Apples	10,000	25	40
4	Apples, Organic	1,000	50	50
5	Apricots	<500	20	40
6	Artichokes	1,000	35	70
7	Asparagus	<500	<1	<2.5
8	Avocados	<500	5	10
9	Beans, Green	1,000	5	10
10	Beets (NPUD '02)	<500	N/C	35
11	Blueberries	<500	5	10
12	Broccoli	7,000	45	65
13	Cabbage	4,000	40	50
14	Caneberries	<500	10	15
15	Cantaloupes	1,000	15	35
16	Carrots	1,000	15	30
17	Cauliflower	2,000	50	70
18	Celery	4,000	60	80
19	Cherries	3,000	20	35
20	Corn	<500	<1	<2.5
21	Cotton	20,000	<2.5	5
22	Cucumbers	1,000	5	20
23	Dry Beans/Pease	<500	<1	<2.5
24	Eggplant	<500	45	50
25	Grapefruit	1,000	5	10
26	Grapes	2,000	5	5
27	Hay, Other (NPUD '02)	<500	N/C	<1
28	Honeydew	1,000	45	45
29	Lemons	2,000	20	35
30	Lettuce	30,000	60	65
31	Nectarines	1,000	25	35
32	Onions	2,000	10	25
33	Oranges	10,000	15	35
34	Parsley (NPUD '02)	<500	N/C	10
35	Peaches	1,000	5	10
36	Peanuts	<500	<1	<2.5
37	Pears	1,000	10	20
38	Pecans	<500	<1	<2.5
39	Peppers	7,000	35	65
40	Pistachios	<500	5	15
41	Plums	<500	5	10

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42	Potatoes	1,000	<2.5	<2.5
43	Prunes	<500	<2.5	5
44	Pumpkins	<500	<1	<2.5
45	Raspberries	<500	5	10
46	Soybeans	1,000	<1	<2.5
47	Spinach	5,000	55	70
48	Squash	<500	5	10
49	Strawberries	3,000	30	50
50	Sweet Corn	2,000	<2.5	5
51	Sweet Potatoes (NPUD '02)	3,000	N/C	15
52	Tangerines	<500	15	25
53	Tobacco	3,000	10	15
54	Tomatoes	7,000	10	40
55	Walnuts	<500	5	10
56	Watermelons	1,000	5	10
57	Wheat	<500	<1	<2.5

All numbers rounded.

<500 Less than 500 pounds of active ingredient

<2.5 Less than 2.5 percent of crop treated

<1 Less than 1 percent of crop treated

N/C Not Calculated

SLUA data sources include:

USDA-NASS (United States Department of Agriculture's National Agricultural Statistics Service)

Private Pesticide Market Research

NPUD 2002 (National Pesticide Use Database) of the CropLife America Foundation

California DPR (Department of Pesticide Regulation)

These results reflect amalgamated data developed by the Agency and are releasable to the public.

Attachment 2: Spinetoram SLUA (D376618, A. Grube, 20-May-2010).

<u>Proprietary Data -- For Internal Use Only</u>			
DOANE Specialty and Row Crops, .		2008, Sorted by Crop	
Thursday, May 20, 2010			
SPINETORAM			
Crop	Lbs. A.I.	Avg % CT	Max % CT
			

Commercial/financial information may be entitled to confidential treatment

Attachment 3: Projected Combined Spinosad/Spinetoram Percent Crop Treated (A. Halvorson, 21-Aug-2007).

Table 1

Spinosad plus Spinetoram Projected Percent Crop Treated (PPCT) on Requested Crops

Crop	Leading/Projected Insecticide(s)	Year	PCT
Barley	Disulfoton	Circa 1997	1%
	All insecticides together	1998	<1%
	Carbofuran, disulfoton, lambda-cyhalothrin, methyl-parathion	2003	<0.5%
	Spinosad + spinetoram	Projected	1%
Corn, field (a)	Clothianidin	2004 - 2006	1%
	Spinosad + spinetoram	Projected	1%
Corn, sweet (b)	Lambda-cyhalothrin, bifenthrin	2004 - 2006	36%-43%
	Spinosad + spinetoram	Projected	39%
Oats	Carbaryl	Circa 1997	<1%
	Carbaryl	1998	1%
	Lambda-cyhalothrin	2005	<0.5%
	Spinosad + spinetoram	Projected	1%
Peanuts	Aldicarb	1991	31%
	Aldicarb	1999	32%
	Aldicarb	2004	27%
	Spinosad + spinetoram	Projected	30%
Peas/beans, dry	Dimethoate	2004-06	7%
	Spinosad + spinetoram	Projected	7%
Sorghum	Carbofuran	1991	5%
	Chlorpyrifos	1998	5%
	Terbufos	2003	4%
	Spinosad + spinetoram	Projected	5%
Soybeans	Lambda-cyhalothrin	2002	2%
	Lambda-cyhalothrin	2005	6%
	Lambda-cyhalothrin	2006	6%
	Spinosad + spinetoram	Projected	5%
Turnip greens	Carbaryl in AR	2000	40%
	Bt in NC	2000	58%
	Bt in SC	2000	52%
	Spinosad + spinetoram	Projected	50%
Wheat, durum	All insecticides together	1991	6%
	No insecticides estimated	2004	<2%(*)
	No insecticides estimated	2006	<1%(*)
	Spinosad + spinetoram	Projected	3%
Wheat, other Spring	Dimethoate, methyl parathion	1998	2%
	Chlorpyrifos, dimethoate, zeta-cypermethrin	2004	<0.5%
	Dimethoate, lambda-cyhalothrin	2006	<0.5%
	Spinosad + spinetoram	Projected	1%
Wheat, Winter	Zeta-cypermethrin	2002	4%
	Chlorpyrifos	2004	3%
	Chlorpyrifos	2006	2%
	Spinosad + spinetoram	Projected	3%

Note 1: For all crops, except field corn and sweet corn, leading insecticides are selected from all insecticides used on the crop. See below for method used for field corn and sweet corn.

(a) For field corn, leading insecticides are selected from those targeted at Fall armyworm (AW), southern AW, misc. AW, corn earworm, European corn borer, southwestern corn borer and/or western bean cutworm (based on proposed Delegate WG Section 3 label information).

(b) For sweet corn, leading insecticides are selected from those targeted at beet AW, Fall AW, southern AW, misc. AW, corn earworm, European corn borer, and/or western bean cutworm (based on proposed Delegate WG Section 3 label information).

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Note 2: The listing of more than one insecticide for a given year means that each was among the leading insecticides (with approximately the same PCT).

Note 3: Projected PCTs are 3-year averages of given historical PCT data (except the PPCT for turnip greens is a 3-year average over states because of deficient years of data).

(*) PCT for durum wheat estimated to be less than smallest herbicide PCT given. USDA indicated that there were not enough reports to estimate any individual insecticide.

Sources –

- USDA/NASS, Agricultural Chemical Usage, Field Crops Summaries, data for 1991, 1998-99, 2002-06
- USDA/NASS, Agricultural Chemical Usage, Vegetables Summaries, data for 2000, 2002, 2004
- EPA proprietary data, 2004-06
- National Center for Food & Agricultural Policy (NCFAP), National Pesticide Use Database, data for circa 1997

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Attachment 4: DEEM-FCID™ chronic residue file.

Filename: C:\Documents and Settings\tbloem\spinetoram\pet care RA\110003c.R98
 Chemical: spinosad
 RfD(Chronic): .0249 mg/kg bw/day NOEL(Chronic): 2.49 mg/kg bw/day
 RfD(Acute): 0 mg/kg bw/day NOEL(Acute): 0 mg/kg bw/day
 Date created/last modified: 08-18-2010/09:49:58/8 Program ver. 2.03
 Comment: 10x interspecies; 10x intraspecies; 1x FQPA SF

EPA Code	Crop Grp	Commodity Name	Def Res (ppm)	Adj. Factors #1	Adj. Factors #2	Comment
01010500	1AB	Beet, garden, roots	0.032000	1.000	1.000	
01010501	1AB	Beet, garden, roots-babyfood	0.032000	1.000	1.000	
01010520	1A	Beet, sugar	0.100000	1.000	1.000	
01010521	1A	Beet, sugar-babyfood	0.100000	1.000	1.000	
01010530	1A	Beet, sugar, molasses	0.750000	1.000	1.000	
01010531	1A	Beet, sugar, molasses-babyfood	0.750000	1.000	1.000	
01010670	1AB	Burdock	0.100000	1.000	1.000	
01010780	1AB	Carrot	0.017000	1.000	1.000	
01010781	1AB	Carrot-babyfood	0.017000	1.000	1.000	
01010790	1AB	Carrot, juice	0.017000	1.000	1.000	
01010840	1AB	Celeriac	0.100000	1.000	1.000	
01011000	1AB	Chicory, roots	0.100000	1.000	1.000	
01011680	1AB	Ginseng, dried	0.100000	1.000	1.000	
01011900	1AB	Horseradish	0.100000	1.000	1.000	
01012500	1AB	Parsley, turnip rooted	0.100000	1.000	1.000	
01012510	1AB	Parsnip	0.100000	1.000	1.000	
01012511	1AB	Parsnip-babyfood	0.100000	1.000	1.000	
01013140	1AB	Radish, roots	0.017000	1.000	1.000	
01013160	1AB	Radish, Oriental, roots	0.017000	1.000	1.000	
01013270	1AB	Rutabaga	0.100000	1.000	1.000	
01013310	1AB	Salsify, roots	0.100000	1.000	1.000	
01013880	1AB	Turnip, roots	0.100000	1.000	1.000	
01030150	1CD	Arrowroot, flour	0.100000	1.000	1.000	
01030151	1CD	Arrowroot, flour-babyfood	0.100000	1.000	1.000	
01030170	1CD	Artichoke, Jerusalem	0.100000	1.000	1.000	
01030820	1CD	Cassava	0.100000	1.000	1.000	
01030821	1CD	Cassava-babyfood	0.100000	1.000	1.000	
01031390	1CD	Dasheen, corm	0.100000	1.000	1.000	
01031660	1CD	Ginger	0.100000	1.000	1.000	
01031661	1CD	Ginger-babyfood	0.100000	1.000	1.000	
01031670	1CD	Ginger, dried	0.100000	1.000	1.000	
01032960	1C	Potato, chips	0.005000	1.000	1.000	
01032970	1C	Potato, dry (granules/ flakes)	0.005000	6.500	1.000	
01032971	1C	Potato, dry (granules/ flakes)-b	0.005000	6.500	1.000	
01032980	1C	Potato, flour	0.005000	6.500	1.000	
01032981	1C	Potato, flour-babyfood	0.005000	6.500	1.000	
01032990	1C	Potato, tuber, w/peel	0.005000	1.000	1.000	
01032991	1C	Potato, tuber, w/peel-babyfood	0.005000	1.000	1.000	
01033000	1C	Potato, tuber, w/o peel	0.005000	1.000	1.000	
01033001	1C	Potato, tuber, w/o peel-babyfood	0.005000	1.000	1.000	
01033660	1CD	Sweet potato	0.100000	1.000	1.000	
01033661	1CD	Sweet potato-babyfood	0.100000	1.000	1.000	
01033710	1CD	Tanier, corm	0.100000	1.000	1.000	
01033870	1CD	Turmeric	0.100000	1.000	1.000	
01034060	1CD	Yam, true	0.100000	1.000	1.000	
01034070	1CD	Yam bean	0.100000	1.000	1.000	
02000510	2	Beet, garden, tops	10.000000	1.000	1.000	
02001010	2	Chicory, tops	10.000000	1.000	1.000	
02001400	2	Dasheen, leaves	10.000000	1.000	1.000	
02003150	2	Radish, tops	10.000000	1.000	1.000	
02003170	2	Radish, Oriental, tops	10.000000	1.000	1.000	
02003320	2	Salsify, tops	10.000000	1.000	1.000	
03001640	3	Garlic	0.100000	1.000	1.000	

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03001650	3	Garlic, dried	0.100000	1.000 1.000
03001651	3	Garlic, dried-babyfood	0.100000	1.000 1.000
03001980	3	Leek	0.100000	1.000 1.000
03002370	3	Onion, dry bulb	0.100000	1.000 1.000
03002371	3	Onion, dry bulb-babyfood	0.100000	1.000 1.000
03002380	3	Onion, dry bulb, dried	0.100000	9.000 1.000
03002381	3	Onion, dry bulb, dried-babyfood	0.100000	9.000 1.000
03002390	3	Onion, green	2.000000	1.000 1.000
03003380	3	Shallot	0.100000	1.000 1.000
04010050	4A	Amaranth, leafy	0.077000	1.000 1.000
04010180	4A	Arugula	0.077000	1.000 1.000
04011040	4A	Chrysanthemum, garland	0.077000	1.000 1.000
04011330	4A	Cress, garden	0.077000	1.000 1.000
04011340	4A	Cress, upland	0.077000	1.000 1.000
04011380	4A	Dandelion, leaves	0.077000	1.000 1.000
04011500	4A	Endive	0.077000	1.000 1.000
04012040	4A	Lettuce, head	0.077000	1.000 1.000
04012050	4A	Lettuce, leaf	0.077000	1.000 1.000
04012480	4A	Parsley, leaves	0.077000	1.000 1.000
04013130	4A	Radicchio	0.077000	1.000 1.000
04013550	4A	Spinach	0.077000	1.000 1.000
04013551	4A	Spinach-babyfood	0.077000	1.000 1.000
04020760	4B	Cardoon	0.077000	1.000 1.000
04020850	4B	Celery	0.008000	1.000 1.000
04020851	4B	Celery-babyfood	0.008000	1.000 1.000
04020860	4B	Celery, juice	0.008000	1.000 1.000
04020870	4B	Celtuce	0.077000	1.000 1.000
04021520	4B	Fennel, Florence	0.008000	1.000 1.000
04023220	4B	Rhubarb	0.077000	1.000 1.000
04023670	4B	Swiss chard	0.077000	1.000 1.000
05010610	5A	Broccoli	0.313000	1.000 1.000
05010611	5A	Broccoli-babyfood	0.313000	1.000 1.000
05010620	5A	Broccoli, Chinese	0.313000	1.000 1.000
05010640	5A	Brussels sprouts	0.081000	1.000 1.000
05010690	5A	Cabbage	0.081000	1.000 1.000
05010710	5A	Cabbage, Chinese, napa	0.081000	1.000 1.000
05010720	5A	Cabbage, Chinese, mustard	0.313000	1.000 1.000
05010830	5A	Cauliflower	0.313000	1.000 1.000
05011960	5A	Kohlrabi	0.081000	1.000 1.000
05020630	5B	Broccoli raab	0.185000	1.000 1.000
05020700	5B	Cabbage, Chinese, bok choy	0.185000	1.000 1.000
05021170	5B	Collards	0.048000	1.000 1.000
05021940	5B	Kale	0.185000	1.000 1.000
05022290	5B	Mustard greens	0.185000	1.000 1.000
05023180	5B	Rape greens	0.185000	1.000 1.000
05023890	5B	Turnip, greens	0.185000	1.000 1.000
06003470	6	Soybean, seed	0.040000	1.000 1.000
06003480	6	Soybean, flour	0.040000	1.000 1.000
06003481	6	Soybean, flour-babyfood	0.040000	1.000 1.000
06003490	6	Soybean, soy milk	0.040000	1.000 1.000
06003491	6	Soybean, soy milk-babyfood or in	0.040000	1.000 1.000
06003500	6	Soybean, oil	0.040000	1.000 1.000
06003501	6	Soybean, oil-babyfood	0.040000	1.000 1.000
06010430	6A	Bean, snap, succulent	0.022000	1.000 1.000
06010431	6A	Bean, snap, succulent-babyfood	0.022000	1.000 1.000
06012570	6A	Pea, edible podded, succulent	0.022000	1.000 1.000
06020310	6B	Bean, broad, succulent	0.040000	1.000 1.000
06020330	6B	Bean, cowpea, succulent	0.040000	1.000 1.000
06020370	6B	Bean, lima, succulent	0.040000	1.000 1.000
06022550	6B	Pea, succulent	0.040000	1.000 1.000
06022551	6B	Pea, succulent-babyfood	0.040000	1.000 1.000
06022590	6B	Pea, pigeon, succulent	0.040000	1.000 1.000
06030300	6C	Bean, black, seed	0.040000	1.000 1.000
06030320	6C	Bean, broad, seed	0.040000	1.000 1.000
06030340	6C	Bean, cowpea, seed	0.040000	1.000 1.000

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06030350	6C	Bean, great northern, seed	0.040000	1.000 1.000
06030360	6C	Bean, kidney, seed	0.040000	1.000 1.000
06030380	6C	Bean, lima, seed	0.040000	1.000 1.000
06030390	6C	Bean, mung, seed	0.040000	1.000 1.000
06030400	6C	Bean, navy, seed	0.040000	1.000 1.000
06030410	6C	Bean, pink, seed	0.040000	1.000 1.000
06030420	6C	Bean, pinto, seed	0.040000	1.000 1.000
06030980	6C	Chickpea, seed	0.040000	1.000 1.000
06030981	6C	Chickpea, seed-babyfood	0.040000	1.000 1.000
06030990	6C	Chickpea, flour	0.040000	1.000 1.000
06031820	6C	Guar, seed	0.040000	1.000 1.000
06031821	6C	Guar, seed-babyfood	0.040000	1.000 1.000
06032030	6C	Lentil, seed	0.040000	1.000 1.000
06032560	6C	Pea, dry	0.040000	1.000 1.000
06032561	6C	Pea, dry-babyfood	0.040000	1.000 1.000
06032580	6C	Pea, pigeon, seed	0.040000	1.000 1.000
08001480	8	Eggplant	0.110000	1.000 1.000
08002340	8	Okra	0.110000	1.000 1.000
08002700	8	Pepper, bell	0.054000	1.000 1.000
08002701	8	Pepper, bell-babyfood	0.054000	1.000 1.000
08002710	8	Pepper, bell, dried	0.054000	1.000 1.000
08002711	8	Pepper, bell, dried-babyfood	0.054000	1.000 1.000
08002720	8	Pepper, nonbell	0.110000	1.000 1.000
08002721	8	Pepper, nonbell-babyfood	0.110000	1.000 1.000
08002730	8	Pepper, nonbell, dried	0.110000	1.000 1.000
08003740	8	Tomatillo	0.053000	1.000 1.000
08003750	8	Tomato	0.053000	1.000 1.000
08003751	8	Tomato-babyfood	0.053000	1.000 1.000
08003760	8	Tomato, paste	0.053000	2.100 1.000
08003761	8	Tomato, paste-babyfood	0.053000	2.100 1.000
08003770	8	Tomato, puree	0.053000	0.700 1.000
08003771	8	Tomato, puree-babyfood	0.053000	0.700 1.000
08003780	8	Tomato, dried	0.053000	14.300 1.000
08003781	8	Tomato, dried-babyfood	0.053000	14.300 1.000
08003790	8	Tomato, juice	0.053000	0.300 1.000
09010750	9A	Cantaloupe	0.094000	1.000 1.000
09010800	9A	Casaba	0.094000	1.000 1.000
09011870	9A	Honeydew melon	0.094000	1.000 1.000
09013990	9A	Watermelon	0.094000	1.000 1.000
09014000	9A	Watermelon, juice	0.094000	1.000 1.000
09020210	9B	Balsam pear	0.046000	1.000 1.000
09020880	9B	Chayote, fruit	0.028000	1.000 1.000
09021020	9B	Chinese waxgourd	0.046000	1.000 1.000
09021350	9B	Cucumber	0.046000	1.000 1.000
09023080	9B	Pumpkin	0.028000	1.000 1.000
09023090	9B	Pumpkin, seed	0.028000	1.000 1.000
09023560	9B	Squash, summer	0.028000	1.000 1.000
09023561	9B	Squash, summer-babyfood	0.028000	1.000 1.000
09023570	9B	Squash, winter	0.028000	1.000 1.000
09023571	9B	Squash, winter-babyfood	0.028000	1.000 1.000
10001060	10	Citrus citron	0.085000	1.000 1.000
10001070	10	Citrus hybrids	0.085000	1.000 1.000
10001080	10	Citrus, oil	23.000000	1.000 1.000
10001800	10	Grapefruit	0.057000	1.000 1.000
10001810	10	Grapefruit, juice	0.057000	0.100 1.000
10001970	10	Kumquat	0.085000	1.000 1.000
10001990	10	Lemon	0.068000	1.000 1.000
10002000	10	Lemon, juice	0.068000	0.100 1.000
10002001	10	Lemon, juice-babyfood	0.068000	0.100 1.000
10002010	10	Lemon, peel	0.068000	1.000 1.000
10002060	10	Lime	0.068000	1.000 1.000
10002070	10	Lime, juice	0.068000	0.100 1.000
10002071	10	Lime, juice-babyfood	0.068000	0.100 1.000
10002400	10	Orange	0.085000	1.000 1.000
10002410	10	Orange, juice	0.085000	0.100 1.000

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10002411	10	Orange, juice-babyfood	0.085000	0.100 1.000
10002420	10	Orange, peel	0.085000	1.000 1.000
10003070	10	Pummelo	0.057000	1.000 1.000
10003690	10	Tangerine	0.085000	1.000 1.000
10003700	10	Tangerine, juice	0.085000	0.100 1.000
11000070	11	Apple, fruit with peel	0.028000	1.000 1.000
11000080	11	Apple, peeled fruit	0.028000	1.000 1.000
11000081	11	Apple, peeled fruit-babyfood	0.028000	1.000 1.000
11000090	11	Apple, dried	0.028000	8.000 1.000
11000091	11	Apple, dried-babyfood	0.028000	8.000 1.000
11000100	11	Apple, juice	0.028000	0.100 1.000
11000101	11	Apple, juice-babyfood	0.028000	0.100 1.000
11000110	11	Apple, sauce	0.028000	1.000 1.000
11000111	11	Apple, sauce-babyfood	0.028000	1.000 1.000
11001290	11	Crabapple	0.028000	1.000 1.000
11002100	11	Loquat	0.029000	1.000 1.000
11002660	11	Pear	0.029000	1.000 1.000
11002661	11	Pear-babyfood	0.029000	1.000 1.000
11002670	11	Pear, dried	0.029000	6.250 1.000
11002680	11	Pear, juice	0.029000	1.000 1.000
11002681	11	Pear, juice-babyfood	0.029000	1.000 1.000
11003100	11	Quince	0.029000	1.000 1.000
12000120	12	Apricot	0.015000	1.000 1.000
12000121	12	Apricot-babyfood	0.015000	1.000 1.000
12000130	12	Apricot, dried	0.015000	6.000 1.000
12000140	12	Apricot, juice	0.015000	1.000 1.000
12000141	12	Apricot, juice-babyfood	0.015000	1.000 1.000
12000900	12	Cherry	0.009000	1.000 1.000
12000901	12	Cherry-babyfood	0.009000	1.000 1.000
12000910	12	Cherry, juice	0.009000	1.500 1.000
12000911	12	Cherry, juice-babyfood	0.009000	1.500 1.000
12002300	12	Nectarine	0.015000	1.000 1.000
12002600	12	Peach	0.015000	1.000 1.000
12002601	12	Peach-babyfood	0.015000	1.000 1.000
12002610	12	Peach, dried	0.015000	7.000 1.000
12002611	12	Peach, dried-babyfood	0.015000	7.000 1.000
12002620	12	Peach, juice	0.015000	1.000 1.000
12002621	12	Peach, juice-babyfood	0.015000	1.000 1.000
12002850	12	Plum	0.015000	1.000 1.000
12002851	12	Plum-babyfood	0.015000	1.000 1.000
12002860	12	Plum, prune, fresh	0.015000	1.000 1.000
12002861	12	Plum, prune, fresh-babyfood	0.015000	1.000 1.000
12002870	12	Plum, prune, dried	0.015000	5.000 1.000
12002871	12	Plum, prune, dried-babyfood	0.015000	5.000 1.000
12002880	12	Plum, prune, juice	0.015000	1.400 1.000
12002881	12	Plum, prune, juice-babyfood	0.015000	1.400 1.000
13010550	13A	Blackberry	0.700000	1.000 1.000
13010560	13A	Blackberry, juice	0.700000	1.000 1.000
13010561	13A	Blackberry, juice-babyfood	0.700000	1.000 1.000
13010580	13A	Boysenberry	0.700000	1.000 1.000
13011420	13A	Dewberry	0.700000	1.000 1.000
13012080	13A	Loganberry	0.700000	1.000 1.000
13013200	13A	Raspberry	0.700000	1.000 1.000
13013201	13A	Raspberry-babyfood	0.700000	1.000 1.000
13013210	13A	Raspberry, juice	0.700000	1.000 1.000
13013211	13A	Raspberry, juice-babyfood	0.700000	1.000 1.000
13020570	13B	Blueberry	0.250000	1.000 1.000
13020571	13B	Blueberry-babyfood	0.250000	1.000 1.000
13021360	13B	Currant	0.250000	1.000 1.000
13021370	13B	Currant, dried	0.250000	1.000 1.000
13021490	13B	Elderberry	0.250000	1.000 1.000
13021740	13B	Gooseberry	0.250000	1.000 1.000
13021910	13B	Huckleberry	0.250000	1.000 1.000
14000030	14	Almond	0.100000	1.000 1.000
14000031	14	Almond-babyfood	0.100000	1.000 1.000

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14000040	14	Almond, oil	0.100000	1.000	1.000
14000041	14	Almond, oil-babyfood	0.100000	1.000	1.000
14000590	14	Brazil nut	0.100000	1.000	1.000
14000680	14	Butternut	0.100000	1.000	1.000
14000810	14	Cashew	0.100000	1.000	1.000
14000920	14	Chestnut	0.100000	1.000	1.000
14001550	14	Filbert	0.100000	1.000	1.000
14001560	14	Filbert, oil	0.100000	1.000	1.000
14001850	14	Hickory nut	0.100000	1.000	1.000
14002130	14	Macadamia nut	0.100000	1.000	1.000
14002690	14	Pecan	0.100000	1.000	1.000
14002820	14	Pistachio	0.100000	1.000	1.000
14003910	14	Walnut	0.100000	1.000	1.000
15000250	15	Barley, pearled barley	0.652000	1.000	1.000
15000251	15	Barley, pearled barley-babyfood	0.652000	1.000	1.000
15000260	15	Barley, flour	0.652000	1.000	1.000
15000261	15	Barley, flour-babyfood	0.652000	1.000	1.000
15000270	15	Barley, bran	0.652000	1.000	1.000
15000650	15	Buckwheat	1.500000	1.000	1.000
15000660	15	Buckwheat, flour	1.500000	1.000	1.000
15001200	15	Corn, field, flour	0.510000	0.220	1.000
15001201	15	Corn, field, flour-babyfood	0.510000	0.220	1.000
15001210	15	Corn, field, meal	0.510000	0.260	1.000
15001211	15	Corn, field, meal-babyfood	0.510000	0.260	1.000
15001220	15	Corn, field, bran	0.510000	1.000	1.000
15001230	15	Corn, field, starch	0.510000	0.010	1.000
15001231	15	Corn, field, starch-babyfood	0.510000	0.010	1.000
15001240	15	Corn, field, syrup	0.510000	0.010	1.000
15001241	15	Corn, field, syrup-babyfood	0.510000	0.010	1.000
15001250	15	Corn, field, oil	0.510000	1.200	1.000
15001251	15	Corn, field, oil-babyfood	0.510000	1.200	1.000
15001260	15	Corn, pop	0.510000	1.000	1.000
15001270	15	Corn, sweet	0.040000	1.000	1.000
15001271	15	Corn, sweet-babyfood	0.040000	1.000	1.000
15002260	15	Millet, grain	1.500000	1.000	1.000
15002310	15	Oat, bran	0.495000	1.000	1.000
15002320	15	Oat, flour	0.495000	1.000	1.000
15002321	15	Oat, flour-babyfood	0.495000	1.000	1.000
15002330	15	Oat, groats/rolled oats	0.495000	1.000	1.000
15002331	15	Oat, groats/rolled oats-babyfood	0.495000	1.000	1.000
15003230	15	Rice, white	0.664000	1.000	1.000
15003231	15	Rice, white-babyfood	0.664000	1.000	1.000
15003240	15	Rice, brown	0.664000	1.000	1.000
15003241	15	Rice, brown-babyfood	0.664000	1.000	1.000
15003250	15	Rice, flour	0.664000	1.000	1.000
15003251	15	Rice, flour-babyfood	0.664000	1.000	1.000
15003260	15	Rice, bran	0.664000	1.000	1.000
15003261	15	Rice, bran-babyfood	0.664000	1.000	1.000
15003280	15	Rye, grain	1.500000	1.000	1.000
15003290	15	Rye, flour	1.500000	1.000	1.000
15003440	15	Sorghum, grain	1.500000	1.000	1.000
15003450	15	Sorghum, syrup	1.500000	1.000	1.000
15003810	15	Triticale, flour	1.500000	1.000	1.000
15003811	15	Triticale, flour-babyfood	1.500000	1.000	1.000
15004010	15	Wheat, grain	0.551000	1.000	1.000
15004011	15	Wheat, grain-babyfood	0.551000	1.000	1.000
15004020	15	Wheat, flour	0.551000	0.320	1.000
15004021	15	Wheat, flour-babyfood	0.551000	0.320	1.000
15004030	15	Wheat, germ	0.551000	0.540	1.000
15004040	15	Wheat, bran	0.551000	1.000	1.000
15004050	15	Wild rice	1.500000	1.000	1.000
18000020	18	Alfalfa, seed	0.150000	1.000	1.000
19010280	19A	Basil, fresh leaves	1.200000	1.000	1.000
19010281	19A	Basil, fresh leaves-babyfood	1.200000	1.000	1.000
19010290	19A	Basil, dried leaves	13.920000	1.000	1.000

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19010291	19A	Basil, dried leaves-babyfood	13.920000	1.000 1.000
19011030	19A	Chive	13.920000	1.000 1.000
19011180	19A	Coriander, leaves	8.000000	1.000 1.000
19011181	19A	Coriander, leaves-babyfood	8.000000	1.000 1.000
19011440	19A	Dillweed	13.920000	1.000 1.000
19011840	19A	Herbs, other	13.920000	1.000 1.000
19011841	19A	Herbs, other-babyfood	13.920000	1.000 1.000
19012020	19A	Lemongrass	13.920000	1.000 1.000
19012200	19A	Marjoram	13.920000	1.000 1.000
19012201	19A	Marjoram-babyfood	13.920000	1.000 1.000
19012490	19A	Parsley, dried leaves	13.920000	1.000 1.000
19012491	19A	Parsley, dried leaves-babyfood	13.920000	1.000 1.000
19013340	19A	Savory	13.920000	1.000 1.000
19021050	19B	Cinnamon	0.180000	1.000 1.000
19021051	19B	Cinnamon-babyfood	0.180000	1.000 1.000
19021190	19B	Coriander, seed	0.180000	1.000 1.000
19021191	19B	Coriander, seed-babyfood	0.180000	1.000 1.000
19021430	19B	Dill, seed	0.180000	1.000 1.000
19022740	19B	Pepper, black and white	0.020000	1.000 1.000
19022741	19B	Pepper, black and white-babyfood	0.020000	1.000 1.000
19023540	19B	Spices, other	0.180000	1.000 1.000
19023541	19B	Spices, other-babyfood	0.180000	1.000 1.000
20001630	20	Flaxseed, oil	0.020000	1.000 1.000
20003190	20	Rapeseed, oil	0.020000	1.000 1.000
20003191	20	Rapeseed, oil-babyfood	0.020000	1.000 1.000
20003300	20	Safflower, oil	0.020000	1.000 1.000
20003301	20	Safflower, oil-babyfood	0.020000	1.000 1.000
20003640	20	Sunflower, seed	0.020000	1.000 1.000
20003650	20	Sunflower, oil	0.020000	1.000 1.000
20003651	20	Sunflower, oil-babyfood	0.020000	1.000 1.000
21000440	M	Beef, meat	0.024000	1.000 1.000
21000441	M	Beef, meat-babyfood	0.024000	1.000 1.000
21000450	M	Beef, meat, dried	0.024000	1.920 1.000
21000460	M	Beef, meat byproducts	0.148000	1.000 1.000
21000461	M	Beef, meat byproducts-babyfood	0.148000	1.000 1.000
21000470	M	Beef, fat	0.424000	1.000 1.000
21000471	M	Beef, fat-babyfood	0.424000	1.000 1.000
21000480	M	Beef, kidney	0.105000	1.000 1.000
21000490	M	Beef, liver	0.148000	1.000 1.000
21000491	M	Beef, liver-babyfood	0.148000	1.000 1.000
23001690	M	Goat, meat	0.024000	1.000 1.000
23001700	M	Goat, meat byproducts	0.148000	1.000 1.000
23001710	M	Goat, fat	0.424000	1.000 1.000
23001720	M	Goat, kidney	0.105000	1.000 1.000
23001730	M	Goat, liver	0.148000	1.000 1.000
24001890	M	Horse, meat	0.024000	1.000 1.000
25002900	M	Pork, meat	0.003000	1.000 1.000
25002901	M	Pork, meat-babyfood	0.003000	1.000 1.000
25002910	M	Pork, skin	0.027000	1.000 1.000
25002920	M	Pork, meat byproducts	0.032000	1.000 1.000
25002921	M	Pork, meat byproducts-babyfood	0.032000	1.000 1.000
25002930	M	Pork, fat	0.027000	1.000 1.000
25002931	M	Pork, fat-babyfood	0.027000	1.000 1.000
25002940	M	Pork, kidney	0.032000	1.000 1.000
25002950	M	Pork, liver	0.015000	1.000 1.000
26003390	M	Sheep, meat	0.024000	1.000 1.000
26003391	M	Sheep, meat-babyfood	0.024000	1.000 1.000
26003400	M	Sheep, meat byproducts	0.148000	1.000 1.000
26003410	M	Sheep, fat	0.424000	1.000 1.000
26003411	M	Sheep, fat-babyfood	0.424000	1.000 1.000
26003420	M	Sheep, kidney	0.105000	1.000 1.000
26003430	M	Sheep, liver	0.148000	1.000 1.000
27002220	D	Milk, fat	0.525000	1.000 1.000
27002221	D	Milk, fat - baby food/infant for	0.525000	1.000 1.000
27012230	D	Milk, nonfat solids	0.012000	1.000 1.000

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27012231	D	Milk, nonfat solids-baby food/in	0.012000	1.000	1.000
27022240	D	Milk, water	0.012000	1.000	1.000
27022241	D	Milk, water-babyfood/infant form	0.012000	1.000	1.000
27032251	D	Milk, sugar (lactose)-baby food/	0.012000	1.000	1.000
28002210	M	Meat, game	0.024000	1.000	1.000
29003120	M	Rabbit, meat	0.024000	1.000	1.000
40000930	P	Chicken, meat	0.085000	1.000	1.000
40000931	P	Chicken, meat-babyfood	0.085000	1.000	1.000
40000940	P	Chicken, liver	0.255000	1.000	1.000
40000950	P	Chicken, meat byproducts	0.255000	1.000	1.000
40000951	P	Chicken, meat byproducts-babyfoo	0.255000	1.000	1.000
40000960	P	Chicken, fat	0.414000	1.000	1.000
40000961	P	Chicken, fat-babyfood	0.414000	1.000	1.000
40000970	P	Chicken, skin	0.414000	1.000	1.000
40000971	P	Chicken, skin-babyfood	0.414000	1.000	1.000
50003820	P	Turkey, meat	0.085000	1.000	1.000
50003821	P	Turkey, meat-babyfood	0.085000	1.000	1.000
50003830	P	Turkey, liver	0.255000	1.000	1.000
50003831	P	Turkey, liver-babyfood	0.255000	1.000	1.000
50003840	P	Turkey, meat byproducts	0.255000	1.000	1.000
50003841	P	Turkey, meat byproducts-babyfood	0.255000	1.000	1.000
50003850	P	Turkey, fat	0.414000	1.000	1.000
50003851	P	Turkey, fat-babyfood	0.414000	1.000	1.000
50003860	P	Turkey, skin	0.414000	1.000	1.000
50003861	P	Turkey, skin-babyfood	0.414000	1.000	1.000
60003010	P	Poultry, other, meat	0.085000	1.000	1.000
60003020	P	Poultry, other, liver	0.255000	1.000	1.000
60003030	P	Poultry, other, meat byproducts	0.255000	1.000	1.000
60003040	P	Poultry, other, fat	0.414000	1.000	1.000
60003050	P	Poultry, other, skin	0.414000	1.000	1.000
70001450	P	Egg, whole	0.103000	1.000	1.000
70001451	P	Egg, whole-babyfood	0.103000	1.000	1.000
70001460	P	Egg, white	0.103000	1.000	1.000
70001461	P	Egg, white (solids)-babyfood	0.103000	1.000	1.000
70001470	P	Egg, yolk	0.103000	1.000	1.000
70001471	P	Egg, yolk-babyfood	0.103000	1.000	1.000
80001570	F	Fish-freshwater finfish	1.240000	1.000	1.000
80001580	F	Fish-freshwater finfish, farm ra	1.240000	1.000	1.000
80001600	F	Fish-saltwater finfish, other	1.240000	1.000	1.000
80001610	F	Fish-shellfish, crustacean	1.240000	1.000	1.000
80001620	F	Fish-shellfish, mollusc	1.240000	1.000	1.000
86010000	O	Water, direct, all sources	0.010500	1.000	1.000
86020000	O	Water, indirect, all sources	0.010500	1.000	1.000
95000010	O	Acerola	1.500000	1.000	1.000
95000060	O	Amaranth, grain	1.000000	1.000	1.000
95000160	O	Artichoke, globe	0.300000	1.000	1.000
95000190	O	Asparagus	0.200000	1.000	1.000
95000200	O	Avocado	0.300000	1.000	1.000
95000220	O	Bamboo, shoots	0.020000	1.000	1.000
95000230	O	Banana	0.084000	1.000	1.000
95000231	O	Banana-babyfood	0.084000	1.000	1.000
95000240	O	Banana, dried	0.084000	3.900	1.000
95000241	O	Banana, dried-babyfood	0.084000	3.900	1.000
95000540	O	Belgium endive	0.020000	1.000	1.000
95000600	O	Breadfruit	0.020000	1.000	1.000
95000730	O	Cactus	0.020000	1.000	1.000
95000740	O	Canistel	0.300000	1.000	1.000
95000770	O	Carob	0.020000	1.000	1.000
95000890	O	Cherimoya	0.300000	1.000	1.000
95001090	O	Cocoa bean, chocolate	0.020000	1.000	1.000
95001100	O	Cocoa bean, powder	0.020000	1.000	1.000
95001110	O	Coconut, meat	0.020000	1.000	1.000
95001111	O	Coconut- meat-babyfood	0.020000	1.000	1.000
95001120	O	Coconut, dried	0.020000	2.100	1.000
95001130	O	Coconut, milk	0.020000	1.000	1.000

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95001140	O Coconut, oil	0.020000	1.000	1.000
95001141	O Coconut, oil-babyfood	0.020000	1.000	1.000
95001150	O Coffee, roasted bean	0.020000	1.000	1.000
95001160	O Coffee, instant	0.020000	1.000	1.000
95001280	O Cottonseed, oil	0.040000	1.000	1.000
95001281	O Cottonseed, oil-babyfood	0.040000	1.000	1.000
95001300	O Cranberry	0.040000	1.000	1.000
95001301	O Cranberry-babyfood	0.040000	1.000	1.000
95001310	O Cranberry, dried	0.040000	1.000	1.000
95001320	O Cranberry, juice	0.040000	1.100	1.000
95001321	O Cranberry, juice-babyfood	0.040000	1.100	1.000
95001410	O Date	0.100000	1.000	1.000
95001510	O Feijoa	0.300000	1.000	1.000
95001530	O Fig	0.100000	1.000	1.000
95001540	O Fig, dried	0.100000	1.000	1.000
95001750	O Grape	0.150000	1.000	1.000
95001760	O Grape, juice	0.150000	1.200	1.000
95001761	O Grape, juice-babyfood	0.150000	1.200	1.000
95001770	O Grape, leaves	0.150000	1.000	1.000
95001780	O Grape, raisin	0.150000	1.620	1.000
95001790	O Grape, wine and sherry	0.150000	1.000	1.000
95001830	O Guava	0.300000	1.000	1.000
95001831	O Guava-babyfood	0.300000	1.000	1.000
95001860	O Honey	0.020000	1.000	1.000
95001861	O Honey-babyfood	0.020000	1.000	1.000
95001880	O Hop	22.000000	1.000	1.000
95001920	O Jaboticaba	0.300000	1.000	1.000
95001930	O Jackfruit	0.020000	1.000	1.000
95001950	O Kiwifruit	0.020000	1.000	1.000
95002090	O Longan	0.300000	1.000	1.000
95002110	O Lychee	0.300000	1.000	2.000
95002120	O Lychee, dried	0.300000	1.850	1.000
95002140	O Mamey apple	0.020000	1.000	1.000
95002150	O Mango	0.300000	1.000	1.000
95002151	O Mango-babyfood	0.300000	1.000	1.000
95002160	O Mango, dried	0.300000	1.000	1.000
95002170	O Mango, juice	0.300000	1.000	1.000
95002171	O Mango, juice-babyfood	0.300000	1.000	1.000
95002180	O Maple, sugar	0.020000	1.000	1.000
95002190	O Maple syrup	0.020000	1.000	1.000
95002270	O Mulberry	0.020000	1.000	1.000
95002280	O Mushroom	0.020000	1.000	1.000
95002350	O Olive	0.020000	1.000	1.000
95002360	O Olive, oil	0.020000	1.000	1.000
95002430	O Palm heart, leaves	0.020000	1.000	1.000
95002440	O Palm, oil	0.020000	1.000	1.000
95002441	O Palm, oil-babyfood	0.020000	1.000	1.000
95002450	O Papaya	0.300000	1.000	1.000
95002451	O Papaya-babyfood	0.300000	1.000	1.000
95002460	O Papaya, dried	0.300000	1.800	1.000
95002470	O Papaya, juice	0.300000	1.500	1.000
95002520	O Passionfruit	0.300000	1.000	1.000
95002521	O Passionfruit-babyfood	0.300000	1.000	1.000
95002530	O Passionfruit, juice	0.300000	1.000	1.000
95002531	O Passionfruit, juice-babyfood	0.300000	1.000	1.000
95002540	O Pawpaw	0.020000	1.000	1.000
95002630	O Peanut	0.040000	1.000	1.000
95002640	O Peanut, butter	0.040000	1.890	1.000
95002650	O Peanut, oil	0.040000	1.000	1.000
95002750	O Peppermint	3.500000	1.000	1.000
95002760	O Peppermint, oil	3.500000	1.000	1.000
95002770	O Persimmon	0.020000	1.000	1.000
95002780	O Pine nut	0.020000	1.000	1.000
95002790	O Pineapple	0.040000	1.000	1.000
95002791	O Pineapple-babyfood	0.040000	1.000	1.000

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95002800	O	Pineapple, dried	0.040000	5.000	1.000
95002810	O	Pineapple, juice	0.040000	1.700	1.000
95002811	O	Pineapple, juice-babyfood	0.040000	1.700	1.000
95002830	O	Plantain	0.084000	1.000	1.000
95002840	O	Plantain, dried	0.084000	3.900	1.000
95002890	O	Pomegranate	0.300000	1.000	1.000
95003060	O	Psyllium, seed	0.020000	1.000	1.000
95003110	O	Quinoa, grain	0.020000	1.000	1.000
95003330	O	Sapote, Mamey	0.300000	1.000	1.000
95003350	O	Seaweed	0.020000	1.000	1.000
95003351	O	Seaweed-babyfood	0.020000	1.000	1.000
95003360	O	Sesame, seed	0.020000	1.000	1.000
95003361	O	Sesame, seed-babyfood	0.020000	1.000	1.000
95003370	O	Sesame, oil	0.020000	1.000	1.000
95003371	O	Sesame, oil-babyfood	0.020000	1.000	1.000
95003460	O	Soursop	0.300000	1.000	1.000
95003510	O	Spanish lime	0.300000	1.000	1.000
95003520	O	Spearmint	3.500000	1.000	1.000
95003530	O	Spearmint, oil	3.500000	1.000	1.000
95003580	O	Starfruit	0.300000	1.000	1.000
95003590	O	Strawberry	0.252000	1.000	1.000
95003591	O	Strawberry-babyfood	0.252000	1.000	1.000
95003600	O	Strawberry, juice	0.252000	1.000	1.000
95003601	O	Strawberry, juice-babyfood	0.252000	1.000	1.000
95003610	O	Sugar apple	0.300000	1.000	1.000
95003620	O	Sugarcane, sugar	0.020000	1.000	1.000
95003621	O	Sugarcane, sugar-babyfood	0.020000	1.000	1.000
95003630	O	Sugarcane, molasses	0.020000	1.000	1.000
95003631	O	Sugarcane, molasses-babyfood	0.020000	1.000	1.000
95003680	O	Tamarind	0.020000	1.000	1.000
95003720	O	Tea, dried	0.020000	1.000	1.000
95003730	O	Tea, instant	0.020000	1.000	1.000
95003800	O	Tomato, Tree	0.020000	1.000	1.000
95003900	O	Vinegar	0.020000	1.000	1.000
95003980	O	Watercress	8.000000	1.000	1.000

Spinetoram and Spinosad

Dietary Exposure and Risk Assessment

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Attachment 5: DEEM-FCID™ chronic exposure estimates.

U.S. Environmental Protection Agency Ver. 2.00
 DEEM-FCID Chronic analysis for SPINOSAD (1994-98 data)
 Residue file name: C:\Documents and Settings\tbloem\spinetoram\pet care
 RA\110003c.R98

Adjustment factor #2 NOT used.

Analysis Date 08-18-2010/09:50:26 Residue file dated: 08-18-2010/09:49:58/8

Reference dose (RfD, Chronic) = .0249 mg/kg bw/day

COMMENT 1: 10x interspecies; 10x intraspecies; 1x FQPA SF

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 Total exposure by population subgroup

Population Subgroup	Total Exposure	
	mg/kg body wt/day	Percent of Rfd
U.S. Population (total)	0.002430	9.8%
U.S. Population (spring season)	0.002527	10.2%
U.S. Population (summer season)	0.002475	9.9%
U.S. Population (autumn season)	0.002356	9.5%
U.S. Population (winter season)	0.002366	9.5%
Northeast region	0.002561	10.3%
Midwest region	0.002375	9.5%
Southern region	0.002210	8.9%
Western region	0.002722	10.9%
Hispanics	0.002662	10.7%
Non-hispanic whites	0.002324	9.3%
Non-hispanic blacks	0.002430	9.8%
Non-hisp/non-white/non-black	0.003624	14.6%
All infants (< 1 year)	0.003034	12.2%
Nursing infants	0.001498	6.0%
Non-nursing infants	0.003618	14.5%
Children 1-6 yrs	0.005111	20.5%
Children 7-12 yrs	0.002954	11.9%
Females 13-19 (not preg or nursing)	0.001668	6.7%
Females 20+ (not preg or nursing)	0.001824	7.3%
Females 13-50 yrs	0.001978	7.9%
Females 13+ (preg/not nursing)	0.002014	8.1%
Females 13+ (nursing)	0.002253	9.0%
Males 13-19 yrs	0.002161	8.7%
Males 20+ yrs	0.002320	9.3%
Seniors 55+	0.001823	7.3%
Children 1-2 yrs	0.005915	23.8%
Children 3-5 yrs	0.004932	19.8%
Children 6-12 yrs	0.003119	12.5%
Youth 13-19 yrs	0.001922	7.7%
Adults 20-49 yrs	0.002184	8.8%
Adults 50+ yrs	0.001859	7.5%
Females 13-49 yrs	0.001848	7.4%



13544

R186267

Chemical Name: Spinosad
Spinectoram

PC Code: 110003

110008

HED File Code: 14000 Risk Reviews
Memo Date: 8/18/2010
File ID: 00000000
Accession #: 000-00-0136

HED Records Reference Center
10/20/2010