

US EPA ARCHIVE DOCUMENT



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

497E

OCT 13 1995
10/13/95

MEMORANDUM

SUBJECT: PP# 5F4534. **Imidacloprid on Canola.** DRES Dietary Exposure and Risk Estimates.

FROM: Brian Steinwand BA
Dietary Risk Evaluation Section
Science Analysis Branch/HED (7509C)

Through: Elizabeth Doyle, Section Head
Dietary Risk Evaluation Section
SAB/Health Effects Division

TO: D. Edwards, PM Team 19
Registration Division (7505C)

EA. Doyle
W. Edwards

Action Requested

Provide a dietary exposure analysis for the use of imidacloprid in/on canola. The petition requests that a tolerance of 0.05 ppm be established. CBTS recommends against these proposed permanent tolerances due to outstanding data deficiencies as listed in the memo of F. Griffith (9/25/95). CBTS however, has no objections to establishing these tolerances as time-limited with a one year expiration date (See memo, F. Griffith, 9/25/95).

Discussion

For the purposes of this analysis, the new use on barley was upgraded to pending status.

Toxicological Endpoint:

The Reference Dose (RfD) used in the analysis is 0.057 mg/kg bwt/day, based on a NOEL of 100 ppm (5.70 mg/kg bwt/day) from a two year rat feeding study with an uncertainty factor of 100 that demonstrated increased thyroid lesions in males as an endpoint. The HED RfD Peer Review Committee also classified imidacloprid as a Group E carcinogen (G. Ghali memo, 11/10/93).



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An acute dietary assessment is required by the Toxicology Endpoint Selection Document for imidacloprid (M. Ottley & K. Baetcke memo, 4/18/94). The endpoint for acute dietary risk assessment is 24 mg/kg/day from the rabbit developmental study. The LEL (72 mg/kg/day) was based upon decreased body weight, increased resorptions, abortions, and increased skeletal abnormalities.

Residue Information

The chronic exposure analysis used the existing DRES file, which incorporated only tolerances (Table 1). The 1977-78 USDA food consumption survey, which DRES estimates are based on, does not contain any consumption information estimates for canola/rape seed. BEAD (R. Griffin personal communication with R. Torla, 5/14/93) estimates 877 million pounds domestic canola production/usage for 1992/1993.

Based on the above and assuming a residue value of 1.0 ppm for rape seed (See memo, J. Wintersteen 10/17/94), DRES estimates exposure of 0.000077 mg/kg/day for the average (58.9 kg) U.S. person (See memo, Attachment A, J. Wintersteen 10/17/94). A consumption estimate based on sex, race, age, or other subgroups cannot be made from the above production/usage estimate.

Tolerances for imidacloprid are published in 40 CFR §180.472. There are no anticipated residues nor percent crop treated estimates. All uses assume 100 percent crop treated.

Results

A summary of the residue information considered in this analysis is attached as Table 1. A DRES chronic exposure analysis was performed using tolerance level residues and 100 percent crop treated information to estimate the Theoretical Maximum Residue Contribution (TMRC) for the general population and 22 subgroups. Summaries of the TMRCs and their representations as percentages of the Reference Dose (RfD) are included as Tables 2 & 3. Summaries of the acute dietary risk for the subgroup females(13+ years) are attached as Table 4.

Chronic Exposure Analysis

Exposure from Published Uses of imidacloprid:

<u>Subgroup</u>	<u>Exposure (mg/kg/day)</u>	<u>%RfD</u>
U.S. Population	0.008187	14.4
Children 1-6 years	0.016934	29.7

Proposed new Tolerances on canola:

U.S. Population	0.000077	1.5
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Granting this tolerance would increase the TMRC as a percentage of imidacloprid's RfD by 1.5% to 16% for the general population.

The chronic analysis for imidacloprid is a worst case estimate of dietary exposure with all residues at tolerance level and 100 percent of the commodities assumed to be treated with imidacloprid. Even without refinements, the chronic dietary risk from exposure to imidacloprid appears to be minimal for this petition on canola at 0.05 ppm.

Acute Exposure:

The endpoint for acute dietary risk assessment is the NOEL (24 mg/kg/day) from the rabbit developmental toxicity study. The LEL (72 mg/kg/day) was based upon decreased body weight, and increased resorptions, abortion and increased skeletal abnormalities. Because the effects of concern are developmental in nature, the only subgroup of concern is females (13+ years old).

Generally, acute dietary margins of exposure greater than 100 tend to cause no dietary concern. In the case of canola, its contribution to the acute dietary risk cannot be calculated due to the lack of consumption data for this commodity. The acute dietary risk for the existing tolerances of imidacloprid for which there is consumption data results in a MOE of 480, which demonstrates no concern for females of child-bearing age considering the existing tolerances. DRES concludes that the risk of consuming canola at the proposed tolerance would not add significantly to the total exposure.

Attachments

cc: DRES; Caswell 497E; RCAB; CBTS (F. Griffith); Tox I

TABLE !

CHEMICAL Imidacloprid CASwell #497E CAS No. 105827-78-9 A.I. CODE: 129099 CFR No. 2.10	STUDY TYPE 2yr feeding- rat NOEL= 5.7000 mg/kg 100.00 ppm LEL= 16.9000 mg/kg 300.00 ppm ONCO: E (RfD/PR Committee)	EFFECTS Increased incidence of mineralized particles in thyroid colloid. No evidence of carcinogenicity in rats or mice.	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
			ADI UF -->100 OPP RfD= 0.057000 EPA RfD= 0.000000	No data gaps.	RfD/PR reviewed 04/22/93

FOOD CODE	FOOD NAME	PETITION NUMBER	NEW	TOLERANCE (PPM)		PUBLISHED
				PENDING	PUBLISHED	
01013AA	GRAPES-FRESH	3F4231			1.000000	
01014DA	GRAPES-RAISINS	3F4231			1.000000	
01014JA	GRAPES-JUICE	3F4231			1.000000	
04001AA	APPLES-FRESH	3F4169			0.500000	
04001DA	APPLES-DRIED	3F4169			0.500000	
04001JA	APPLES-JUICE	3F4169			0.500000	
06007AA	MANGOES	4F4285			0.200000	
08020AA	HOPS	5E4425			6.000000	
11001AA	EGGPLANT	3F4231			1.000000	
11003AA	PEPPERS,SWEET,GARDEN	3F4231			1.000000	
11003AB	CHILI PEPPERS	3F4231			1.000000	
11003AD	PEPPERS-OTHER	3F4231			1.000000	
11004AA	PIMIENTOS	3F4231			1.000000	
11005AA	TOMATOES-WHOLE	3F4231			1.000000	
11005JA	TOMATOES-JUICE	3F4231			1.000000	
11005RA	TOMATOES-PUREE	3F4231			1.000000	
11005TA	TOMATOES-PASTE	3F4231			1.000000	
11005UA	TOMATOES-CATSUP	3F4231			1.000000	
13005AA	BROCCOLI	3F4231			3.000000	
13006AA	BRUSSEL SPROUTS	3F4231			6.000000	
13007AA	CABBAGE-GREEN AND RED	3F4231			1.000000	
13008AA	CAULIFLOWER	3F4231			3.500000	
13009AA	COLLARDS	3F4231			3.500000	
13010AA	CABBAGE-CHINESE/CELERY, INC. BOK CHOY	3F4231			3.500000	
13011AA	KALE	3F4231			3.500000	
13012AA	KOHLRABI	3F4231			3.500000	
13013AA	LETTUCE-LEAFY VARIETIES	3F4231			3.500000	
13020AA	LETTUCE-UNSPECIFIED	3F4231			3.500000	
13021AA	MUSTARD GREENS	3F4231			3.500000	
13045AA	LETTUCE-HEAD VARIETIES	3F4231			3.500000	
14013AA	POTATOES(WHITE)-WHOLE	3F4169			0.300000	
14013AB	POTATOES(WHITE)-UNSPECIFIED	3F4169			0.300000	
14013AC	POTATOES(WHITE)-PEELED	3F4169			0.300000	
14013DA	POTATOES(WHITE)-DRY	3F4169			0.300000	
14013HA	POTATOES(WHITE)-PEEL ONLY	3F4169			0.300000	
24001AA	BARLEY	4F4337		0.050000		
24006AA	SORGHUM (INCLUDING MILO)	4F4337			0.050000	
24007AA	WHEAT-ROUGH	4F4337			0.050000	
24007GA	WHEAT-GERM	4F4337			0.050000	
24007HA	WHEAT-BRAN	4F4337			0.050000	

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
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FOOD CODE	FOOD NAME	PETITION NUMBER	NEW	TOLERANCE (PPM)	
				PENDING	PUBLISHED
24007MA	WHEAT-FLOUR	4F4337			0.050000
25002SA	BEEF SUGAR	4F4337			0.050000
27003OA	COTTONSEED-OIL	4F4169			6.000000
27003WA	COTTONSEED-MEAL	4F4169			9.000000
27017AA	RAPE SEED	5F4534	0.050000		
43058AA	WINE AND SHERRY	3F4231			1.000000
50000DB	MILK-NON-FAT SOLIDS	4F4169			0.100000
50000FA	MILK-FAT SOLIDS	4F4169			0.100000
50000SA	MILK SUGAR (LACTOSE)	4F4169			0.300000
53001BA	BEEF-MEAT BYPRODUCTS	4F4169			0.300000
53001BB	BEEFORGAN MEATS)-OTHER	4F4169			0.300000
53001DA	BEEF-DRIED	4F4169			0.300000
53001FA	BEEF(BONELESS)-FAT (BEEF TALLOW)	4F4169			0.300000
53001KA	BEEFORGAN MEATS)-KIDNEY	4F4169			0.300000
53001LA	BEEFORGAN MEATS)-LIVER	4F4169			0.300000
53001MA	BEEF(BONELESS)-LEAN (W/O REMOVEABLE FAT)	4F4169			0.300000
53002BA	GOAT-MEAT BYPRODUCTS	4F4169			0.300000
53002BB	GOAT(ORGAN MEATS)-OTHER	4F4169			0.300000
53002FA	GOAT(BONELESS)-FAT	4F4169			0.300000
53002KA	GOAT(ORGAN MEATS)-KIDNEY	4F4169			0.300000
53002LA	GOAT(ORGAN MEATS)-LIVER	4F4169			0.300000
53002MA	GOAT(BONELESS)-LEAN (W/O REMOVEABLE FAT)	4F4169			0.300000
53003AA	HORSE	4F4169			0.300000
53005BA	SHEEP-MEAT BYPRODUCTS	4F4169			0.300000
53005BB	SHEEP(ORGAN MEATS)-OTHER	4F4169			0.300000
53005FA	SHEEP(BONELESS)-FAT	4F4169			0.300000
53005KA	SHEEP(ORGAN MEATS)-KIDNEY	4F4169			0.300000
53005LA	SHEEP(ORGAN MEATS)-LIVER	4F4169			0.300000
53005MA	SHEEP(BONELESS)-LEAN (W/O REMOVEABLE FAT)	4F4169			0.300000
53006BA	PORK-MEAT BYPRODUCTS	4F4169			0.300000
53006BB	PORK(ORGAN MEATS)-OTHER	4F4169			0.300000
53006FA	PORK(BONELESS)-FAT (INCLUDING LARD)	4F4169			0.300000
53006KA	PORK(ORGAN MEATS)-KIDNEY	4F4169			0.300000
53006LA	PORK(ORGAN MEATS)-LIVER	4F4169			0.300000
53006MA	TURKEY-BYPRODUCTS	3F4231			0.050000
55008BA	TURKEY-GIBLETS (LIVER)	3F4231			0.050000
55008LA	TURKEY-FLESH(W/O SKIN, W/O BONES)	3F4231			0.050000
55008MA	TURKEY-FLESH(+SKIN,W/O BONES)	3F4231			0.050000
55008MB	TURKEY-UNSPECIFIED	3F4231			0.050000
55008MC					

CHEMICAL	STUDY TYPE	EFFECTS	REFERENCE DOSES	DATA GAPS/COMMENTS	STATUS
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FOOD CODE	FOOD NAME	PETITION NUMBER	TOLERANCE (PPM)	
			NEW	PUBLISHED
55013BA	POULTRY, OTHER-BYPRODUCTS	3F4231		0.050000
55013LA	POULTRY, OTHER-GIBLETS(LIVER)	3F4231		0.050000
55013MA	POULTRY, OTHER-FLESH (+SKIN, W/O BONES)	3F4231		0.050000
55014AA	EGGS-WHOLE	3F4231		0.020000
55014AB	EGGS-WHITE ONLY	3F4231		0.020000
55014AC	EGGS-YOLK ONLY	3F4231		0.050000
55015BA	CHICKEN-BYPRODUCTS	3F4231		0.050000
55015LA	CHICKEN-GIBLETS(LIVER)	3F4231		0.050000
55015MA	CHICKEN-FLESH(W/O SKIN, W/O BONES)	3F4231		0.050000
55015MB	CHICKEN-FLESH(+SKIN, W/O BONES)	3F4231		0.050000

TABLE 2

TOLERANCE ASSESSMENT SYSTEM ROUTINE CHRONIC ANALYSIS

CHEMICAL INFORMATION	STUDY TYPE	EFFECTS	REFERENCE DOSES		DATA GAPS/COMMENTS	STATUS
			ADI	UF		
Imidacloprid Caswell #497E CAS No. 105827-78-9 A.I. CODE: 129099 CFR No.	2yr feeding- rat NOEL= 5.7000 mg/kg 100.00 ppm LEL= 16.9000 mg/kg 300.00 ppm ONCO: E (Rfd/PR Committee)	Increased incidence of mineralized particles in thyroid colloid. No evidence of carcinogenicity in rats or mice.	OPP Rfd= 0.057000 EPA Rfd= 0.000000	-->100	No data gaps.	Rfd/PR reviewed 04/22/93

POPULATION SUBGROUP	TOTAL TMRC (MG/KG BODY WEIGHT/DAY)		NEW TMRC**	NEW TMRC AS PERCENT OF RFD	DIFFERENCE AS PERCENT OF RFD	EFFECT OF ANTICIPATED RESIDUES	
	CURRENT TMRC*	NEW TMRC**				ARC	%RFD
U.S. POPULATION - 48 STATES	0.008186	0.008189	14.367070	0.005026			
U.S. POPULATION - SPRING SEASON	0.007785	0.007789	13.664219	0.005458			
U.S. POPULATION - SUMMER SEASON	0.007825	0.007829	13.734228	0.005302			
U.S. POPULATION - FALL SEASON	0.008559	0.008562	15.020233	0.004754			
U.S. POPULATION - WINTER SEASON	0.008555	0.008558	15.013537	0.004591			
NORTHEAST REGION	0.008515	0.008519	14.946072	0.006981			
NORTH CENTRAL REGION	0.008392	0.008395	14.728439	0.004826			
SOUTHERN REGION	0.007376	0.007378	12.943365	0.003167			
WESTERN REGION	0.008818	0.008822	15.476839	0.005909			
HISPANICS	0.008620	0.008623	15.127812	0.004419			
NON-HISPANIC WHITES	0.008311	0.008314	14.586258	0.005481			
NON-HISPANIC BLACKS	0.007079	0.007081	12.422396	0.002333			
NON-HISPANIC OTHERS	0.008668	0.008671	15.212726	0.005467			
NURSING INFANTS (< 1 YEAR OLD)	0.005513	0.005516	9.677642	0.006542			
NON-NURSING INFANTS (< 1 YEAR OLD)	0.014817	0.014824	26.007509	0.012239			
FEMALES (13+ YEARS, PREGNANT)	0.006778	0.006779	11.892402	0.000846			
FEMALES 13+ YEARS, NURSING CHILDREN (1-6 YEARS OLD)	0.007715	0.007717	13.538268	0.003321			
CHILDREN (7-12 YEARS OLD)	0.016933	0.016934	29.708784	0.000996			
MALES (13-19 YEARS OLD)	0.012548	0.012548	22.014528	0.000621			
FEMALES (13-19 YEARS OLD, NOT PREG. OR NURSING)	0.008499	0.008501	14.913198	0.002904			
MALES (20 YEARS AND OLDER)	0.007187	0.007187	12.609547	0.001170			
FEMALES (20 YEARS AND OLDER, NOT PREG. OR NURS)	0.006255	0.006263	10.987288	0.012805			
	0.006056	0.006058	10.627449	0.002714			

*Current TMRC does not include new or pending tolerances.
 **New TMRC includes new, pending, and published tolerances.

TABLE 3

TOLERANCE ASSESSMENT SUMMARY FOR Imidacloprid
CASWELL #497E

DATE: 10/06/95

ANALYSIS FOR POPULATION SUB-GROUP: U.S. POPULATION - 48 STATES

EXISTING TOLERANCES (PUBLISHED ONLY)		
RESULT IN A TMRC OF:	0.008187	MG/KG/DAY
THE EXISTING TMRC IS EQUIVALENT TO:	14.362	% OF THE ADI.
NO NEW TOLERANCES ARE IN THE FILE.		
OTHER PENDING TOLERANCES EXCLUDING THE		
CURRENT NEW PETITION HAVE A TMRC OF:	0.000003	MG/KG/DAY
THIS TMRC WILL OCCUPY	0.005	% OF THE ADI.
IF ALL PENDING TOLERANCES (INCLUDING THE		
CURRENT NEW PETITION) ARE GRANTED		
THE RESULTANT TMRC WILL BE:	0.008190	MG/KG/DAY
THE TOTAL TMRC WILL OCCUPY	14.367	% OF THE ADI.

ANALYSIS FOR POPULATION SUB-GROUP: CHILDREN (1-6 YEARS OLD)

EXISTING TOLERANCES (PUBLISHED ONLY)		
RESULT IN A TMRC OF:	0.016934	MG/KG/DAY
THE EXISTING TMRC IS EQUIVALENT TO:	29.708	% OF THE ADI.
NO NEW TOLERANCES ARE IN THE FILE.		
OTHER PENDING TOLERANCES EXCLUDING THE		
CURRENT NEW PETITION HAVE A TMRC OF:	0.000001	MG/KG/DAY
THIS TMRC WILL OCCUPY	0.001	% OF THE ADI.
IF ALL PENDING TOLERANCES (INCLUDING THE		
CURRENT NEW PETITION) ARE GRANTED		
THE RESULTANT TMRC WILL BE:	0.016935	MG/KG/DAY
THE TOTAL TMRC WILL OCCUPY	29.709	% OF THE ADI.

TABLE 4

1 DETAILED ACUTE ANALYSIS INCLUDING AR'S: ALL STATISTICS BASED ON USERS' DAILY CONSUMPTION 15:12 Friday, October 6, 1995 43

 *NAME: IMIDACLOPRID *****
 *CASWELL NO: 497E CFR NO: CFR A *****
 *CAS NO: 12909-90-0 SHAUGHNESSY NO: 129099 B *****
 *STATUS CODES: C *****
 *RDV INFO: The LD value used in this analysis is 0.01 MG/KG of BODY WEIGHT/DAY *****
 *FILE INFO: No Tolerance Data Are Used--Without User Modifications. *****
 ***** AR DATA: No User Modifications *****
 - FEMALES (13+ YRS) *****

ESTIMATED % OF POTENTIAL		MEAN DAILY RESIDUE CONTRIBUTION PER USER-DAY														
PERSON DAYS THAT ARE USER-DAYS	MG/KG BODY WEIGHT/DAY	AS PERCENT OF RDV														
0.00	0.000000	0.00														
99.85	0.006367	63.67														
ESTIMATED % OF POPULATION USER-DAYS WITH RESIDUE CONTRIBUTION EXCEEDING X TIMES THE RDV, FOR X=																
0	.2	.4	.6	.8	1	1.2	1.4	1.6	1.8	2	3	4	5	10	15	20
100	73	49	34	24	18	14	11	9	7	6	2	1	0	0	0	0

TOLERANCES:
 ANTICIPATED RESIDUES:

Exposure = RDV x X
 = 0.01 x 5
 High End Exposure = 0.05
 MOE = NOEL + Exposure
 = 24 mg/kg/day + 0.05 mg/kg/day
 MOE = 480
 Mean MOE = NOEL + Mean
 = 24 + 0.006337
 = >3,700