UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

MEMORANDUM

DATE: 6/16/99

SUBJECT: Chronic Dietary Exposure Analysis for the Proposed use of Azoxystrobin on Pistachio Nuts and the Tree Nuts Crop Group

PP#:	7F4864
DP Barcode #:	D256300
Chemical No.:	128810
40 CFR:	180.507
Class:	Fungicide
Trade Names:	Heritage Fungicide (EPA Reg. No. 10182-408) ICIA5504 80WG Fungicide (Reg. No. 10182-416) Abound Flowable Fungicide (Reg. No. 10182-415)

TO: J. Bazuin/C. Gyles-Parker, PM Team 22
MUIERB/RD (7505C)

FROM: Douglas Dotson, Chemist
RAB2/HED (7509C)

THROUGH: D. Hrdy, Dietary Exposure SAC Reviewer
C. Christensen, Dietary Exposure SAC Reviewer
Donna Davis, Branch Chief (RAB2/HED, 7509C)

Action Requested

Provide a chronic dietary exposure analysis for the proposed tolerance increase for azoxystrobin residues on pistachio nuts and the tree nuts crop group. A tolerance of 0.01 ppm was recently established in conjunction with tolerance petition #7F4864. The registrant is requesting that this tolerance be increased to 0.02 ppm. Therefore a value of 0.02 ppm was used for pistachios and tree nuts in this analysis. The most recent DEEM™ analysis for azoxystrobin was performed on

5/12/99 when a time-limited tolerance was recommended for azoxystrobin residues on parsley in California (Memo, D. Dotson, 5/14/99, D255978).

Executive Summary

The Tier 1 chronic dietary analysis for azoxystrobin is a conservative estimate of dietary exposure with tolerance level residues and 100% crop treated. The risk from chronic dietary exposure to azoxystrobin as represented by the %PAD is below HED's level of concern for the U.S. population and all of the population subgroups. Increasing the tolerance for tree nuts and pistachio nuts from 0.01 to 0.02 ppm had a negligible effect on exposure for the U.S. population and all population subgroups.

Toxicological Information

Chronic Toxicity: RfD=0.18 mg/kg/day. The RfD was established based on a chronic toxicity study (MRID#43678139) in rats with a NOAEL of 18.2 mg/kg/day. Reduced body weights and bile duct lesions were observed at the LOAEL of 34 mg/kg/day. An uncertainty factor of 100 was used to account for both the inter-species extrapolation and the intra-species variability (see Memo, RfD Committee, 11/7/96). On this basis, the RfD was calculated to be 0.18 mg/kg/day.
Acute Toxicity: No acute endpoint was identified by the TES (Toxicology Endpoint Selection) Committee 12/10/96.
Cancer Risk: The HED RfD/Peer Review Committee determined that azoxystrobin should be classified as "Not Likely" to be a human carcinogen according to the proposed revised Cancer Guidelines (See TES Document, 12/10/96).
FQPA Safety Factor: The HED FQPA Safety Factor Committee met on August 24, 1998. The committee recommended that the 10 fold safety factor be removed (i.e., set to 1). Thus, the RfD is equivalent to the population adjusted dose (PAD).

Residue Information

Tolerances for azoxystrobin (including time-limited tolerances) are published in 40 CFR §180.507. Azoxystrobin is a reduced risk fungicide which has been registered on numerous commodities in the past year. Two risk assessments associated with Section 3 registrations have recently been prepared for azoxystrobin. The first risk assessment included the following commodities: cucurbits, bananas, potatoes, and stone fruit (Memo, D. Dotson, D248886, 10/27/98). The second risk assessment included peanut hay, pistachios, rice, tree nuts, wheat, and canola (Memo, D. Dotson, D248888, 1/28/99). The tolerances for these commodities have not as yet been published in 40 CFR, however they can be found in the respective risk assessments. The time-limited tolerance for Brassica leafy vegetables and turnip tops (a recent

Section 18) is 25 ppm. The time-limited tolerance for parsley (the most recent Section 18) is 20 ppm.

For this analysis, tolerance level residues and 100 percent crop treated assumptions were made for pistachio nuts, tree nuts, and all other commodities. Processing studies show that residues do not concentrate in the following foods: grapes-raisins, plums-prunes (dried), potatoes-white (dry), grapes-juice, tomatoes-juice, and tomatoes-puree. As a result, DEEM™ default processing factors (adjustment factors #1) were removed (i.e., set to 1) for these commodities. In addition, the concentration factor for grapes-juice-concentrate was changed from 3.6 to 3.0 to preserve the concentration ratio from juice to concentrate.

A DEEM™ analysis was performed on 1/22/99 in conjunction with a request for tolerances on canola, peanut hay, pistachios, rice, tree nuts, and wheat. In that action, permanent tolerances were proposed on commodities which already had time-limited tolerances in place. For a discussion of the tolerances used in the DEEM™ analysis see Memo (D. Dotson, 1/22/99, D251712).

Results

A summary of the residue information considered in this analysis is included as Attachment 1. A DEEM™ (Dietary Exposure Evaluation Model) chronic dietary exposure analysis was performed using tolerance level residues and 100 percent crop treated data to estimate the theoretical maximum residue contribution (TMRC) for the U.S. population and 26 subgroups. The DEEM™ analysis evaluated the individual food consumption as reported by respondents in the USDA 1989-1991 nationwide Continuing Surveys of Food Intake by Individuals, and accumulated exposure to the chemical for each commodity. The chronic DEEM™ analysis used mean consumption (3 day average) data and gave the following results for the U.S. Population (total), the infants/children subgroup with the highest TMRC (Children 1-6 years), and the female subgroup with the highest TMRC (females 13+ (nursing)). The complete analysis is included as Attachment 2.

Chronic Dietary Exposure Summary		
Subgroup	Exposure (mg/kg/day)	% PAD
U.S. Population (total)	0.0121	6.7
Children 1-6 years	0.0216	12.0
Females 13+ (nursing)	0.0141	7.8

As the FQPA 10x safety factor was removed, the %RfD is equal to the %PAD and the level of concern for chronic dietary risk is 100%.

Discussion

The Tier 1 chronic dietary analysis for azoxystrobin is a conservative estimate of dietary exposure with tolerance level residues and 100% crop treated. The risk from chronic dietary exposure to azoxystrobin as represented by the %PAD is below HED's level of concern for the U.S. population and all population subgroups. Increasing the tolerance for pistachios and tree nuts from 0.01 to 0.02 ppm had a negligible effect on exposure for all of the listed groups. The TMRC remained the same to 4 significant figures in all groups except one (Males 20+ years). In this group the TMRC was the same to 3 significant figures. As a result, the %RfD values did not change. The DEEM™ software reports these values to either 2 or 3 significant figures. For the purposes of comparison, the Dietary Exposure Summary Table for the most recent addition to the commodity residue list (parsley) is found in Attachment 3.

Attachments: 1. DEEM89N Chronic Analysis for Azoxystrobin Commodity Residue List
2. Dietary Exposure Summary for Increase of Pistachio and Tree Nuts Tolerance
3. Dietary Exposure Summary for Most Recent Addition to Commodity Residue List (Parsley)

cc: D. Dotson, L. Richardson (CEB1)
RDI: Dietary Exposure SAC (C. Christensen and S. Chun) 5/26/99

Attachment 1: Commodity Residue List

Chemical name: Azoxystrobin Filename: C:\deem89\resdata\azoxy10.R96

RfD(Chronic): .18 mg/kg bw/day NOEL(Chronic): 18.2 mg/kg bw/day
RfD(Acute): 0 mg/kg bw/day NOEL(Acute): 0 mg/kg bw/day
Date created/last modified: 05-27-1999/09:56:47/8 Program ver. 6.77

Food Code	Crop Grp	Food Name	RESIDUE (ppm)	RDF #	Adj.Factors #1	Adj.Factors #2	Comment
40	14	Almonds	0.020000	0	1.000	1.000	7F4864
410	12	Apricot juice	1.500000	0	1.000	1.000	8F4995
59	12	Apricots	1.500000	0	1.000	1.000	8F4995
60	12	Apricots-dried	1.500000	0	6.000	1.000	8F4995
497	9B	Balsam pear	1.000000	0	1.000	1.000	exp 6/30/99 (7F4864: 0.30 ppm)
72	0	Bananas	0.100000	0	1.000	1.000	8F4995
73	0	Bananas-dried	0.100000	0	3.900	1.000	8F4995
378	0	Bananas-juice	0.100000	0	1.000	1.000	8F4995
51	14	Beech-nuts	0.020000	0	1.000	1.000	7F4864
323	M	Beef-dried	0.010000	0	1.920	1.000	7F4864
324	M	Beef-fat w/o bones	0.010000	0	1.000	1.000	7F4864
325	M	Beef-kidney	0.010000	0	1.000	1.000	7F4864
327	M	Beef-lean (fat/free) w/o bones	0.010000	0	1.000	1.000	7F4864
326	M	Beef-liver	0.010000	0	1.000	1.000	7F4864
321	M	Beef-meat byproducts	0.010000	0	1.000	1.000	7F4864
322	M	Beef-other organ meats	0.010000	0	1.000	1.000	7F4864
152	9B	Bitter melon	1.000000	0	1.000	1.000	exp 6/30/99 (7F4864: 0.30 ppm)
452	5B	Bok choy	25.000000	0	1.000	1.000	99GA0009
41	14	Brazil nuts	0.020000	0	1.000	1.000	7F4864
168	5A	Broccoli	25.000000	0	1.000	1.000	99GA0009
451	5A	Broccoli-chinese	25.000000	0	1.000	1.000	99GA0009
169	5A	Brussels sprouts	25.000000	0	1.000	1.000	99GA0009
49	14	Butter nuts	0.020000	0	1.000	1.000	7F4864
170	5A	Cabbage-green and red	25.000000	0	1.000	1.000	99GA0009
383	5B	Cabbage-savoy	25.000000	0	1.000	1.000	99GA0009
301	0	Canola oil (rape seed oil)	1.000000	0	1.000	1.000	8F4995
143	9A	Casabas	1.000000	0	1.000	1.000	exp 6/30/99 (7F4864: 0.30 ppm)
42	14	Cashews	0.020000	0	1.000	1.000	7F4864
171	5A	Cauliflower	25.000000	0	1.000	1.000	99GA0009
61	12	Cherries	1.500000	0	1.000	1.000	7F4864
62	12	Cherries-dried	1.500000	0	4.000	1.000	7F4864
63	12	Cherries-juice	1.500000	0	1.500	1.000	7F4864
43	14	Chestnuts	0.020000	0	1.000	1.000	7F4864
386	9B	Christophine	1.000000	0	1.000	1.000	exp 6/30/99 (7F4864: 0.30 ppm)
172	5B	Collards	25.000000	0	1.000	1.000	99GA0009
144	9A	Crenshaws	1.000000	0	1.000	1.000	exp 6/30/99 (7F4864: 0.30 ppm)
148	9B	Cucumbers	1.000000	0	1.000	1.000	exp 6/30/99 (7F4864: 0.30 ppm)
44	14	Filberts (hazelnuts)	0.020000	0	1.000	1.000	7F4864
330	M	Goat-fat w/o bone	0.010000	0	1.000	1.000	7F4864
331	M	Goat-kidney	0.010000	0	1.000	1.000	7F4864
333	M	Goat-lean (fat/free) w/o bone	0.010000	0	1.000	1.000	7F4864
332	M	Goat-liver	0.010000	0	1.000	1.000	7F4864
328	M	Goat-meat byproducts	0.010000	0	1.000	1.000	7F4864
329	M	Goat-other organ meats	0.010000	0	1.000	1.000	7F4864
13	0	Grapes	1.000000	0	1.000	1.000	5F4541
15	0	Grapes-juice	1.000000	0	1.000	1.000	5F4541
392	0	Grapes-juice-concentrate	1.000000	0	3.000	1.000	5F4541
195	0	Grapes-leaves	1.000000	0	1.000	1.000	5F4541
14	0	Grapes-raisins	1.000000	0	1.000	1.000	5F4541
315	0	Grapes-wine and sherry	1.000000	0	1.000	1.000	5F4541
45	14	Hickory nuts	0.020000	0	1.000	1.000	7F4864
334	M	Horsemeat	0.010000	0	1.000	1.000	7F4864
174	5B	Kale	25.000000	0	1.000	1.000	99GA0009
175	5A	Kohlrabi	25.000000	0	1.000	1.000	99GA0009
182	4A	Lettuce-unspecified	20.000000	0	1.000	1.000	99CA0009
176	4A	Lettuce-leafy varieties	20.000000	0	1.000	1.000	99CA0009

192	4A	Lettuce-head varieties	6.000000	0	1.000	1.000	99CA0009
46	14	Macadamia nuts (bush nuts)	0.020000	0	1.000	1.000	7F4864
141	9A	Melons-cantaloupes-juice	1.000000	0	1.000	1.000	7F4864
142	9A	Melons-cantaloupes-pulp	1.000000	0	1.000	1.000	7F4864
145	9A	Melons-honeydew	1.000000	0	1.000	1.000	7F4864
146	9A	Melons-persian	1.000000	0	1.000	1.000	exp 6/30/99 (7F4864: 0.30 ppm)
319	D	Milk-fat solids	0.006000	0	1.000	1.000	7F4864
318	D	Milk-nonfat solids	0.006000	0	1.000	1.000	7F4864
320	D	Milk sugar (lactose)	0.006000	0	1.000	1.000	7F4864
183	5B	Mustard greens	25.000000	0	1.000	1.000	99GA0009
64	12	Nectarines	1.500000	0	1.000	1.000	8F4995
184	4A	Parsley	20.000000	0	1.000	1.000	99CA0019: New
65	12	Peaches	1.500000	0	1.000	1.000	8F4995
66	12	Peaches-dried	1.500000	0	7.000	1.000	8F4995
402	12	Peaches-juice	1.500000	0	1.000	1.000	8F4995
403	O	Peanuts-butter	0.010000	0	1.890	1.000	6F4762
940	O	Peanuts-hulled	0.010000	0	1.000	1.000	6F4762
293	O	Peanuts-oil	0.030000	0	1.000	1.000	6F4762
47	14	Pecans	0.020000	0	1.000	1.000	6F4642
50	O	Pistachio nuts	0.020000	0	1.000	1.000	7F4864
480	O	Plantains-green	0.100000	0	1.000	1.000	8F4995
94	O	Plantains-ripe	0.100000	0	1.000	1.000	8F4995
481	O	Plantains-dried	0.100000	0	3.900	1.000	8F4995
67	12	Plums (damsons)	1.500000	0	1.000	1.000	8F4995
68	12	Plums-prunes (dried)	1.500000	0	1.000	1.000	8F4995
69	12	Plums/prune-juice	1.500000	0	1.400	1.000	8F4995
344	M	Pork-fat w/o bone	0.010000	0	1.000	1.000	7F4864
345	M	Pork-kidney	0.010000	0	1.000	1.000	7F4864
347	M	Pork-lean (fat free) w/o bone	0.010000	0	1.000	1.000	7F4864
346	M	Pork-liver	0.010000	0	1.000	1.000	7F4864
342	M	Pork-meat byproducts	0.010000	0	1.000	1.000	7F4864
343	M	Pork-other organ meats	0.010000	0	1.000	1.000	7F4864
210	1C	Potatoes/white-dry	0.030000	0	1.000	1.000	8F4995
209	1C	Potatoes/white-peeled	0.030000	0	1.000	1.000	8F4995
211	1C	Potatoes/white-peel only	0.030000	0	1.000	1.000	8F4995
208	1C	Potatoes/white-unspecified	0.030000	0	1.000	1.000	8F4995
207	1C	Potatoes/white-whole	0.030000	0	1.000	1.000	8F4995
149	9B	Pumpkin	1.000000	0	1.000	1.000	exp 6/30/99 (7F4864: 0.01 ppm)
408	15	Rice-bran	5.000000	0	1.000	1.000	7F4864
271	15	Rice-milled (white)	5.000000	0	1.000	1.000	7F4864
270	15	Rice-rough (brown)	5.000000	0	1.000	1.000	7F4864
338	M	Sheep-fat w/o bone	0.010000	0	1.000	1.000	7F4864
339	M	Sheep-kidney	0.010000	0	1.000	1.000	7F4864
341	M	Sheep-lean (fat free) w/o bone	0.010000	0	1.000	1.000	7F4864
340	M	Sheep-liver	0.010000	0	1.000	1.000	7F4864
336	M	Sheep-meat byproducts	0.010000	0	1.000	1.000	7F4864
337	M	Sheep-other organ meats	0.010000	0	1.000	1.000	7F4864
303	6A	Soybean-other	0.100000	0	1.000	1.000	98AR0012
307	6A	Soybeans-flour (defatted)	0.300000	0	1.000	1.000	98AR0012
306	6A	Soybeans-flour (low fat)	0.300000	0	1.000	1.000	98AR0012
305	6A	Soybeans-flour (full fat)	0.300000	0	1.000	1.000	98AR0012
304	6A	Soybeans-mature seeds dry	0.100000	0	1.000	1.000	98AR0012
297	6A	Soybeans-oil	2.000000	0	1.000	1.000	98AR0012
482	O	Soybeans-protein isolate	0.100000	0	1.000	1.000	98AR0012
255	6A	Soybeans-sprouted seeds	0.100000	0	0.330	1.000	98AR0012
186	4A	Spinach	30.000000	0	1.000	1.000	99DE0002 and 99MD0009
150	9B	Squash-summer	1.000000	0	1.000	1.000	exp 6/30/99 (7F4864: 0.30 ppm)
415	9B	Squash-spaghetti	1.000000	0	1.000	1.000	exp 6/30/99 (7F4864: 0.30 ppm)
151	9B	Squash-winter	1.000000	0	1.000	1.000	exp 6/30/99 (7F4864: 0.30 ppm)
17	O	Strawberries	10.000000	0	1.000	1.000	98FL0022
416	O	Strawberries-juice	10.000000	0	1.000	1.000	98FL0022
282	1A	Sugar-beet	0.700000	0	1.000	1.000	98MN0020
379	1A	Sugar-beet-molasses	0.700000	0	1.000	1.000	98MN0020
163	8	Tomatoes-catsup	0.600000	0	1.000	1.000	6F4762
423	8	Tomatoes-dried	0.200000	0	14.300	1.000	6F4762
160	8	Tomatoes-juice	0.200000	0	1.000	1.000	6F4762
162	8	Tomatoes-paste	0.600000	0	1.000	1.000	6F4762
161	8	Tomatoes-puree	0.200000	0	1.000	1.000	6F4762

159	8	Tomatoes-whole	0.200000	0	1.000	1.000	6F4762	
153	O	Towelgourd	1.000000	0	1.000	1.000	exp 6/30/99	(7F4864: 0.30 ppm)
188	2	Turnips-tops	25.000000	0	1.000	1.000	99GA0009	
429	M	Veal-dried	0.010000	0	1.920	1.000	7F4864	
424	M	Veal-fat w/o bones	0.010000	0	1.000	1.000	7F4864	
426	M	Veal-kidney	0.010000	0	1.000	1.000	7F4864	
425	M	Veal-lean (fat free) w/o bones	0.010000	0	1.000	1.000	7F4864	
427	M	Veal-liver	0.010000	0	1.000	1.000	7F4864	
430	M	Veal-meat byproducts	0.010000	0	1.000	1.000	7F4864	
428	M	Veal-other organ meats	0.010000	0	1.000	1.000	7F4864	
431	14	Walnut oil	0.020000	0	1.000	1.000	7F4864	
48	14	Walnuts	0.020000	0	1.000	1.000	7F4864	
189	O	Watercress	1.000000	0	1.000	1.000	exp 6/30/99	
147	9A	Watermelon	1.000000	0	1.000	1.000	exp 6/30/99	(7F4864: 0.30 ppm)
436	9A	Watermelon-juice	1.000000	0	1.000	1.000	exp 6/30/99	(7F4864: 0.30 ppm)
278	15	Wheat-bran	0.200000	0	1.000	1.000	7F4864	
279	15	Wheat-flour	0.100000	0	1.000	1.000	7F4864	
277	15	Wheat-germ	0.100000	0	1.000	1.000	7F4864	
437	15	Wheat-germ oil	0.100000	0	1.000	1.000	7F4864	
276	15	Wheat-rough	0.100000	0	1.000	1.000	7F4864	
439	9B	Wintermelon	1.000000	0	1.000	1.000	exp 6/30/99	(7F4864: 0.30 ppm)

Attachment 2: Dietary Exposure Summary

U.S. Environmental Protection Agency Ver. 6.76
DEEM Chronic analysis for AZOXYSTROBIN (1989-92 data)
Residue file name: C:\deem89\resdata\azoxy11.R96 Adjustment factor #2 NOT used.
Analysis Date 05-27-1999/10:04:19 Residue file dated: 05-27-1999/10:01:15/8
Reference dose (RfD, CHRONIC) = .18 mg/kg bw/day

Total exposure by population subgroup

Population Subgroup	Total Exposure mg/kg body wt/day	Total Exposure Percent of Rfd
U.S. Population (total)	0.012089	6.7%
U.S. Population (spring season)	0.012397	6.9%
U.S. Population (summer season)	0.012829	7.1%
U.S. Population (autumn season)	0.011291	6.3%
U.S. Population (winter season)	0.011827	6.6%
Northeast region	0.012991	7.2%
Midwest region	0.009943	5.5%
Southern region	0.012474	6.9%
Western region	0.013093	7.3%
Hispanics	0.010558	5.9%
Non-hispanic whites	0.011317	6.3%
Non-hispanic blacks	0.016263	9.0%
Non-hisp/non-white/non-black)	0.020795	11.6%
All infants (< 1 year)	0.014731	8.2%
Nursing infants	0.003874	2.2%
Non-nursing infants	0.019301	10.7%
Children 1-6 yrs	0.021642	12.0%
Children 7-12 yrs	0.012769	7.1%
Females 13-19(not preg or nursing)	0.009148	5.1%
Females 20+ (not preg or nursing)	0.012219	6.8%
Females 13-50 yrs	0.010635	5.9%
Females 13+ (preg/not nursing)	0.008730	4.9%
Females 13+ (nursing)	0.014126	7.8%
Males 13-19 yrs	0.008160	4.5%
Males 20+ yrs	0.009890	5.5%
Seniors 55+	0.013371	7.4%
Pacific Region	0.013994	7.8%

Attachment 3: Dietary Exposure Summary for Most Recent Addition to Commodity Residue List (Parsley)

U.S. Environmental Protection Agency Ver. 6.76
DEEM Chronic analysis for AZOXYSTROBIN (1989-92 data)
Residue file name: C:\deem89\resdata\azoxy10.R96 Adjustment factor #2 NOT used.
Analysis Date 05-27-1999/09:57:36 Residue file dated: 05-27-1999/09:56:47/8
Reference dose (RfD, CHRONIC) = .18 mg/kg bw/day

Total exposure by population subgroup

Population Subgroup	Total Exposure mg/kg body wt/day	Total Exposure Percent of Rfd
U.S. Population (total)	0.012089	6.7%
U.S. Population (spring season)	0.012397	6.9%
U.S. Population (summer season)	0.012829	7.1%
U.S. Population (autumn season)	0.011290	6.3%
U.S. Population (winter season)	0.011827	6.6%
Northeast region	0.012990	7.2%
Midwest region	0.009943	5.5%
Southern region	0.012474	6.9%
Western region	0.013093	7.3%
Hispanics	0.010558	5.9%
Non-hispanic whites	0.011317	6.3%
Non-hispanic blacks	0.016263	9.0%
Non-hisp/non-white/non-black)	0.020795	11.6%
All infants (< 1 year)	0.014731	8.2%
Nursing infants	0.003874	2.2%
Non-nursing infants	0.019301	10.7%
Children 1-6 yrs	0.021642	12.0%
Children 7-12 yrs	0.012769	7.1%
Females 13-19(not preg or nursing)	0.009148	5.1%
Females 20+ (not preg or nursing)	0.012219	6.8%
Females 13-50 yrs	0.010635	5.9%
Females 13+ (preg/not nursing)	0.008730	4.9%
Females 13+ (nursing)	0.014125	7.8%
Males 13-19 yrs	0.008160	4.5%
Males 20+ yrs	0.009889	5.5%
Seniors 55+	0.013371	7.4%
Pacific Region	0.013994	7.8%