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

**OFFICE OF**
**PREVENTION, PESTICIDES AND**
**TOXIC SUBSTANCES**

PC Code 129098
DP Barcode D334948, D334950

# MEMORANDUM

**DATE:** February 7, 2007

**SUBJECT:** Tier I Estimated Drinking Waters Concentrations of Fluazinam and Total Residues for the Use in the Human Health Risk Assessment; IR4 Petition for the Use of Fluazinam on Edible-Podded Legume Vegetables (except peas), Bushberry (crop subgroup 13B), Brassica (Cole) Leafy Vegetables, Ginseng, and Dry, and Succulent Bean Crop Subgroup 6B (except peas)

**TO:** Shaja Brothers, Risk Manager Reviewer
Daniel Rosenblatt, Chief
Barbara Madden, Chief
Minor Use Branch
Registration Division (7505P)

**AND:** Kelly Schumacher
Cristina Swartz, Chief
Registration Action Branch II
Health Effects Division (7509P)

**FROM:** José Luis Meléndez, Chemist
Environmental Risk Branch V
Environmental Fate and Effects Division (7507P)

**THROUGH:** Mah T. Shamim, Ph.D., Chief
Environmental Risk Branch V
Environmental Fate and Effects Division (7507P)

This memo presents the Tier I Estimated Surface Drinking Water Concentrations and Estimated Ground Water Concentrations (EDWCs) for Fluazinam (CAS name 3-chloro-*N*-[3-chloro-2,6-dinitro-4-(trifluoromethyl)phenyl]-5-(trifluoromethyl)-2-pyridinamine, CAS no. 79622-59-6) and Fluazinam Total Residues (fluazinam plus its major transformation products), calculated using the Tier I aquatic models FIRST and SCI-GROW, respectively, for use in the human health risk assessment.

The Estimated Drinking Water Concentrations (EDWCs) for Fluazinam and Fluazinam Total Residues were calculated based on a maximum application rate of 3.90 lb a.i./A/season of fluazinam. In addition to the EDWC's for Fluazinam, EDWC's were calculated for Total

Fluazinam Residues because the environmental fate studies indicated that the parent compound forms transformation compounds which are similar in structure to the parent under most conditions.

For parent Fluazinam, the surface water acute value is 71.0 ppb, and the chronic value is 0.7 ppb. The groundwater screening concentration is 0.187 ppb of Fluazinam. These values represent upper-bound estimates of the concentrations of the chemical that might be found in surface water and groundwater due to the use of Fluazinam on bushberries at the maximum application rate of 3.90 lb a.i./A/season.

For Total Fluazinam Residues, the surface water acute value is 71.0 ppb and the chronic value is 17.7 ppb. The groundwater screening concentration is 0.187 ppb. These values represent upper-bound estimates of the concentrations of Total Residues of Fluazinam that might be found in surface water and groundwater due to the use of Fluazinam on bushberries at the maximum application rate of 3.90 lb a.i./A/season.

Should the results of this assessment indicate a need for further refinement, please, contact EFED as soon as possible so that we may schedule a Tier II assessment.

**Data Gaps:**
Additional data has been requested to upgrade the Photolysis in Water and Photodegradation on Soil data requirements. The additional information will refine the information about the quantitation of the parent and degradates. In addition, EFED believes that the available Terrestrial Field Dissipation Studies provide useful information about the parent fluazinam. However, poor recoveries for two of the transformation products upon storage stability cast doubts over the results obtained for them in the field. At this time, only one new study is required, on a typical site, with a concurrent storage stability study.

## EXECUTIVE SUMMARY

Fluazinam, CAS Name: 3-chloro-*N*-[3-chloro-2,6-dinitro-4-(trifluoromethyl)phenyl]-5-(trifluoromethyl)-2-pyridinamine, and IUPAC Name: 3-chloro-*N*-(3-chloro-5-trifluoromethyl-2-pyridyl)-α,α,α-trifluoro-2,6-dinitro-*p*-toluidine, has a CAS Number of 79622-59-61 and a PC Code of 129098. It is a pyridine (dinitroaniline) fungicide. The structure consists of one phenyl ring with two nitro groups, and a pyridine ring. Both rings have a trifluoromethyl group. The rings are attached by a nitrogen (amine).

Fluazinam is a new protectant and contact fungicide, a phenyl pyridinamine. It is an uncoupler of oxidative phosphorilation in the respiration chain involving protonation/deprotonation (it inhibits fungal respiration, and the production of energy within the fungus).

Fluazinam is currently used only on potatoes and peanuts. The product name is Omega 500F Agricultural Fungicide (EPA Reg. No. 71512-1). It contains 40.0% fluazinam. It is being proposed in a Section 3 (IR4) petition, for use on edible-podded legume vegetables (except peas), bushberry (crop subgroup 13B), brassica (cole) leafy vegetables, ginseng, and dry, and succulent bean crop Subgroup 6B (except peas). The application methods vary with the crops. For example, aerial applications are prohibited, but the material may be applied by sprinkler irrigation, or, for brassica leafy vegetables, it may be applied by soil incorporation prior to transplanting.

This is a Tier I screening assessment using Tier 1 aquatic models SCI-GROW and FIRST, and maximum application rates for fluazinam, with minimum application intervals. It was found that the worse case scenario was bushberry, with the highest application rate, and the highest PCA. In addition to the parent fluazinam, the total residues were modeled because fluazinam is transformed relatively rapidly into various transformation products that resemble the parent structure.

At this time, the persistence of fluazinam transformation products is uncertain because the information about these compounds from terrestrial field dissipation studies has been deemed invalid. The aquatic metabolism studies signal high persistence of such degradates. A new terrestrial field dissipation study has been required. In addition, the extent and importance of photolysis is not very clear because the supplemental data available is not quantitative. EFED requested additional data from such studies to clarify this point.

Table 1 provides a summary of the Tier I modeled drinking water concentrations. In addition to the EDWC's for Fluazinam, EDWC's were calculated for Total Fluazinam Residues because the environmental fate studies indicated that the parent compound forms transformation compounds which are similar in structure to the parent under most conditions. Should there be a need for additional refinements, the EFED can perform a Tier II aquatic assessment, for surface waters.

**Table 1. Maximum Tier I Estimated Drinking Water Concentrations (EDWCs) for drinking water assessment based on ground application of fluazinam.**

| DRINKING WATER SOURCE (MODEL USED) | USE (rate modeled) | MAXIMUM ESTIMATED DRINKING WATER CONCENTRATION (EDWC) ( ppb) | |
|---|---|---|---|
| Groundwater<br><br>(SCI-GROW) **Fluazinam and Total Residues of Fluazinam** | Bushberries (3.90 lb a.i./A) | Acute and Chronic | 0.187 |
| Surface Water<br><br>(FIRST) **Fluazinam** | Bushberries (3.90 lb a.i./A) | Acute | 71.0 |
| | Bushberries (3.90 lb a.i./A) | Chronic | 0.7 |
| Surface Water<br><br>(FIRST) **Total Residues of Fluazinam** | Bushberries (3.90 lb a.i./A) | Acute | 71.0 |
| | Bushberries (3.90 lb a.i./A) | Chronic | 17.7 |

## PROBLEM FORMULATION

*This is a Tier I drinking water assessment that uses modeling and available monitoring data to estimate the ground water and surface water concentrations of pesticides in drinking water source water (pre-treatment) resulting from pesticide use on sites that are highly vulnerable. This initial tier screens out chemicals with low potential risk and provides estimated exposure* *concentrations for the human health dietary risk assessment.*

**ANALYSIS**

**Use Characterization**

A summary table of all use patterns, new uses and modeled uses, is illustrated below (Table 2). The crop groups bolded are the proposed ones.

**Table 2. Summary use information for fluazinam, based on Omega 500F label (EPA Reg. No. 71512-1).**

| USE | SINGLE APP. RATE (lb. a.i./A) | NUMBER OF APPS. | SEASONAL APP. RATE (lb. a.i./A) | INTERVAL BETWEEN APPS. (days) | APP. METHOD | PHI (days) |
|---|---|---|---|---|---|---|
| Peanut | 0.78 | ~2.66 | 2.10 | 21 | Sprinkler irrigation | 0 |
| Potato | 0.26 | 7 | 1.82 | 7 | Sprinkler irrigation | 0 |
| **Crop Subgroup 6A, Edible-Podded Legume Vegetables except peas,** **such as, but not limited to: *Phaseolus spp.* Such as: runner bean, snap bean, wax bean; *Vigna spp.* Such as: asparagus bean, Chinese longbean, moth bean, yardlong bean; jackbean, and sword bean** | **0.44** | **2** | **0.91** | **7** | **Sprinkler irrigation** | **14** |
| **Dry Bean, and Succulent Bean Crop Subgroup 6B, except Peas** **(such as, but not limited to lima bean)** | **0.44** | **2** | **0.91** | **7** | **Sprinkler irrigation** | **30** |

| Table 2. Summary use information for fluazinam, based on Omega 500F label (EPA Reg. No. 71512-1). | | | | | | |
|---|---|---|---|---|---|---|
| USE | SINGLE APP. RATE (lb. a.i./A) | NUMBER OF APPS. | SEASONAL APP. RATE (lb. a.i./A) | INTERVAL BETWEEN APPS. (days) | APP. METHOD | PHI (days) |
| **Crop Subgroup 13B, Bushberry,** such as, but not limited to: Aronia berry, blueberry (highbush and lowbush), Chilean guava, currant (Buffalo, black, red, and Native), elderberry, European barberry, gooseberry, highbush cranberry, honeysuckle, huckleberry, jostaberry, juneberry, lingonberry, salal, and sea buckthorn | 0.65 | 6 | 3.90 | 7 | Sprinkler irrigation | 30 |
| **Crop Group 5, Brassica (Cole) Leafy Vegetables,** such as, but not limited to: broccoli; broccoli raab (rapini); Chinese cabbage (napa); cauliflower; collards, kale; mizuna; mustard spinach; turnip greens; Chinese broccoli; Brussels sprouts; Chinese cabbage (bok choy); Chinese mustard cabbage; cavalo broccoli; kohlrabi; mustard greens; rape greens | [Transplant 6.45 fl oz/100 gal or presumably 0.64 lb a.i./A]<br><br>Soil incorporation 1.36 at a soil depth of 6-8 in | 1 | 2.00 | N/A | Soil drench or soil incorporation | 20;<br><br>50 for heading vegetables such as cabbage and broccoli |
| **Ginseng** | 0.78 | 4 | 3.12 | 7 | Sprinkler irrigation | 30 |

The usual application method for fluazinam is sprinkler irrigation; however, it can be soil incorporated before transplant, for soils with low infiltration rates, for Crop Group 5, Brassica (Cole) Leafy Vegetables. Fluazinam may not be applied aerially.

The label specifies a buffer zone of 25 ft within aquatic areas (lakes, reservoirs, rivers, permanent streams, marshes or natural ponds, and estuaries) so as to allow growth of a vegetative filter strip.

The use pattern selected for modeling was bushberry. It has the maximum total application rate, and it is applied by sprinkler irrigation, which may cause more drift towards the standard pond than the soil incorporated brassica group 5, it also has the highest PCA (default, 87%). With six applications, at seven-day interval, it is likely that this scenarios will provide the highest chronic exposure as well.

## Fate and Transport Characterization

A detailed summary of physical/chemical and environmental fate/transport properties of the pesticide, including measured parameters, values, data sources, and comments, is included in Table 3.

**Table 3. Summary of physical/chemical and environmental fate and transport properties of <pesticide>. <EXAMPLE>**

| PARAMETER | VALUE(S) (units) | SOURCE | COMMENT |
|---|---|---|---|
| Chemical Name | 3-chloro-N-[3-chloro-2,6-dinitro-4-(trifluoromethyl)phenyl]-5-(trifluoromethyl)-2-pyridinamine | EPA Pesticide Fact Sheet | - |
| Molecular Weight | 465.1 | PMRA Regulatory Note REG2003-12, 10/27/03 | - |
| Solubility (20 °C) | 0.025 mg/L @ pH 5.5; 0.071 mg/L @ pH 7.0 | MRID: 42208403. | - |
| Vapor Pressure (20 °C) | $8.25 \times 10^{-6}$ mm Hg | MRID: 42248403. | - |
| Henry's Law constant | $1.81 \times 10^{-3}$ atm-$m^3$/mol | MRID: 46235701. | Estimated from vapor pressure and water solubility. |
| pKa (20 °C) | 7.22 in 50% ethanol-water | EPA Pesticide Fact Sheet | - |
| Octanol-Water Partition Coefficient ($K_{OW}$, at 20 °C) | 3620; log $P_{ow}$ = 3.56 | EPA Pesticide Fact Sheet | - |
| Hydrolysis Half-life (pH 5, 7, 9; (25 °C)) | pH 5 stable<br>pH 7 42 days<br>pH 9 6 days | MRID: 42208412. | Fluazinam + degradates: Stable at all pHs. |
| Aqueous Photolysis Half-life | $t_{1/2}$ = 2.5 days<br>dark control = stable | MRID: 44807312, 43521009(s). | One degradate was a tricyclic compound. |
| Soil Photolysis Half-life | $t_{1/2}$ = 35.0 days, value corrected for dark control | MRID: 44807313(s). | Degradates at ≤10% of the applied. |
| Aerobic Soil Metabolism Half-life | $t_{1/2}$ = 132 days | MRID: 42208413(c). | Degradates at ≤10% of the applied. |
| Anaerobic Aquatic Metabolism Half-life | ~⅓ day (or approximately 8 hours) | MRID: 43521010(c). | Fluazinam + degradates ~ stable |

| Table 3. Summary of physical/chemical and environmental fate and transport properties of <pesticide>. <EXAMPLE> | | | |
|---|---|---|---|
| **PARAMETER** | **VALUE(S) (units)** | **SOURCE** | **COMMENT** |
| Aerobic Aquatic Metabolism<br><br>Half-life | $t_{1/2}$ = 4.0-7.4 hours | MRID: 44807314(c). | Fluazinam + degradates = 51-71 days |
| FLUAZINAM Soil Partition Coefficient ($K_d$) | 11.12, 43.48, 27.19, 37.88 ml/g | MRID: 42248628, 42974913. | - |
| FLUAZINAM Soil Partition Coefficient ($K_{OC}$) | 2316, 1705, 1915, 1894 mL/g | MRID: 46235732. | - |
| AGED FLUAZINAM Column Leaching | 0.66%; >>80% remained in the top soil | MRID: 42208415. | - |
| HYPA Soil Partition Coefficient ($K_d$) | 14, 13, 26, 8.1, 4.3, 19 ml/g | MRID: 43528201. | - |
| HYPA Soil Partition Coefficient ($K_{OC}$) | 450, 700, 1700, 450, 920, 1300 mL/g | MRID: 43528201. | - |
| CAPA Soil Partition Coefficient ($K_d$) | 28, 11, 4.9, 67 ml/g | MRID: 44807315. | - |
| CAPA Soil Partition Coefficient ($K_{OC}$) | 1289, 1317, 1876, 3784 mL/g | MRID: 44807315. | - |
| Terrestrial Field Dissipation<br><br>Half-life | Range from 9 to 49 days: Ephrata, WA: DT50~9 days loamy sand, pinto beans; Kempton, ND: half-life=49 days, sandy loam, beans; Porterville, CA: half-life=20 days, loamy sand, beans; Montezuma, GA<br><br>The degradation was biphasic. | MRID: 44807318, 44807320, 44807316, 44807319, 44807317. | - |
| Bioaccumulation in Fish | 348X Fillet<br>1220X Whole fish<br>≥67% of residues depurated after 21 days from the fillet | MRID: 43521012. | – |

Based on the properties of the chemical, applications of fluazinam are likely to reach the target (the crop), but drift is also possible. The chemical has a low vapor pressure, and a moderate Henry's Law constant. Due to the fact that it appears to show relatively short half lives in aquatic media, and it binds to soils, EFED believes that the chemical would not volatilize substantially.

EFED concludes that fluazinam appears to degrade at moderate to low rates in aerobic soils, but it is more rapidly transformed into other compounds of similar backbone structure in high pH solutions or in aquatic media, both, aerobic or anaerobic. Fluazinam may be photolyzed relatively rapidly (2.5 days) to form a tricyclic compound (G-504). The total fluazinam residues (fluazinam and its transformation products) are persistent in most environments (aerobic aquatic metabolism 51-71 days, relatively stable in anaerobic aquatic environment) and are likely to reach aquatic media as a totality through runoff. Since fluazinam does not alter substantially its backbone structure in the environment, but instead, goes through a slight transformation of functional groups, EFED considered parent and transformation products together when making assessments.

While the parent and two transformation products, HYPA and CAPA, have relatively low mobility, indicating a relatively low potential for ground water contamination, further information on the other transformation products should be required in a new terrestrial field dissipation study.

Fluazinam shows a potential to bioaccumulate in fish (BCF=1220X for whole fish; ≥67% of residues depurated in 21 days).

The fate and transport characterization also summarizes the various degradation products formed by each process in the studies reviewed in tabular form. (Table 4)

**Table 4. Summary of degradate formation from degradation of fluazinam.**

| STUDY TYPE | DEGRADATE and MAXIMUM CONCENTRATION | | | SOURCE |
|---|---|---|---|---|
| | CAPA (% applied) | HYPA (% applied) | AMPA (% applied) | |
| Hydrolysis | 34% at 28 days pH 7; 84-85% at 20 days at pH 9 | - | - | MRID: 42208412. |
| Aqueous Photolysis | **G-504** was 14.0-17.1% by 7-10 days | _ | - | MRID: 444807312, 43521009. |
| Soil Photolysis | _ | Detected at more than dark control | Detected at more than dark control | MRID: 44807313. |
| Aerobic Soil Metabolism | _ | Detected | MAPA and DAPA also detected | MRID: 42208413. |
| Aerobic Aquatic Metabolism | _ | - | 24.2% at 0.2 day; DAPA: at day 30; SDS-67200 39.6%by day 14 | MRID: 43521010. |
| Anaerobic Aquatic Metabolism | 12.6% at 72 hr | - | DAPA: 19.0% by 240 hr; DCPA: 11.3% at 24 hr | MRID: 44807314. |
| Terrestrial Field Dissipation | MAPA, CAPA, and HYPA were monitored; however, there were problems with the storage stability data | | | MRID: various. |

## Drinking Water Exposure Modeling

### *Models*

Brief description of the models used:

SCI-GROW (v 2.3, 8/5/03) (Screening Concentration in Ground Water) is a regression model used as a screening tool to estimate pesticide concentrations found in ground water used as drinking water. SCI-GROW was developed by fitting a linear model to groundwater concentrations with the Relative Index of Leaching Potential (RILP) as the independent variable. Groundwater concentrations were taken from 90-day average high concentrations from Prospective Ground Water studies; the RILP is a function of aerobic soil metabolism and the soil-water partition coefficient. The output of SCI-GROW represents the concentrations that might be expected in shallow unconfined aquifers under sandy soils, which is representative of the ground water most vulnerable to pesticide contamination likely to serve as a drinking water source. (**Ref. 1 and 2**)

FIRST (v 1.1.0, 12/18/07) (FQPA Index Reservoir Screening Tool) is a metamodel of PRZM and EXAMS used as a screening tool to estimate pesticide concentrations found in surface water used as drinking water. FIRST was developed by making multiple runs of PRZM using varying sorption coefficients and determining the concentration in the EXAMS index reservoir scenario after a two-inch single storm event. (The Index Reservoir is a standard water body used by the Office of Pesticide Programs to assess drinking water exposure (Office of Pesticide Programs, 2002). It is based on a real reservoir (albeit not currently in active use as a drinking water supply), Shipman City Lake in Illinois, that is known to be vulnerable to pesticide contamination.) The single runoff event moves a maximum of 8% of the applied pesticide into the reservoir. This amount can be reduced by degradation or effects of binding to soil in the field. Additionally, FIRST can account for spray drift and adjusts for the area within a watershed that is planted with the modeled crop (Percent Cropped Area). Spray drift (modeled as direct deposition of the pesticide into the reservoir) is assumed to be 16% of the applied active ingredient for aerial application, 6.3% for orchard air blast application, and 6.4% for other ground spray application. Despite being a single event model, FIRST can account for spray drift from multiple applications. The default agricultural Percent Cropped Area (PCA) is 87%. The PRZM scenario used for FIRST development was among the most vulnerable, and thus resulting surface water concentrations represent the upper bound values on the concentrations that might be found in drinking water from the use of a pesticide. (**Ref. 1, 3 and 4**)

For volatile and semi-volatile compounds, Tier I modeling will tend to over-estimate surface water EDWCs because there are no parameters in FIRST that explicitly take into account volatility (ie., no vapor pressure or Henry's Law constant inputs). Therefore, in reality, more of the compound will be volatilizing than Tier I can account for. If drinking water levels of concern are exceeded for over-estimated Tier I surface water EDWCs, Tier II modeling will be able to refine these EDWCs by including volatility, Henry's Law, diffusion in air, and enthalpy considerations. Since SCI-GROW is a regression model developed from actual pesticide data with a range of volatilities, systematic conclusions cannot be drawn about over or underestimation of groundwater EDWCs at Tier I.

*Modeling Approach and Input Parameters*

Tables of modeling parameter input values for SCI-GROW and FIRST (Tables 5 and 6, respectively) based on the current input parameter guidance *(**Ref. 5**)* are included.

In addition to the EDWC's for Fluazinam, EDWC's were estimated for Total Fluazinam Residues because the environmental fate studies indicated that the parent compound forms transformation compounds which are similar in structure to the parent under most conditions. The input parameters were selected according to the similarity observed in the mobility characteristics of fluazinam, HYPA, and CAPA.

It was observed that the $K_{OC}$ model was better to describe the mobility of fluazinam. Only one value of aerobic soil metabolism was available, but two values of aerobic aquatic metabolism were available. It is noted that the aerobic aquatic metabolism is only 10.9 hours. A ground application method was utilized.

For the total residues, the half-life was calculated taking into consideration the transformation products plus fluazinam. This applied for the aerobic aquatic metabolism (91.8 days for total residues, in contrast to 10.9 hours for fluazinam), and the hydrolysis (relatively stable for total residues *vs*. 42 days for fluazinam). For the hydrolysis study, the transformation product that is formed is CAPA. In the aerobic aquatic metabolism study, the transformation products formed are DCPA, CAPA, and DAPA, plus various minor transformation products. For other parameters, in the absence of a suitable value, it was assumed that the value for fluazinam was similar to that for the total residues because they had similar structures.

**Table 5. SCI-GROW (v 2.3) input parameter values for fluazinam and total residues of fluazinam, use on bushberries[1].**

| PARAMETER (units) | FLUAZINAM | TOTAL RESIDUES | SOURCES AND COMMENTS |
|---|---|---|---|
| Maximum Application Rate (lb a.i./A) | 0.65 | | Proposed label. |
| Number of Applications per Year | 6 | | Proposed label. Represents most-conservative scenario in which the total maximum rate is applied in six applications. |
| Organic Carbon Partition Coefficient ($K_{oc}$; mL/g) | 1904.5 | | Represents the median value of four values ranging from 1705 to 2316 mL/g for the parent compound. |
| Aerobic Soil Metabolism Half-life (days) | 132 | | Represents one value for the aerobic soil metabolism of the parent compound. |

[1] Parameters are selected as per Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides; Version II, February 28, 2002.

**Table 6. FIRST (v 1.1.0) input parameter values for fluazinam and total residues of fluazinam, use on bushberries[1].**

| PARAMETER (units) | FLUAZINAM | TOTAL RESIDUES | SOURCES AND COMMENTS |
|---|---|---|---|
| Application Rate (lb a.i./A) | 0.65 | 0.65 | Proposed label. |
| Number of Applications | 6 | 6 | Proposed label. |
| Interval between Applications (days) | 7 | 7 | Proposed label. |
| Percent Cropped Area (decimal) | 0.87 | 0.87 | National default. |
| Soil Partition Coefficient ($K_d$; (mL/g) or $K_{OC}$ (mL/$g_{OC}$)) | 1894 | 1894 | Represents the lowest non-sand $K_{OC}$ value among four values ranging from 1705 to 2316 mL/g. The $K_{OC}$ model is better for this chemical. |

| **Table 6. FIRST (v 1.1.0) input parameter values for fluazinam and total residues of fluazinam, use on bushberries[1].** | | | |
|---|---|---|---|
| **PARAMETER (units)** | **FLUAZINAM** | **TOTAL RESIDUES** | **SOURCES AND COMMENTS** |
| Aerobic Soil Metabolism Half-life (days) | 396 | 396 | Determined by multiplying the calculated half-life (132 days) by 3 to account for the uncertainty associated with using a single value. |
| Wetted in? | No | No | Proposed label. |
| Depth of Incorporation (inches) | 0 | 0 | Proposed label. |
| Method of Application | Ground application | Ground application | Proposed label. |
| Solubility in Water @ 20 $^{o}$C, unbuffered (mg/L or ppm) | 0.071 | 0.071 | Maximum available value, at pH 7. |
| Aerobic Aquatic Metabolism Half-life (days) | 0.454 | 91.8 | Represents the 90$^{th}$ percentile of the upper confidence bound on the mean of two half-life values (4.0 hr and 7.4 hr: mean 5.7 hr, std. dev. 2.40 hr, the value is 10.9 hr or 0.454 days). For total residues two half-lives (51 and 71 days: mean 61 days, std. dev. 14.14 days) |
| Hydrolysis Half-life @ pH 7 (days) | 42 | Stable | The transformation product CAPA reaches a maximum at the end of the study at pH 7. |
| Aquatic Photolysis Half-life @ pH 7 (days) | 2.5 | 2.5 | From aqueous photolysis study |

[1] Parameters are selected as per Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides; Version II, February 28, 2002

The Percent Cropped Area (PCA) used was the National Default of 0.87, it is intended for use on other crops for which no PCA has been developed. Options for Tier I are national scale cotton, wheat, corn, soybeans, or default; regional PCAs are a Tier II tool intended for refined assessment. ***(Ref. 6)***

*Modeling Results*

Table 7 summarizes the modeling results for all model runs.

| **Table 7. Maximum Tier I Estimated Drinking Water Concentrations (EDWCs) for drinking water risk assessment based on ground application of fluazinam.** | | | |
|---|---|---|---|
| **DRINKING WATER SOURCE (MODEL USED)** | **USE (rate modeled)** | **MAXIMUM ESTIMATED DRINKING WATER CONCENTRATION (EDWC) ( ppb)** | |
| Groundwater<br><br>(SCI-GROW) **Fluazinam and Total Residues of Fluazinam** | Bushberries (3.90 lb a.i./A) | Acute and Chronic | 0.187 |

| **Table 7. Maximum Tier I Estimated Drinking Water Concentrations (EDWCs) for drinking water risk assessment based on ground application of fluazinam.** | | | |
|---|---|---|---|
| **DRINKING WATER SOURCE (MODEL USED)** | **USE (rate modeled)** | **MAXIMUM ESTIMATED DRINKING WATER CONCENTRATION (EDWC) ( ppb)** | |
| Surface Water<br><br>(FIRST) **Fluazinam** | Bushberries (3.90 lb a.i./A) | Acute | 71.0 |
| | Bushberries (3.90 lb a.i./A) | Chronic | 0.7 |
| Surface Water<br><br>(FIRST) **Total Residues of Fluazinam** | Bushberries (3.90 lb a.i./A) | Acute | 71.0 |
| | Bushberries (3.90 lb a.i./A) | Chronic | 17.7 |

*SCIGROW concentration (ppb) represents the groundwater concentration that might be expected in shallow unconfined aquifers under sandy soils. Output is used for both acute and chronic endpoints.*

*FIRST concentrations (ppb) represent untreated surface water concentrations.*

*The one-in-10-year peak day concentration is used for acute endpoints and the one-in-10-year annual average concentration is used for chronic endpoints.*

*The estimated concentrations provided in this assessment are conservative estimates of concentrations in drinking water. If dietary risks require refinement, higher tiered crop-specific and location-specific models and modeling scenarios can be used.*

**Monitoring Data**
No monitoring data are available for fluazinam.

**Drinking Water Treatment**
It is likely that primary treatment may reduce the levels of fluazinam due to its tendency to bind. However, there is no information available at this time to determine the levels of reduction. On the other hand, fluazinam is very short lived in aquatic environments, forming various other transformation products. (***Ref. 9***)

## CONCLUSIONS

This is a Tier I level analysis, refinements may be available should they be needed. The acute levels of surface drinking waters was 71.0 ppb, the chronic level of drinking waters was 0.7 ppb of fluazinam. The groundwater concentration of fluazinam, suitable for acute and chronic is 0.187 ppb. The peak concentration was limited by the solubility limit of fluazinam. It was assumed that the maximum application rate was used on bushberries, with the minimum interval between applications.

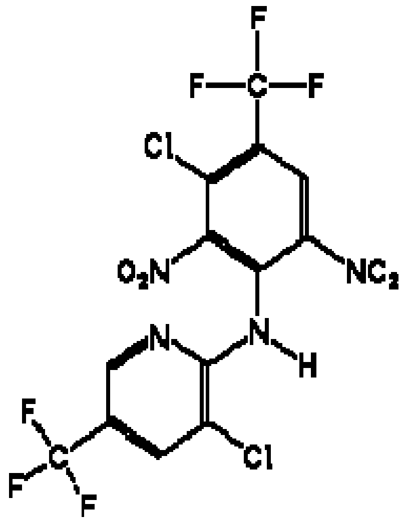
For the total residues of fluazinam, the acute levels of surface drinking waters was 71.0 ppb, the chronic level of drinking waters was 17.7 ppb of total residues. The groundwater concentration of total residues of fluazinam, suitable for acute and chronic is 0.187 ppb. The peak concentration was also limited by the solubility limit of fluazinam.

It was assumed that for the total residues of fluazinam, the properties of fluazinam were applicable, for example, the solubility, which is the limiting factor in the peak concentration. Another example is the mobility. It may be slightly different for each transformation product, while it was assumed that it was the same than the parent fluazinam. These assumptions make the assessment uncertain. A more definitive assessment could be made with the expenditure of additional resources, and given the availability of additional data.

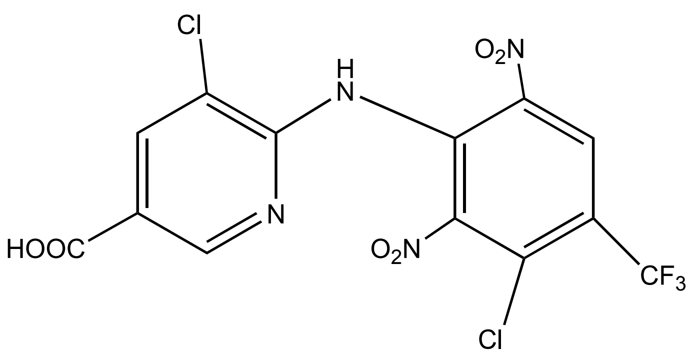
The total residues approach is conservative with uncertainties due to unavailability of degradate information. A Tier II assessment could involve input from additional studies (not available at this time) and refine the risk assessment.

**APPENDIX**

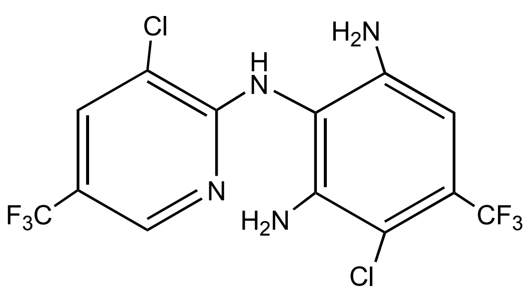
**Molecular structure of fluazinam and its degradation products.**



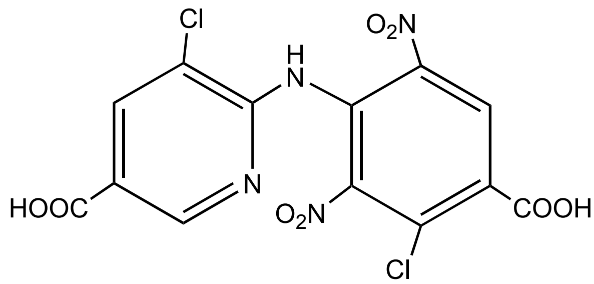

FLUAZINAM




CAPA




DAPA




DCPA

**SCIGROW and FIRST model output files.**

```
                       SCIGROW
                     VERSION 2.3
        ENVIRONMENTAL FATE AND EFFECTS DIVISION
             OFFICE OF PESTICIDE PROGRAMS
         U.S. ENVIRONMENTAL PROTECTION AGENCY
                    SCREENING MODEL
            FOR AQUATIC PESTICIDE EXPOSURE

SciGrow version 2.3
chemical:Fluazinam
time is  1/23/2007   8:40: 1
-------------------------------------------------------------------------
 Application      Number of       Total Use    Koc      Soil Aerobic
 rate (lb/acre)  applications   (lb/acre/yr)  (ml/g)   metabolism (days)
-------------------------------------------------------------------------
     0.650          6.0           3.900      1.90E+03      132.0
-------------------------------------------------------------------------
groundwater screening cond (ppb) =   1.87E-01
*************************************************************************
```

RUN No. 1 FOR Fluazinam ON Bushberrie * INPUT VALUES *

| RATE (#/AC) ONE(MULT) | No.APPS & INTERVAL | | SOIL Koc | SOLUBIL (PPB ) | APPL TYPE (%DRIFT) | %CROPPED AREA | INCORP (IN) |
|---|---|---|---|---|---|---|---|
| .650( 3.783) | 6 | 7 | 1894.0 | 71.0 | GROUND( 6.4) | 87.0 | .0 |

FIELD AND RESERVOIR HALFLIFE VALUES (DAYS)

| METABOLIC (FIELD) | DAYS UNTIL RAIN/RUNOFF | HYDROLYSIS (RESERVOIR) | PHOTOLYSIS (RES.-EFF) | | METABOLIC (RESER.) | COMBINED (RESER.) |
|---|---|---|---|---|---|---|
| 396.00 | 2 | N/A | 2.50- | 310.00 | .45 | .45 |

UNTREATED WATER CONC (MICROGRAMS/LITER (PPB)) Ver 1.1.0 DEC 12, 2005

| PEAK DAY (ACUTE) CONCENTRATION | ANNUAL AVERAGE (CHRONIC) CONCENTRATION |
|---|---|
| 71.000 | .660 |

RUN No. 2 FOR Fluaz. Res. ON Bushberrie * INPUT VALUES *

| RATE (#/AC) ONE(MULT) | No.APPS & INTERVAL | | SOIL Koc | SOLUBIL (PPB ) | APPL TYPE (%DRIFT) | %CROPPED AREA | INCORP (IN) |
|---|---|---|---|---|---|---|---|
| .650( 3.431) | 6 | 7 | 1894.0 | 71.0 | GROUND( 6.4) | 87.0 | .0 |

FIELD AND RESERVOIR HALFLIFE VALUES (DAYS)

| METABOLIC (FIELD) | DAYS UNTIL RAIN/RUNOFF | HYDROLYSIS (RESERVOIR) | PHOTOLYSIS (RES. EFF) | | METABOLIC (RESER.) | COMBINED (RESER.) |
|---|---|---|---|---|---|---|
| 91.80 | 2 | N/A | .00- | .00 | 91.80 | 91.80 |

UNTREATED WATER CONC (MICROGRAMS/LITER (PPB)) Ver 1.1.0 DEC 12, 2005

| PEAK DAY (ACUTE) CONCENTRATION | ANNUAL AVERAGE (CHRONIC) CONCENTRATION |
|---|---|
| 71.000 | 18.542 |

```
RUN No.   3 FOR Fluaz. Res. Conf ON   Bushberrie    * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL  APPL TYPE  %CROPPED INCORP
  ONE(MULT)    INTERVAL    Koc   (PPB )   (%DRIFT)     AREA    (IN)
--------------------------------------------------------------------
.650(  3.783)   6   7    1894.0   71.0   GROUND( 6.4)  87.0    .0

FIELD AND RESERVOIR HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)  RAIN/RUNOFF  (RESERVOIR)  (RES.-EFF)   (RESER.)   (RESER.)
--------------------------------------------------------------------
 396.00       2          N/A      2.50-  310.00    91.80     70.83

UNTREATED WATER CONC (MICROGRAMS/LITER (PPB)) Ver 1.1.0 DEC 12, 2005
--------------------------------------------------------------------
     PEAK DAY  (ACUTE)      ANNUAL AVERAGE (CHRONIC)
       CONCENTRATION            CONCENTRATION
--------------------------------------------------------------------
          71.000                    17.697
```

******************************************************************


**References:**

1. Policy Establishing Current Versions of Exposure Models and Responsibility for Model Maintenance (11/06/2002)
2. SCIGROW: Users Manual (11/01/2001, revised 08/23/2002)
3. FIRST Users Manual (08/01/2001)
4. FIRST: A Screening Model to Estimate Pesticide Concentrations in Drinking Water (05/01/2001)
5. Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides, Version II (02/28/2002)
6. Use of the Index Reservoir and Percent Crop Area in EFED Drinking Water Assessments (12/01/1999)
7. Golf Course Adjustment Factors for Simulated Aquatic Exposure Concentrations (06/01/2005)
8. Policy for Estimating Aqueous Concentrations from Pesticides Labeled for Use on Rice (10/29/2002)
9. The Incorporation of Water Treatment Effects on Pesticide Removal and Transformations in Food Quality Protection Act (FQPA) Drinking Water Assessments  (10/25/2001)


******************************************************************