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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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MAY 10

OFFICE OF PREVENTION, PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM: Addendum to the Bensulide RED: Revised Risk Assessment and Risk Characterization for Risk to Aquatic Organisms from Use on Turf

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Attached is the third addendum to the Bensulide RED from EFED. This addendum revises the risk quotients and risk characterization for risk to aquatic organisms from use of bensulide on turf. This revision became necessary due to revisions in the aquatic EECs for the turf use of bensulide. The risk quotients and corresponding risk conclusions reported here for the turf use of bensulide supercede those reported in the original RED chapter and in Addendum 1.

The Environmental Fate and Effects Division (EFED) originally calculated estimated surface water concentrations for bensulide using Tier 2 PRZM/EXAMS modeling. These EEC's were used for assessing both drinking water exposure and toxicological risk to aquatic organisms. However, EFED has decided that surface water modeling for turf sites should stop at the Tier I level with GENEEC modeling since the scenario used in PRZM-EXAMS does not have the appropriate parameters to accurately model runoff from turf sites (which include golf courses). Therefore, EFED recalculated the aquatic risk quotients for turf based on EEC's generated from the GENEEC model. This resulted in a reduction in the overall level of risk predicted for aquatic organisms, although some high risks still exists.

ADDENDUM 3

Revised Assessment for Risks to Aquatic Organisms from Use of Bensulide on Turf

A. Background

The Environmental Fate and Effects Division (EFED) originally calculated estimated surface water concentrations resulting from bensulide use on vegetable and turf sites using Tier 2 PRZM/EXAMS modeling. These EEC's were used for assessing both drinking water exposure and toxicological risk to aquatic organisms. However, EFED has decided that surface water modeling for turf sites should stop at the Tier I level with GENEEC modeling since the scenario used in PRZM-EXAMS does not have the appropriate parameters to accurately model runoff from turf sites (which include golf courses). Therefore, EFED has recalculated the aquatic risk quotients for turf based on EEC's generated from the GENEEC model. The risk quotients and corresponding risk conclusions reported here for the turf use of bensulide supercede those reported in the original RED chapter and in Addendum 1. Risk quotients and corresponding risk conclusions for the use of bensulide on vegetable sites are unchanged.

The EEC's generated for Turf using Tier 1 GENEEC modeling are given below.

EECs for Use of Bensulide on Turf, Using Tier 1 GENEEC Modeling

Application Method	Application Rate (lbs ai/A)	Number of Applications (Time Between Applications)	EEC (µg/L)		
			Maximum	21-day Average	56-day Average
Broadcast granular application, unincorporated	7.5	1	60	45	33
Broadcast granular application, unincorporated	7.5	2 (120 day interval)	108	82	59
Broadcast granular application, unincorporated	10	1	80	60	44
Broadcast granular application, unincorporated	10	2 (120 day interval)	144	108	79
Broadcast EC spray, unincorporated	12.5	1	106	80	58
Broadcast EC spray, unincorporated	12.5	2 (120 day interval)	189	142	103
Broadcast granular application, unincorporated	12.5	1	100	75	55
Broadcast granular application, unincorporated	12.5	2 (120 day interval)	180	135	98

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B. Risk to Aquatic Animals

1. Freshwater Fish

Acute risk quotients for freshwater fish are given below.

Freshwater Fish Acute Risk Quotients for Use of Bensulide on Turf, Based on a Rainbow Trout LC50

Application Method	Rate in lb ai/A	Number of Applications	LC50 (ppb)	Peak EEC (ppb)	Acute RQ (EEC/LC50)
Broadcast granular application, unincorporated	7.5	1	720	60	0.08*
Broadcast granular application, unincorporated	7.5	2	720	108	0.15**
Broadcast granular application, unincorporated	10	1	720	80	0.11**
Broadcast granular application, unincorporated	10	2	720	144	0.20**
Broadcast EC spray, unincorporated	12.5	1	720	106	0.15**
Broadcast EC spray, unincorporated	12.5	2	720	189	0.26**
Broadcast granular application, unincorporated	12.5	1	720	100	0.14**
Broadcast granular application, unincorporated	12.5	2	720	180	0.25**

*** Exceeds acute high, acute restricted, and acute endangered species LOCs.
** Exceeds acute restricted and acute endangered species LOCs.
* Exceeds acute endangered species LOC.

The acute risk quotients indicate that use of bensulide on turf does not pose a high acute risk to freshwater fish. However, except for a single granular application at 7.5 lb ai/A, all risk quotients do exceed the LOC for risk that may be mitigated by restricted use registration. All risk quotients also exceed the LOC for acute risk to threatened and endangered species of freshwater fish. Risks are reduced when applications are made at lower use rates and when only one application is made per year.

Chronic risk quotients for freshwater fish are tabulated below.

Freshwater Fish Chronic Risk Quotients for Use of Bensulide on Turf, Based on a Fathead Minnow NOAEL.

Application Method	Rate in lb ai/A	Number of Applications	NOAEC (ppb)	56-day mean EEC (ppb)	Chronic RQ (EEC/ NOAEL)
Broadcast granular application, unincorporated	7.5	1	374	33	0.09
Broadcast granular application, unincorporated	7.5	2	374	59	0.16
Broadcast granular application, unincorporated	10	1	374	44	0.12
Broadcast granular application, unincorporated	10	2	374	79	0.21
Broadcast EC spray, unincorporated	12.5	1	374	58	0.16
Broadcast EC spray, unincorporated	12.5	2	374	103	0.28
Broadcast granular application, unincorporated	12.5	1	374	55	0.15
Broadcast granular application, unincorporated	12.5	2	374	98	0.26

Risk quotients indicate that none of the uses of bensulide on turf exceed the LOC for chronic risk to freshwater fish. Therefore, use of bensulide on turf is predicted to pose low chronic risk to freshwater fish.

2. Freshwater Invertebrates

Risk to freshwater invertebrates was assessed based on supplemental toxicity results for *Daphnia magna*. In this acute study, low dissolved oxygen concentrations were present in the four highest test concentrations, and oxygen levels declined as the test concentration increased. The low oxygen levels might have contributed to the observed mortality, thus decreasing the observed LC_{50}. Despite this uncertainty, the actual LC_{50} for *Daphnia magna* is not likely to be greater than the observed value of 0.58 mg ai/L. This value was thus therefore used to give a conservative (i.e., possibly overprotective) assessment of the risk of bensulide to freshwater invertebrates.

The acute risk quotients are tabulated below.

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Freshwater Invertebrate Acute Risk Quotients for Use of Bensulide on Turf, Based on a *Daphnia magna* LC50

Application Method	Rate in lb ai/A	Number of Applications	LC50 (ppb)	Peak EEC (ppb)	Acute RQ (EEC/LC50)
Broadcast granular application, unincorporated	7.5	1	580	60	0.10**
Broadcast granular application, unincorporated	7.5	2	580	108	0.19**
Broadcast granular application, unincorporated	10	1	580	80	0.14**
Broadcast granular application, unincorporated	10	2	580	144	0.25**
Broadcast EC spray, unincorporated	12.5	1	580	106	0.18**
Broadcast EC spray, unincorporated	12.5	2	580	189	0.33**
Broadcast granular application, unincorporated	12.5	1	580	100	0.17**
Broadcast granular application, unincorporated	12.5	2	580	180	0.31**

*** Exceeds acute high, acute restricted, and acute endangered species LOCs.
** Exceeds acute restricted and acute endangered species LOCs.
* Exceeds acute endangered species LOC.

The risk quotients indicate that use of bensulide on turf does not pose a high acute risk to freshwater invertebrates. However, all risk quotients do exceed the LOC for risk that may be mitigated by restricted use registration, as well as the LOC for risk to threatened and endangered species.

Chronic risk to freshwater invertebrates is also based on a life-cycle toxicity test in which effects of the solvent used could have impacted the outcome of the test. The risk assessment based on these supplemental data could overestimate or underestimate the actual risk. Chronic risk quotients for freshwater invertebrates are tabulated below.

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Freshwater Invertebrate Chronic Risk Quotients for Use of Bensulide on Turf, Based on a *Daphnia magna* LC_{50}

Application Method	Rate in lb ai/A	Number of Applications	NOAEC (ppb)	21-day mean EEC (ppb)	Chronic RQ (EEC/ NOAEL)
Broadcast granular application, unincorporated	7.5	1	<6.93	45	6.5*
Broadcast granular application, unincorporated	7.5	2	<6.93	82	11.8*
Broadcast granular application, unincorporated	10	1	<6.93	60	8.7*
Broadcast granular application, unincorporated	10	2	<6.93	108	15.6*
Broadcast EC spray, unincorporated	12.5	1	<6.93	80	11.5*
Broadcast EC spray, unincorporated	12.5	2	<6.93	142	20.5*
Broadcast granular application, unincorporated	12.5	1	<6.93	75	10.8*
Broadcast granular application, unincorporated	12.5	2	<6.93	135	19.5*

* Exceeds chronic LOC.

Risk quotients indicate that all turf uses of bensulide exceed the LOC for chronic risk to freshwater invertebrates. EFED therefore concludes that the use of bensulide on turf poses a high chronic risk to freshwater invertebrates. Chronic risk is greatest when bensulide is applied twice within a year. These risk quotients are uncertain because the solvent used in the study appeared to have influenced the test results. Uncertainty could be reduced if the registrant would submit a new life-cycle toxicity study with *Daphnia magna*.

3. Estuarine and Marine Fish

The acute risk quotients for estuarine and marine fish are tabulated below.

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Estuarine/Marine Freshwater Fish Acute Risk Quotients for Use of Bensulide on Turf, Based on a Spot LC50

Application Method	Rate in lb ai/A	Number of Applications	LC50 (ppb)	Peak EEC (ppb)	Acute RQ (EEC/LC50)
Broadcast granular application, unincorporated	7.5	1	320	60	0.19**
Broadcast granular application, unincorporated	7.5	2	320	108	0.34**
Broadcast granular application, unincorporated	10	1	320	80	0.25**
Broadcast granular application, unincorporated	10	2	320	144	0.45**
Broadcast EC spray, unincorporated	12.5	1	320	106	0.33**
Broadcast EC spray, unincorporated	12.5	2	320	189	0.59***
Broadcast granular application, unincorporated	12.5	1	320	100	0.31**
Broadcast granular application, unincorporated	12.5	2	320	180	0.56***

*** Exceeds acute high, acute restricted, and acute endangered species LOCs.
** Exceeds acute restricted and acute endangered species LOCs.
* Exceeds acute endangered species LOC.

The risk quotients indicate that uses of bensulide on turf poses a high acute risk to estuarine and marine fish only when two applications are made at 12.5 lb ai/A each. Restricting use to one time per season mitigates this high acute risk. All risk quotients for estuarine and marine fish exceed the LOC for risk that may be mitigated by restricted use registration, as well as the LOC for risk to threatened and endangered species. Note that these conclusions apply only to use in areas where bensulide may be transported from the use site to marine and estuarine areas (see the risk characterization discussion below).

4. Estuarine and Marine Invertebrates

The acute risk quotients for estuarine and marine invertebrates are tabulated below.

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Estuarine/Marine Acute Risk Quotients for Use of Bensulide on Turf, Based on a Mysid LC50

Application Method	Rate in lb ai/A	Number of Applications	LC50 (ppb)	Peak EEC (ppb)	Acute RQ (EEC/LC50)
Broadcast granular application, unincorporated	7.5	1	62.4	60	0.96***
Broadcast granular application, unincorporated	7.5	2	62.4	108	1.7***
Broadcast granular application, unincorporated	10	1	62.4	80	1.3***
Broadcast granular application, unincorporated	10	2	62.4	144	2.3***
Broadcast EC spray, unincorporated	12.5	1	62.4	106	1.7***
Broadcast EC spray, unincorporated	12.5	2	62.4	189	3.0***
Broadcast granular application, unincorporated	12.5	1	62.4	100	1.6***
Broadcast granular application, unincorporated	12.5	2	62.4	180	2.9***

*** Exceeds acute high, acute restricted, and acute endangered species LOCs.
** Exceeds acute restricted and acute endangered species LOCs.
* Exceeds acute endangered species LOC.

Risk quotients indicate high risk to estuarine and marine invertebrates for all uses on turf. The risk quotients also exceed the LOC's for risk that may be mitigated by restricted use and risk to threatened and endangered species. Note that these conclusions apply only to use in areas where bensulide may be transported from the use site to marine and estuarine areas (see the discussion of risk characterization below).

C. Risk to Aquatic Plants

Risk quotients for **nonendangered** species of aquatic plants are tabulated below.

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Aquatic Plant Risk Quotients (Nonendangered Species) for Use of Bensulide on Turf.

Application Method	Rate in lb ai/A	Number of Applications	EC_{50} (ppb)	Peak EEC (ppb)	Acute RQ (EEC/EC_{50})
Broadcast granular application, unincorporated	7.5	1	140	60	0.43
Broadcast granular application, unincorporated	7.5	2	140	108	0.77
Broadcast granular application, unincorporated	10	1	140	80	0.57
Broadcast granular application, unincorporated	10	2	140	144	1.0*
Broadcast EC spray, unincorporated	12.5	1	140	106	0.76
Broadcast EC spray, unincorporated	12.5	2	140	189	1.4*
Broadcast granular application, unincorporated	12.5	1	140	100	0.71
Broadcast granular application, unincorporated	12.5	2	140	180	1.3*

* Exceeds high risk LOC for nonendangered species.

The risk quotients indicate that the uses of bensulide on turf pose a high risk to nonendangered aquatic plants only when two applications per year are made at a rate of 10 lb ai/A or greater. Single applications of bensulide on turf does not pose a high risk to nontarget aquatic plants.

Risk quotients for **threatened and endangered** species of aquatic plants are tabulated below.

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Aquatic Plant Risk Quotients (Endangered Species) for Use of Bensulide on Turf

Application Method	Rate in lb ai/A	Number of Applications	NOAEC (ppb)	Peak EEC (ppb)	Acute RQ (EEC/ NOAEL)
Broadcast granular application, unincorporated	7.5	1	17	60	3.5*
Broadcast granular application, unincorporated	7.5	2	17	108	6.4*
Broadcast granular application, unincorporated	10	1	17	80	4.7*
Broadcast granular application, unincorporated	10	2	17	144	8.5*
Broadcast EC spray, unincorporated	12.5	1	17	106	6.2*
Broadcast EC spray, unincorporated	12.5	2	17	189	11.1*
Broadcast granular application, unincorporated	12.5	1	17	100	5.9*
Broadcast granular application, unincorporated	12.5	2	17	180	10.6*

* Exceeds LOC for high risk to aquatic plants, including endangered species.

The risk quotients indicate that all uses of bensulide on turf pose enough risk to cause concerned for possible adverse effects to threatened or endangered species of aquatic plants.

Risk Characterization–Risk to Aquatic Organisms of Bensulide use on Turf

In the original RED chapter, risk of the turf use of bensulide to aquatic organisms was overestimated because an inappropriate tier 2 model was used to estimate aquatic EEC's. Based on new EEC's generated by GENEEC, we have found that the use of bensulide on turf poses more limited risks than previously thought, although high risks still exists for some scenarios. Turf uses of bensulide generally do not pose a high risk to freshwater or saltwater fish, except when used twice per year at a rate of 10 ln ai/A or more, in which case there is a high risk to estuarine/marine fish. All acute risk quotients for fish are, however, in the range that trigger consideration of restricted use registration. Use of bensulide on turf is still predicted to pose a chronic high risk to aquatic invertebrates. Turf uses do not pose a high acute risk to freshwater invertebrates, but do pose a high acute risk to estuarine and marine invertebrates, which appear to be more sensitive to bensulide.

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Because of deficiencies, both the acute and chronic toxicity studies conducted with freshwater invertebrates were classified as "supplemental". The use of data from supplemental study creates uncertainty in the risk assessment for freshwater invertebrates. The deficiencies in the acute study likely increased the apparent toxicity level, thereby making the assessment more protective. The Agency has confidence in the acute risk assessment since it concluded that the acute risk was not high, even when based on the conservative toxicity value. However, the chronic invertebrate toxicity study may have either overestimeted or underestimated the actual risk. The conclusion of the chronic risk assessment is uncertain. There is a chance that the chronic risk to freshwater invertebrates may not actually high, but there is also a chance that it is even greater than predicted. Regulatory decisions should be based on the high risk conclusion unless the registrant agrees to replace the deficient chronic toxicity studies with the *Daphnia magna*, in which case the risk would be reassessed. The risk assessment for estuarine/marine invertebrates is more certain. Based on data from a core study, the assessment concluded that turf uses pose a high acute risk. High chronic risk to estuarine/marine invertebrates is also likely.

Risk conclusions for estuarine/marine organisms are based on substantial use of bensulide in coastal areas. Although EFED does not know the exact distribution of bensulide use on turf, golf courses and turf sites occur in coastal areas and are often in close associated with marine and estuarine habitats. Therefore, some exposure to marine and estuarine organisms is expected.

As turf use will result in little or no spray drift, exposure to surface water would be limited to movement of the pesticide in runoff and subsurface flow. Subsurface flow should be minimal because bensulide is not mobile in soils. Also, little erosion of soil is expected on turf sites. Thus, movement will be primarily as dissolved material in surface runoff. There is a high potential for this type of movement because bensulide persists in the upper soil layer; it neither leaches nor degrades at an appreciable rate. High soil residues are therefore likely to persist until the next runoff event.

There is a high potential for use on turf to result in chronic exposure in aquatic invertebrates, thereby potentially causing chronic effects. Because bensulide is persistent in the upper layer of the soil, it is available to gradually wash off in runoff for many weeks or months after application. Numerous field dissipation studies conducted on established turf found that bensulide residues also gradually wash out of the thatch into the soil, thereby increasing the persistence of residues in the soil. Once it enters surface water, it is also persistent, degrading very slowly by hydrolysis and aquatic photolysis. These factors increase the potential for chronic exposure to fish and invertebrates.

An additional factor that increases the potential of chronic effects of bensulide is repeated applications. Bensulide is frequently applied to turf in both the spring and the autumn. Since predicted half lives of bensulide are greater than the 120-day application interval, more than half of the bensulide residues from the first application will be present in the soil at the second application. Residues can also carry over from year to year. In a field study conducted on a golf course treated with granular bensulide, residues of bensulide were observed to persist in the thatch layer from one spring application to the next (Niemczyk and Krause, 1994). Therefore, not only will treated areas continuously contaminate aquatic habitats, but the amount of

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contamination may increase over time if bensulide accumulates in soil and thatch from repeated applications. Chronic risk would be substantially reduced by limiting use on turf to one application per year.

The largest turf use of bensulide is on golf course greens and tees. This use pattern is expected to result in relatively low exposure to surface water. Greens and tees make up a relatively small portion of the total golf course landscape. The GENEEC model used to estimate exposure assumes a large contiguous area will be treated, whereas greens and tees represent relatively small and widely dispersed treatment areas. Therefore, treatment of only greens and tees would be expected to produce aquatic residues much less than those predicted by this model. Furthermore, the untreated areas that surround the greens will serve as a buffer zone, reducing the amount of bensulide that will reach surface water. Use on greens and tees only therefore is not expected to result in significant risk to fish or aquatic invertebrates. Conversely, use on golf course fairways and other turf areas are expected to result in high exposure and high risk to aquatic organisms. A field study confirmed that high concentrations of bensulide may be transported in runoff from golf course fairways (Odanaka et al., 1994). Thus, changing the label to restricting use from golf course fairways would be an effective risk mitigation measure.

REFERENCES

Niemczyk, H.D. and A.A. Krause. 1994. Behaviour and mobility of preemergent herbicides in turfgrass: a field study. J. Environ. Sci. Health B29: 507-539.

Odanaka, Y., T. Taniguchi, Y. Shimamura, K. Iijima, Y. Koma, T. Takechi, and O. Matano. 1994. Runoff and leaching of pesticides in golf course. J. Pesticide Sci. 19:1-10.

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GENEEC Values for Two Applications per Year of Bensulide on Golf Course Fairways

RUN No. 2 FOR Bensulide INPUT VALUES

RATE (#/AC) ONE(MULT)	APPLICATIONS NO.-INTERVAL		SOIL KOC	SOLUBILITY (PPM)	% SPRAY DRIFT	INCORP DEPTH(IN)
12.500(22.440)	2	120	1830.0	5.6	1.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
363.00	0	220.00	200.00-24540.00	.00	218.05

GENERIC EECs (IN PPB)

PEAK GEEC	AVERAGE 4 DAY GEEC	AVERAGE 21 DAY GEEC	AVERAGE 56 DAY GEEC
189.36	180.50	142.27	103.37

RUN No. 6 FOR Bensulide INPUT VALUES

RATE (#/AC) ONE(MULT)	APPLICATIONS NO.-INTERVAL		SOIL KOC	SOLUBILITY (PPM)	% SPRAY DRIFT	INCORP DEPTH(IN)
12.500(22.440)	2	120	1830.0	5.6	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
363.00	0	220.00	200.00-24540.00	.00	218.05

GENERIC EECs (IN PPB)

PEAK GEEC	AVERAGE 4 DAY GEEC	AVERAGE 21 DAY GEEC	AVERAGE 56 DAY GEEC
179.80	171.17	135.12	98.46

RUN No. 4 FOR Bensulide INPUT VALUES

RATE (#/AC) ONE(MULT)	APPLICATIONS NO.-INTERVAL		SOIL KOC	SOLUBILITY (PPM)	% SPRAY DRIFT	INCORP DEPTH(IN)

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10.000(17.952)	2	120	1830.0	5.6	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
363.00	0	220.00	200.00-24540.00	.00	218.05

GENERIC EECs (IN PPB)

PEAK GEEC	AVERAGE 4 DAY GEEC	AVERAGE 21 DAY GEEC	AVERAGE 56 DAY GEEC
143.84	136.94	108.09	78.76

RUN No. 2 FOR Bensulide INPUT VALUES

RATE (#/AC) ONE(MULT)	APPLICATIONS NO.-INTERVAL	SOIL KOC	SOLUBILITY (PPM)	% SPRAY DRIFT	INCORP DEPTH(IN)
7.500(13.464)	2	120	1830.0	5.6	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
363.00	0	220.00	200.00-24540.00	.00	218.05

GENERIC EECs (IN PPB)

PEAK GEEC	AVERAGE 4 DAY GEEC	AVERAGE 21 DAY GEEC	AVERAGE 56 DAY GEEC
107.88	102.70	81.07	59.07

GENEEC Values for One Application/year of Bensulide on Golf Course Fairways

RUN No. 1 FOR Bensulide INPUT VALUES

RATE (#/AC) ONE(MULT)	APPLICATIONS NO.-INTERVAL	SOIL KOC	SOLUBILITY (PPM)	% SPRAY DRIFT	INCORP DEPTH(IN)
12.500(12.500)	1	1	1830.0	5.6	1.0	.0

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FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
363.00	0	220.00	200.00-24540.00	.00	218.05

GENERIC EECs (IN PPB)

PEAK GEEC	AVERAGE 4 DAY GEEC	AVERAGE 21 DAY GEEC	AVERAGE 56 DAY GEEC
105.90	100.96	79.57	57.80

RUN No. 1 FOR Bensulide INPUT VALUES

RATE (#/AC) ONE(MULT)	APPLICATIONS NO.-INTERVAL	SOIL KOC	SOLUBILITY (PPM)	% SPRAY DRIFT	INCORP DEPTH(IN)
7.500(7.500)	1 1	1830.0	5.6	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
363.00	0	220.00	200.00-24540.00	.00	218.05

GENERIC EECs (IN PPB)

PEAK GEEC	AVERAGE 4 DAY GEEC	AVERAGE 21 DAY GEEC	AVERAGE 56 DAY GEEC
60.09	57.21	45.16	32.91

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RUN No. 3 FOR Bensulide INPUT VALUES

RATE (#/AC) ONE(MULT)	APPLICATIONS NO.-INTERVAL		SOIL KOC	SOLUBILITY (PPM)	% SPRAY DRIFT	INCORP DEPTH(IN)
10.000(10.000)	1	1	1830.0	5.6	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
363.00	0	220.00	200.00-24540.00	.00	218.05

GENERIC EECs (IN PPB)

PEAK GEEC	AVERAGE 4 DAY GEEC	AVERAGE 21 DAY GEEC	AVERAGE 56 DAY GEEC
80.13	76.28	60.21	43.87

RUN No. 5 FOR Bensulide INPUT VALUES

RATE (#/AC) ONE(MULT)	APPLICATIONS NO.-INTERVAL		SOIL KOC	SOLUBILITY (PPM)	% SPRAY DRIFT	INCORP DEPTH(IN)
12.500(12.500)	1	1	1830.0	5.6	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
363.00	0	220.00	200.00-24540.00	.00	218.05

GENERIC EECs (IN PPB)

PEAK GEEC	AVERAGE 4 DAY GEEC	AVERAGE 21 DAY GEEC	AVERAGE 56 DAY GEEC
100.16	95.35	75.26	54.84

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