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

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OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Review of Public Interest Documentation for the Registration of Orthosulfamuron Herbicide for Control of Sedges, Broadleaf, and Aquatic Weeds in Rice Production. DP # 327089.

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07/20/2006

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SUMMARY

The registrant, Isagro Inc. USA, claims that the registration of orthosulfamuron herbicide for the control of sedges, broadleaf, and aquatic weeds in rice production is in the public interest. In addition, the registrant claims that orthosulfamuron is an important herbicide as a resistance management tool to control watergrass species resistant to propanil, cyhalofop, and fenoxaprop in California. Unlike bispyribac-sodium and other sulfonylurea herbicides, orthosulfamuron will be available in wettable granules (WG) and granule (GR) formulations. Therefore, it can be applied as foliar treatment and directly to the flooded rice.

Activity of orthosulfamuron on annual sedges is similar to halosulfuron, but it provides a greater control of hemp sesbania (*Sesbania exaltata*) and aquatic weeds such as duck salad (*Heteranthera* spp.) and alligator weed (*Alternanthera philoxeroides*). Compared with bensulfuron methyl, orthosulfamuron provides better control of sedges (*Cyperus iria*, *Cyperus esculantus*, *Cyperus difformis*), and similar control of aquatic weeds. Regardless of the differences in rice production in different geographic regions, no single herbicide is effective on different weed spectrums found in individual rice fields. Compared to the available registered herbicides, orthosulfamuron has its unique

characteristics and activity on a different weed spectrum. Furthermore, water seeded rice fields infested with hempsesbania, alligator weeds, duck salad, and water grass (*Echinochloa*) species resistant to propanil would be the right niche for the use of this herbicide. Benefits of using orthosulfamuron in controlling such a weed spectrum in rice production would be greater than the use of currently registered herbicides. Therefore, BEAD determined that the availability of orthosulfamuron is in public interest.

AGENCY POLICY ON PUBLIC INTEREST FINDINGS

FIFRA section 3(C)(7)(C) authorizes the issuance of a conditional registration for a new pesticide with specific restrictions and for a specific period of time. This interim registration allows temporary use of a pesticide while full registration is being pursued. All three of the following conditions must be met for a conditional registration: 1) insufficient time has elapsed for the generation of data since the requirement for that data was imposed; 2) use of the pesticide will not cause unreasonable adverse effects; and 3) use of the pesticide is in the public interest.

The registration of a new pesticide ingredient is presumed to be in the public interest if one or more of the following criteria are applicable: 1) it involves a replacement for another pesticide that is of continuing concern to the Agency; 2) it involves a use for which a section 18 emergency exemption has been granted, if the basis for the exemption was the lack of a suitable alternative; and 3) it involves use against a pest of public health significance.

For pesticides which do not meet any of the criteria listed above for the presumption of public interest, one of the following three criteria must be met: 1) there is a need for the new pesticide that is not being met by currently registered pesticides; 2) the new pesticide is less risky than currently registered pesticides; 3) the benefits from the new pesticide are greater than those from currently, registered pesticides or non-chemical control measures. BEAD's review focuses on items 1 and 3.

Generally, in a Public Interest Proposal, economic information includes the expected market price. Although expected percent share of the market and an analysis of the primary competitive products were included in the application, no market price information was included in the submission. Therefore, economic analysis was not conducted on this application.

GENERAL INFORMATION ON ORTHOSULFAMURON

Orthosulfamuron, a member of the sulfonylurea family, is a systemic herbicide that can be used for the control of annual and perennial broadleaf weeds and sedges in rice production. It is applied as a selective post emergence herbicide and for the best results it should be applied on emerging and actively growing weeds. This stage normally corresponds to the growth stage with 2 to 4 leaves of rice. Orthosulfamuron inhibits the acetolactate synthase, also known as actohydorxy acid synthase (ALS/AHAS). Inhibition of this enzyme blocks the biosynthesis of branch chained amino acids (valine, leusine and

isoleucine) in susceptible plants. It is mainly absorbed by the plant foliage. The proposed maximum annual application rate is 1.7 to 2.1 oz of wettable granule (50 WG) and 13 lbs of granule (GR) product per acre.

REGISTRANT'S CLAIMS FOR PUBLIC INTEREST

The Applicant, Isagro USA Inc., claims that the registration of orthosulfamuron herbicide for the control of sedges, broadleaves, and aquatic weeds in rice production is in the public interest. This claim is based on the activity of orthosulfamuron on sedges, hemp· sesbania, jointvetch, and aquatic weeds such as duck salad, alligator weed, and herbicide resistant watergrass species.

BIOLOGICAL ANALYSIS AND CONCLUSIONS

Rice is the staple food for half of the world population (3). In the U.S. 3.31 million acres of rice were planted in 2005, and 40% of the crop is exported. Rice provides commodity support for numerous industries (human and animal food, manufacturers) and has a 1.78 billion economic value in the U.S. agricultural crop production (8). The major rice producing states, acreage, yield, and the economic value of the rice production in the individual state is shown in Table 1. Arkansas and California are the two major states sharing a 64% of U.S. rice production.

Table 1. Acreage, production, and economic value of the rice production in 2005 in major rice producing states in the U.S.

State	Planted Acreage (in thousands)	Production (in 1000 hundred weights)	Value of the production (in millions of dollars)
Arkansas	1,635	108,792	810
California	528	38,836	407
Louisiana	530	30,983	229
Mississippi	265	16,832	127
Missouri	216	14,124	105
Texas	202	14,124	108

Source: (8)

Weeds reduce the yields in rice production by competing for nutrients, moisture, and light. In addition, they interfere with the cultural practices and increase the harvesting and drying costs (7). Chemical, mechanical, biological, and manual weed control methods are available for the control of weeds in rice production. Use of herbicides is the most efficient weed control method used in the rice production. Many herbicides are available for the weed management in rice production. These herbicides are applied as burn-down, pre-emergence, early post-emergence, and late post emergence treatments. The selection of the appropriate herbicide or herbicide combinations used for the weed control depends on the factors such as type, size, and density of the weeds at the site, and growth stage of the crop. Orthosulfamuron is recommended as a post-emergence herbicide to control

broadleaves, sedges, and some aquatic weeds such as duck salad, alligator weed, and watergrass species (6).

Halosulfuron, penxosulam, bensulfuron, bispyribac sodium and propanil are the most competitive registered post-emergence herbicides to orthosulfamuron (Table 2). Except propanil, mode of action of these herbicides is similar to orthosulfamuron. Halosulfuron can be applied with glyphosate for pre-plant burn down of emerged annual grasses, broadleaf weeds, and sedges. Foliar applications of halosulfuron can be made at the 3-5 leaf stage of rice. Dry broadcast applications can be made at the 1-2 leaf stage of rice when weeds have 1 to 2 leaves. Also, this product can be applied as a dry broadcast treatment at the post flood stage. The activity of orthosulfamuron on annual sedges is closer to halosulfuron. However, halosulfuron is less effective in controlling the alligator weed, watergrass, and morningglory (*Ipomoea*) species (Table 2).

Compared to orthosulfamuron, and halosulfuron, penoxsulam has a greater efficacy on water hyssop spp. However, it is less effective on controlling alligator weed. Bensulfuron is also a highly competitive herbicide to orthosulfamuron. However, it does not have an activity on watergrass species. Compared to orthosulfamuron, bispyribac sodium, and propanil have a grater activity on watergrass species and they are less effective on weed species such as ducksalad and yellow nutsedge. Furthermore, propanil is less effective in controlling alligator weed (Table 2).

The presence of herbicide resistant watergrass species (*Echinochloa* spp.) to propanil, quinclorac, fenoxaprop, thiobencarb, and cyhalofop has been reported in major rice producing states (1, 5). Selection of proper herbicides with different mode of action and crop rotation has been used as a tool to manage herbicide resistant weeds (2). However, if several herbicides with different mode of action are available, crop rotation may not be necessary as a weed control measure. Several herbicides (halosulfuron, penxosulam, bensulfuron, bispyribac sodium) with similar mode of action to orthosulfamuron are available for the management of aquatic weeds in the rice production. However, the weed spectrum controlled by these herbicides varies depending on the activity of the individual herbicide (Table 2).

Regardless of the differences in rice production in different geographic regions, no single herbicide is effective on managing the different weed spectrums found in individual rice fields. Compared to the currently available registered herbicides, orthosulfamuron has its unique characteristics and activity on a different weed spectrum. Furthermore, the water seeded rice fields infested with hemp sesbania, alligator weeds, duck salad, and water grass species resistant to propanil, would be the market niche for this herbicide. Benefits of using orthosulfamuron in controlling such a weed spectrum in rice production would be greater than the use of currently registered herbicides. Therefore, BEAD believes that the availability of orthosulfamuron is in the public interest.

Table 2. Comparison of efficacy of alternative post-emergence herbicides to orthosulfamuron.

Herbicide	Trade Name	Mode of Action	Appl. Rate (ai lb/ac)	Watergrass spp.	Ducksalad	Water hyssop spp.	Ricefield bulrush	Yellow nutsedge	Purple nutsedge	Sprangletop	Alligator weed	Hemp sesbania	Morningglory spp.	Annual sedges	Small flower umbrella sedge	Eclipta	Jointvetch
Orthosulfamuron	----	ALS inhibitor	0.05*	6	8	0	8	7	-	0	6	8	7	9	9	8	8
Halosulfuron	Permit	ALS inhibitor	0.03	0	7	-	-	9	9	0	2	7	5	9	9	8	7
Penoxsulam	Grasp	ALS inhibitor	0.04	8	9	8	9	2	-	0	4	8	6	8	9	8	8
Bensulfuron	Londax	ALS-inhibitor	0.03	0	8	8	-	6	-	0	6	4	2	8	7	8	6
Bispyribac sodium	Regiment	ALS inhibitor	0.02	8	2	7	8	2	-	0	8	9	6	6	7	9	8
Propanil	Stam	Photosystem II inhibitor	3	8	4	9	8	4	-	7	2	9	8	8	8	9	9
Imazethapyr	Newpath	ALS inhibitor	0.06	-	4	1	-	4	-	6	0	0	2	9	-	0	0
Quinclorac	Facet 75 DF	Growth regulator	0.37	-	0	2	-	5	-	0	0	9	7	8	-	2	8
Molinate	Ordram	Growth inhibitor	3.0	-	-	2	-	-	-	5	-	2		5	-	5	0
Carfentrazone-ethyl	Aim	PPO inhibitor	0.02	-	4	-	-	-	-		-	9	8	5		6	9
Bentazon	Basagran	PS II inhibitor	0.75	-	8	8	-	-	-	-		4	8	8		8	3
2,4-D	2,4-D	Growth regulator	0.5	-	9	9	-	-	-	-		9	9	2		9	5

*wettable powder (50WG)
Note: Weed control ratings were 0 to 10; 0 = not controlled and 10 = 100 % controlled
Source: (4, 6)

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