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

MAY 1 1985

M E M O R A N D U M

SUBJ: 85-OK-02 Proposed Section 18 Exemption for Use of Glyphosphate (Roundup) on Wheat [RCB#895]

FROM: Allan J. Reiter, Chemist
Residue Chemistry Branch
Hazard Evaluation Division (TS-769C)

THRU: Edward Zager, Section Head
Special Registration Section II
Residue Chemistry Branch
Hazard Evaluation Division (TS-769C)

TO: Jack Housenger, PM Team #41
Registration Division (TS-767C)

The State of Oklahoma has requested a Section 18 exemption to use glyphosate on wheat.

Tolerances have been established for the combined residues of glyphosate (Roundup; N-[phosphonomethyl]glycine; EPA Reg. No. 524-308-AA) and its metabolite aminomethyl phosphonic acid at 0.1 ppm (N) on grain crops and at 0.2 ppm on kidney and liver of cattle, goats, hogs, horses, poultry and sheep (40 CFR 180.364).

PP#3F2809/FAP5H5450 proposing a 0.25 ppm tolerance for the combined residues of this herbicide on wheat grain is currently in reject status due to deficiencies in the residue data (#3F2809, Memo of R.W. Cook, 4/18/85).

Proposed Use

The proposed use involves rope wick or wiper application of glyphosate to volunteer rye when it is six or more inches above the desirable wheat crop. The herbicide will be diluted to 33% with water. The State of Oklahoma states that the herbicide will be applied at the rate of 0.06 lb a.i./A, and thus estimates that the application will be over 75,000 A for a total of 4,500 lb a.i.; a PHI of 30 days for wheat is specified. In addition, the proposed label states that repeat applications may be necessary after the rye has headed and has achieved maximal growth and height. Also, it advises that wiper applicators be adjusted so that the wiper contact point with rye is at least 2 inches above the wheat. Other precautions include operating the application equipment at no greater that 5 mph and avoiding leakage or

dripping, and recommending two applications in opposite directions on the same day for optimal results.

Section 18 exemptions for the same use of glyphosate to control volunteer rye on wheat have been issued before in Oregon (Memo of E. Zager, 7/6/82), in Washington (Memo of A. Rathman, 83-WA-08, 4/27/83), and Oklahoma (no review, 84-OK-05). Currently, Monsanto Co. has submitted a Section 3 registration petition for this use.

Analytical Method

A method deemed adequate for enforcement purposes and which has undergone a succussful method trial on soybeans and beef liver, has been published in PAM II (J.G. Cummings, PP#5F1536, memo of 1/6/77). It is entitled Analytical Residue Method for the Detrmination of Glyphosate and Aminomethyl Phosphonic Acid Residues in Forages, Grains, Soil and Water. Briefly, it involves methylation by derivatization with methyl pseudourea or diazomethane followed by quantitative determination by GLC using a phosphorus-specific flame photometric detector. Recoveries are 55-70% (parent) and 45-60% (metabolite). However, this 4-5 d procedure is quite time-consuming. An alternative HPLC method has undergone a successful method trial on peanuts (PP#OF2329, 1,19/81, R. Storherr). This method is not as sensitive as the GLC method but more rapid. It thus may be concluded that adequate methods are available for enforcement.

An analytical reference standard is available from the Pesticide and Industrial Chemicals Repository (Code 3801).

Residue Data

Residue data have been presented in a similar Section 18 request (Memo of E. Zager, 4/27/83) involving use of glyphosate to control volunteer rye in wheat fields. In this case, data on treated sorghum was translated to wheat. Briefly, four field studies conducted in KS, NE, MO involving roller and rope wick applications of glyphosate at 0.06 lb a.i./A resulted in residues of the parent herbicide in sorghum grain of <0.05 ppm (with a single exception of one sample containing 0.18 ppm) at PHI's of 37-39 days and in sorghum forage of <0.05-0.15 ppm at PHI's of 20-37 days. Residues of the metabolite aminomethylphosphonic acid were <0.05 in all grain and forage samples at PHI's ≥ 8 days. By translation to wheat, it was thus concluded that the combined residues would not exceed 0.2 ppm in/on wheat grain straw at a 30 day PHI. It was further concluded that "since this was essentially a no residue situation in wheat grain, that no concentration of residue was expected in wheat processed fractions".

More recently (Memo of R.W. Cook, #3F2809, 4/18/85) additional residue data involving rope wick application of glyphosate to wheat were reviewed and found to be unsatisfactory for supporting a proposed tolerance of 0.25 ppm in wheat grain. Among the deficiencies cited were the inability to determine the maximum expected residue because of the inability to define the application conditions and particularly "upper dosage limits"; it was concluded that no satisfactory tolerance could be recommended. These field studies conducted in 6 states showed residues of glyphosate ranging from ND to 0.98 ppm in grain at 7-38 d PHI for two treatments ("double pass"). In one study a "single pass" rope wick application of a 33% solution of glyphosate and a 7 day PHI produced residues of 0.24-0.4 ppm and <0.05 ppm of aminomethylphosphonic acid in wheat grain, while straw contained 1.4-1.6 ppm glyphosate and <0.05-0.06 ppm of aminomethylphosphonic acid; the corresponding residues approximately doubled with "two passes".

Considering only the four trials with 28-38 day PHI's, maximum residues of the parent on grain ranged from 0.09 ppm for one treatment and 0.16 ppm for two treatments; no detectable residues of the metabolite were observed on wheat grain. For wheat straw at 28-38 d PHI, maximum residues were 0.20 ppm (parent) for a single treatment and 0.22 ppm for a double treatment; no residues were observed of the metabolite at either rate. While the available residue data are not adequate to support a permanent tolerance on wheat, they are considered adequate to support a one year emergency use.

Thus, it may be concluded that residues of glyphosate in/on wheat grain resulting from two treatments of 0.06 lb a.i./A are not likely to exceed 0.25 ppm in or on wheat grain and 3 ppm in or on wheat straw at 30 days after treatment.

Until residue data are received on wheat forage, RCB recommends that a restriction be made against the grazing of treated wheat forage or hay.

Milled Byproducts

Based upon a review of a wheat milling study (Memo of R.W. Cook, PP#3F2809/FAP5H5450, 4/18/85), it was concluded that proposed food additive tolerances for wheat bran and shorts were inadequate. It was recommended that an appropriate level would be 3X the level found in the rac (wheat grain). Residues in milled wheat byproducts will not exceed 0.75 ppm.

Meat, Milk, Poultry and Eggs

From the earlier Sec. 18 memo on this subject (Memo of E. Zager, 7/6/82) the following comments were made. "The contribution to the dietary burden of glyphosate from feeding of treated wheat grain and straw will be negligible compared to the dietary

contribution from other feed items with established tolerances for residues of glyphosate such as soybeans (6 ppm); soybean forage (15 ppm) and soybean hay (15 ppm).

"Thus, for wheat treated twice at no greater than 0.06 lb a.i./A, secondary residues of glyphosate and its metabolite aminomethyl phosphonic acid are not expected to exceed the established tolerances of 0.2 ppm for kidney and liver of cattle, goats, hogs, horses, poultry with respect to secondary residues in milk, eggs and tissues other than liver and kidney.

Conclusions

1. Adequate enforcement methodology is available in PAM II, Method I. A reference standard is available from the Pesticide and Industrial Chemicals Respository.

2. Residues of glyphosate and its metabolite aminomethyl phosphonic acid will not likely to exceed 0.25 ppm in/on wheat grain, 0.75 ppm in milled byproducts and 3 ppm in/on wheat straw at a 30-day PHI, if applied by the proposed program.

3. Secondary residues of glyphosate and its metabolite aminomethyl phosphonic acid in/on kidney and liver of cattle, goats, hogs, horses, poultry and sheep are not expected to exceed the established 0.2 ppm tolerance. A restriction is needed on the feeding of forage or hay from glyphosate treated wheat.

Recommendation

TOX considerations permitting, and provided the use is limited to only a double pass of 33% glyphosate under the proposed conditions and a restriction is added to the label against feeding of treated forage or hay, we have no objections to the proposed Section 18 exemption. An agreement should be made with the FDA regarding the legal status of the treated crops in commerce.

cc: glyphosate SF,Sec.18 SF,RF,Circu.,Reiter,Reiter's RF,TOX

RDI:E.Z.:4/30/85:R.D.S.:4/30/85
TS-769C:RCB:Reviewer:A.J.Reiter:ajr:557-3043:CM#2:Rm.708:5/1/85