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

APR 16 1993

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM:

SUBJECT: Chlorpropham. Registrant Pin Nip, Inc. Response to the Reregistration Standard: Magnitude of the Residue in Postharvest Potatoes and Potato Processed Commodities (MRID 42566801).
CBRS No. 11008. DP Barcode No. D185464.

FROM: John Abbotts, Chemist
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THRU: Francis B. Suhre, Section Head
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TO: Venus Eagle, PM Team 71
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E.R. Butts, International, Inc., on behalf of registrant Pin Nip, Inc., and in support of reregistration, has submitted data on magnitude of the residue in potatoes treated post-harvest and potato processed commodities.

Tolerances are established for combined residues of the plant regulator and herbicide chlorpropham, isopropyl m-chlorocarbanilate (CIPC), and its metabolite 1-hydroxy-2-propyl 3'-chlorocarbanilate, calculated as CIPC, in or on potatoes (post-harvest) at 50 ppm, and soybeans at 0.2 ppm (40 CFR 180.181). Chlorpropham is a List A Chemical. A Registration Standard (Guidance Document) was issued 12/87; an Update to the Residue Chemistry Chapter was issued 10/16/91.

Conclusions

1. Residues in fortified samples for method validation were reported as µg or ng. The adequacy of the method cannot be evaluated until registrant reports weights of fortified samples, so residues in ppm or ppb can be calculated and compared with residues in treated samples.

2. Judgment is reserved on submitted 3-chloroaniline residue data until the analytical methodology employed has been validated for its ability to detect conjugated 3-chloroaniline residues. Such validation can best be conducted using radiolabeled samples from metabolism studies.

3. It is assumed that the performing laboratory reported residues in peel and pulp which actually represented ppm or ppb equivalent for whole potato weight, and then added these values to obtain the residues reported for whole potato. In the absence of residue data on wet peel from processing samples, registrant should report residue data for peels in terms of both wet peel weight and equivalent whole potato weight. The latter expression can be used in calculating residues in or on whole potato.

4. In untreated samples, residues of chlorpropham in potato waste and chlorpropham and 3-chloroaniline in dried skins represented a significant portion of residues detected in treated samples; for these commodities, residues in untreated samples should not be subtracted as background. For these commodities, registrant should confirm that residues reported in treated samples were uncorrected for residues in untreated samples, or adjust reported residues accordingly.

5. The performing laboratory claimed that residues in skins dried in the laboratory are higher than residues that would be expected from commercial processing methods. However, in the absence of adequate data from potatoes processed by commercial methods, the data from skins dried in the laboratory must represent the basis for establishing tolerances.

6. Maximum residues of 3-chloroaniline detected were 398 ppb in whole potato, 4600 ppb in dry peel, and 622 ppb in potato processed waste. Although judgment on 3-chloroaniline residues is reserved in accordance with Conclusion 2, these data indicate that residues of 3-chloroaniline concentrate during processing of treated potatoes in dry peel and potato processed waste.

7. Residue data were submitted to support the use of an RTU formulation applied by aerosol/fogger at an application rate of 0.017 lb ai/1000 lb potatoes. Registrations, including SLN labels, which specify higher rates, other application methods, or other formulations, should be canceled, if other registrants do not submit data to support them.

8. Data on residues other than parent and 3-chloroaniline are not required for potatoes treated post-harvest.

9. While not a requirement, if methods development is pursued, method sensitivity might be improved with HPLC conditions which provide better separation of interfering matrix peaks from peaks of the residues to be regulated.

Recommendations

The submitted study can be upgraded to an acceptable status if additional information is provided to resolve CBRS Conclusions 1, 2, 3, and 4 above. Consistent with Conclusion 7, registrations not supported by the data submitted or other registrants should be canceled.

Additional information in response to the Conclusions may alter residue data. In addition, uses supported by other registrants may require higher tolerances than the use supported here. However, based on the data provided, tolerances on potato commodities should reflect the following residue levels:

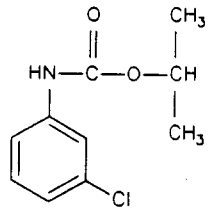
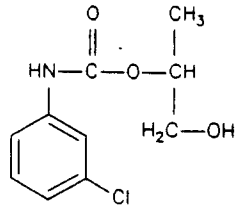
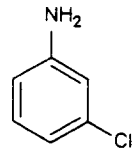
For parent chlorpropham, 12 ppm in whole potatoes, 140 ppm in dry peel, and 40 ppm in potato processed waste.

Background

Registrants have voluntarily canceled all uses except post-harvest treatment of potatoes. The Update to the Residue Chemistry Chapter (10/16/91) concluded that data are required depicting chlorpropham residues of concern, including 3-chloroaniline, in or on potatoes analyzed immediately after treatment in commercial storage with an RTU formulation applied at the maximum registered rate as an aerosol through forced air circulation systems, and (in separate tests) with an EC formulation applied at the maximum registered rate as a dilute aqueous spray to potatoes moved along a conveyer belt. Samples from each test must be taken from several positions in the storage pile. A processing study is also required depicting chlorpropham residues of concern, including 3-chloroaniline, in potato granules, potato chips, and potato peels, wet and dried, processed from raw tubers bearing measurable, weathered residues. If residues concentrate in any of these processed commodities, the registrant must propose an appropriate food/feed additive tolerance. A subsequent review noted that data could be translated between 4 lb and 7 lb formulations used as a fog, provided the formulations were of identical types (e.g., both were RTU formulations), had the same application rate and timing, and the methods of application were essentially identical (CBRS No. 9013, 12/26/91, P.A. Deschamp).

In support of reregistration, E.R. Butts, International, Inc., submitted a protocol for determination of residues of chlorpropham and 3-chloroaniline on potatoes and potato processed commodities due to post-harvest fumigation. This protocol was acceptable, with specified modifications (CBRS No. 9278, 4/17/92, S.R. Funk). Structures of parent chlorpropham, the metabolite presently included in the tolerance expression, and 3-chloroaniline are shown in Table 1.

Table 1. Chlorpropham and Metabolites.

Chemical Names (Common names)	Chemical Structure
isopropyl m-chlorocarbanilate isopropyl 3-chlorocarbanilate (chlorpropham; CIPC)	
1-hydroxy-2-propyl-3'-chlorocarbanilate (40 CFR 180.181) hydroxyisopropyl-N-(3-chlorophenyl) carbamate (isopropyl-OH-CIPC)	
3-chloroaniline (chloroaniline)	

The nature of the residue in stored potatoes treated post-harvest is adequately understood (CBRS Nos. 8942, 9137, 9166, 9171, 3/10/93, J. Abbotts). At a meeting on 3/22/93, the HED Metabolism Committee reached the following conclusions with regard to post-harvest treatment of potatoes with chlorpropham (Memo, 3/31/93, J. Abbotts):

1. The tolerance for potatoes may be continued for residues of chlorpropham only, but the need to include 3-chloroaniline in the tolerance expression will be revisited upon availability of adequate oncogenicity data.

2. Judgment is reserved on whether 3-chloroaniline is a residue of concern, and on whether concentration of 3-chloroaniline in potato processed commodities is of concern, pending the availability of data on its oncogenicity.

3. Judgment is reserved on whether concentration of chlorpropham in potato processed commodities is of concern, pending review of data on oncogenicity.

4. Judgment is reserved on the magnitude of 3-chloroaniline residues pending validation of a method adequate for detecting bound residues in potato commodities.

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As the present submission in support of reregistration, E.R. Butts International, Inc., on behalf of Pin Nip, Inc., provided the following document:

Chlorpropham and 3-Chloroaniline Residue Study on Potatoes, Potato Skins, Potato Chips, and Potato Granules after Post-Harvest Fumigation, Study Number 92-001, Hibbs Analytical Laboratories, October 25, 1992 (MRID 42566801).

The present submission also included a cover letter, dated 11/18/92, describing the protocol modifications made in response to the earlier review (CBRS No. 9278, 4/17/92, S.R. Funk)

Protocol

Potato tubers, Russet Burbank variety, were grown in southeastern Idaho and harvested in October 1991. Potatoes were stored in a potato cellar near Rexburg, Idaho. The cellar was a dirt-walled A-frame structure; walls and floors were natural soil, with a wall seven feet high. The roof was a wooden A-frame covered by a layer of straw bales which acted as insulator and sealant. The outside of the structure was a corrugated tin roof. The cellar measured 350 ft long by 40 ft wide, with a total capacity of 5 million lb of potatoes.

The test substance was Sprout Nip 7A (EPA Reg. No. 34704-614), 7 lb ai per gal (78.5% chlorpropham), ready-to-use (RTU) formulation in methyl alcohol. Chlorpropham was dispensed into the potato cellar with a commercial fogger, mounted on the back of a pickup truck, and connected to the ventilation system of the cellar. The cellar ventilation system consisted of corrugated, perforated pipe placed across the floor of the cellar. Flow rate was approximately 1 cubic ft per min. Potatoes were treated at an application rate of 1 lb ai per 60,000 lb potatoes. After fumigation was completed, the potato cellar was not ventilated for 24 h, and then normal ventilation was restored to the cellar.

Potato samples were collected at six different sites from three different levels of potato storage. Samples were collected from the top of the pile at about one-third and two-thirds the total length of the pile. Flags were placed at these two sites so all sample collections at these sites were at the same location. Samples from the other sites were obtained by cutting holes through the side wall of the air plenum. Samples were taken from a level 1 ft above the cellar floor and at 7 ft, midway between the floor at the top of the potato pile.

31 potatoes were taken from each of six collection sites at each time point, for a total of 186 potatoes for each time point. Samples were taken immediately before fumigation (0 hr), and at 2 h, 15 days, 30 days, 60 days, 90 days, and 106 days after fumigation. Of the 31 potatoes from each collection site, 20

were combined and processed into potato granules; this generated granules and a waste product consisting of wet peels. The remaining 11 potatoes from each site were sent to Hibbs Analytical Laboratory, Boise, Idaho, for extraction and analysis. From each collection site, five potatoes were used to produce five potato peel and five potato pulp samples. Three potatoes from each site were turned into dried potato skins and another three from each site were processed into potato chips. Each resulting potato sample was analyzed individually.

At each sampling site, the first eleven potatoes were placed in individual plastic bags, then placed in a new one gal paint can and the lid securely fastened. The other 20 potatoes from each site were placed in unused five gal plastic buckets, and the lids sealed. Transport of the samples in the cans and buckets with lids prevented loss of the fumigant during shipment. Potatoes were shipped to William J. Englar and Associates of Moses Lake, WA for processing into granules, or to Hibbs Analytical Laboratory, Boise ID for processing and analysis. Potato granule and process waste samples from Moses Lake were shipped to Hibbs Analytical Laboratory for analysis.

Whole potatoes transported to Hibbs Analytical Laboratory were individually peeled with a vegetable peeler. Potato chips were prepared by slicing pulp thinly and frying in canola oil. Dried potato skins were prepared by drying in a laboratory oven. Potatoes shipped to Moses Lake were processed into granules and processing waste.

Analytical Method

At Hibbs Analytical Laboratory, the six different types of potato samples were weighed, shredded, and placed in a beaker. To the beaker was added reagent alcohol (ethanol:isopropyl alcohol, 95:5) to extract peels and pulp, or 60% aqueous alcohol, to extract chips, skins, and granules, along with internal standards barban (for chlorpropham analysis) or 4-chloroaniline (for 3-chloraniline analysis). All samples were extracted identically after addition of alcohol and internal standard. Samples were heated in a water bath at 50°C for 30 min, followed by agitation for 20 min. Extracts were passed through a glass fiber filter in a plastic syringe into two glass vials; one sample was used for analysis of chlorpropham, and the second for analysis of 3-chloroaniline.

Chlorpropham was analyzed by reverse phase HPLC using a 5 micron C18 column eluted with a solution of 48.5% acetonitrile, 50% water, and 1.5% acetic acid, adjusted to pH 6.75 with sodium hydroxide. Some samples were analyzed using a 3 micron C18 column eluted with 50% acetonitrile, 50% water, containing 0.125 M ammonium acetate and adjusted to pH 5.85. Detection was by uv at 254 nm.

For analysis of 3-chloroaniline, extract samples were acidified to pH 2.5 and loaded onto a strong cation exchange (SCX) column which had been activated by passing one column volume of 1 N HCl through the resin bed, followed by one column volume of deionized water. Columns were washed with acidified 50% aqueous ethanol, then eluted with one column volume of reagent alcohol:water (50:50) containing 1 M ammonium hydroxide, followed by one-half column volume of water. Samples were neutralized with glacial acetic acid, then analyzed by HPLC using a 5 micron C18 column, eluted with water:acetonitrile:acetic acid (66:34:0.3) at pH 4.7. Detection was by uv at 242 nm. Residues of both compounds were quantitated on the basis of peak height, corrected for recovery of the internal standard.

The method was validated with potato samples fortified with chlorpropham or 3-chloroaniline. Recoveries from fortified samples are summarized in Table 2:

Table 2. Recoveries from Fortified Potato Samples.

Recoveries of Chloropropham:			
Sample	Fortification, µg	Recovery, µg	Recovery, %
Peel	830	830	100
	1542	1610	104
	1720	1703	99.0
Pulp	41.5	45.1	109
	130	123	94.4
	261	242	92.8
Dried Skins	237	240	101
	712	736	103
	890	929	104
Potato Chip	130	138	106
	504	523	104
Granules	178	189	106
	498	524	105
Recoveries of 3-Chloroaniline:			
Sample	Fortification, ng	Recovery, ng	Recovery, %
Peel	4340	4097	94.4
	13020	12932	99.3
	34720	33733	97.2
Pulp	521	671	129.1
	1302	1417	108.8
Skin	2084	1997	95.8
	8682	8148	93.8
Chip	4341	4128	95.1
	13023	12699	97.5
Granule	1099	1366	124.2
	3297	3179	96.4

CBRS Comments, Analytical Method

The performing laboratory reported fortification levels and recoveries only as µg or ng; also unreported were weights of the fortified samples, which would allow calculation of residues in ppm or ppb. For analyzed treated samples, weights were reported only for granules, at 75-95 g. If fortified samples represented the same weights, then the smallest value for chloropropham in fortified granules would be 1.87 ppm, which is far higher than residues detected in treated samples (see below). The smallest

value for 3-chloroaniline in fortified granules, assuming samples of 75-95 g, would be 11.6 ppb, which is less than the claimed limit of quantitation, 20 ppb. The performing laboratory reported that this fortification level would have been below the limit of quantitation "if a normal sample weight is assumed" for this sample. The implication is that the weight of fortified samples was not the same as the weight of analyzed treated samples. The recoveries in Table 2 represent an acceptable range. However, until fortification levels are converted to ppm or ppb and compared with residue levels detected in treated samples, the adequacy of the method cannot be evaluated.

Conclusion 1: Residues in fortified samples for method validation were reported as µg or ng. The adequacy of the method cannot be evaluated until registrant reports weights of fortified samples, so residues in ppm or ppb can be calculated and compared with residues in treated samples.

The Residue Chemistry Chapter (8/14/87) concluded that data collection and enforcement methodology should include hydrolysis step(s) in order to detect free and conjugated side-chain modified metabolites, such as isopropyl-OH-CIPC and 3-chloroaniline. The Guidance Document (12/87) specified that methods used for data collection, including methods specific for 3-chloroaniline, be tested with regard to their efficiency in extracting bound residues. To this end, it was recommended that methods be validated with weathered radioactive residues in conjunction with the required metabolism studies.

The Update to the Residue Chemistry Chapter (10/16/91) reiterated the requirement that methods must include a hydrolysis step at the tissue stage to release bound/conjugated residues. Such a hydrolysis step must be incorporated into all methods to be used for data collection in support of tolerances. The efficiency of extraction of bound/conjugated residues must be determined for any or all residue data collection methods the registrant has used or will use to support tolerances. This may best be conducted with samples containing radiolabeled material from plant and animal metabolism studies.

The nature of the residue in potatoes treated post-harvest is adequately understood (CBRS Nos. 8942ff, 3/10/93, J. Abbotts). Residues identified in peel included 3-chloroaniline, representing 0.35% of TRR (0.102 ppm). Also identified was 3-chloroaniline-N-glucosylamine, present at 0.05% TRR in peel, and 0.18% in pulp, for a combined level of 0.23% TRR (0.067 ppm). Conjugated forms of 3-chloroaniline may thus be present in potatoes and potato processed commodities.

The analytical method used in the present submission extracts tissues with reagent alcohol or aqueous alcohol. These extraction conditions would not be expected to release conjugated

3-chloroaniline for subsequent identification. Consistent with the conclusions of the HED Metabolism Committee (Memo, 3/31/93, J. Abbotts), judgment must therefore be reserved on 3-chloroaniline residue data until the analytical methodology employed has been validated for its ability to detect conjugated 3-chloroaniline residues.

Conclusion 2: Judgment is reserved on submitted 3-chloroaniline residue data until the analytical methodology employed has been validated for its ability to detect conjugated 3-chloroaniline residues. Such validation can best be conducted using radiolabeled samples from metabolism studies.

Residue Data

Table 3 summarizes residues of chlorpropham and 3-chloroaniline in or on potato commodities. Data in the table represent ranges of individual samples and averages over all six sampling sites. Residue data for granules and potato waste represent single determinations of composite samples for each collection time.

Table 3. Chlorpropham and 3-Chloroaniline Residues in Potato Commodities.

Potato Sample	Range (Average) of Chlorpropham residues, ppm, from samples collected at times after treatment:					
	2 hours	15 days	30 days	60 days	90 days	106 days
Whole Potato	2.97-10.98 (6.58)	2.06-11.35 (6.52)	2.13-9.95 (6.11)	1.55-9.28 (5.58)	0.54-8.52 (4.96)	0.63-8.75 (4.80)
Potato Chips	1.84-8.76 (3.94)	1.54-10.03 (5.58)	0.86-10.62 (5.10)	2.03-9.73 (5.76)	0.74-9.11 (4.93)	2.02-7.18 (4.96)
Dried Skins	26.3-129.1 (75.9)	27.3-118.3 (68.8)	33.5-127.0 (75.6)	21.5-81.8 (50.9)	6.2-104.8 (45.1)	12.4-94.3 (59.5)
Granules	0.07	0.08	0.07	≤0.05	≤0.05	0.11
Potato Waste	29.4	34.3	33.6	23.4	21.4	15.8
Potato Sample	Range (Average) of 3-Chloroaniline residues, ppb, from samples collected at times after treatment:					
	2 hours	15 days	30 days	60 days	90 days	106 days
Whole Potato	≤20-398 (144)	≤20-142 (51)	21-143 (60)	35-165 (71)	29-142 (62)	32-86 (46)
Potato Chips	≤20-88 (41)	≤20-160 (64)	≤20-333 (117)	≤20-269 (114)	≤20-317 (104)	44-130 (91)
Dried Skins	≤50-4600 (1327)	≤50-1026 (514)	131-1634 (770)	232-1363 (529)	108-1078 (366)	289-971 (613)
Granules	≤20	≤20	≤20	≤20	≤20	≤20
Potato Waste	622	285	302	207	228	247

Registrant reported residues in potato pulp and in potato peel. The large majority of residues were detected in the peel, with only small portions in the pulp. It is therefore not surprising that residues concentrated in dried skins compared to whole potatoes. Whole potatoes were not analyzed, but residues (ppm or ppb) in whole potatoes were calculated as the sum of residues (ppm or ppb) reported for peel and pulp. For this approach to be correct, the performing laboratory must have reported residues in peel and pulp which actually represented ppm or ppb equivalent for whole potato weight, and then added these values. Residues per weight of peel would therefore be expected to be higher than the values reported. Residue data are also required on the processed commodity wet peel. If residue data are not available for this commodity from processing samples, as appears to be the case, then data from treated, peeled potatoes would be acceptable. Registrant should report residue data for peels in terms of both wet peel weight and equivalent whole potato weight.

Conclusion 3: It is assumed that the performing laboratory reported residues in peel and pulp which actually represented ppm or ppb equivalent for whole potato weight, and then added these values to obtain the residues reported for whole potato. In the absence of residue data on wet peel from processing samples, registrant should report residue data for peels in terms of both wet peel weight and equivalent whole potato weight. The latter expression can be used in calculating residues in or on whole potato.

For all potato commodities, residue levels of both chlorpropham and 3-chloroaniline were generally lower in samples taken from sites 1 and 2, at the top of the potato pile; residue levels at the four remaining sites were similar at all sampling times. In most cases residues were at or near maximum at 2 h after treatment, and declined gradually with time. From the data on Table 3, the relative concentrations in whole potatoes and chips vary with samples collected at different times after treatment. However, for all samples together for both chlorpropham and 3-chloraniline, the highest residues on potatoes are greater than the highest residues on chips. A tolerance for potatoes would therefore be sufficient to include residues on chips, and a separate tolerance on chips should not be necessary. For both chlorpropham and 3-chloroaniline, residues concentrate on dried skins and potato waste.

It should be noted that significant residues were detected in some untreated samples designed to represent controls. Chlorpropham residues in potato waste from untreated potatoes were 1.38 ppm. In dried skins from untreated potatoes, chlorpropham residues were as high as 25.8 ppm (average 6.4 ppm) and 3-chloroaniline residues were as high as 207 ppb (average

101 ppb). Because these levels represent a significant portion of residues in treated samples, they should not be subtracted as background when reporting residue data.

Conclusion 4: In untreated samples, residues of chlorpropham in potato waste and chlorpropham and 3-chloroaniline in dried skins represented a significant portion of residues detected in treated samples; for these commodities, residues in untreated samples should not be subtracted as background. For these commodities, registrant should confirm that residues reported in treated samples were uncorrected for residues in untreated samples, or adjust reported residues accordingly.

The performing laboratory claimed that residues in dried skins overstate residues expected from commercial processing. For this study, the performing laboratory peeled treated potatoes and dried the skins in a laboratory oven. The laboratory noted that the commercial process uses a steam peeling method followed by several cooking steps. In addition, commercial processing uses large quantities of heated air to dry the cooked skins. In support of its claim, the laboratory reported that commercially prepared skins from a major dehydrator were analyzed. No residues of chlorpropham were present in four of six samples, and residues of the remaining two samples contained an average of 5 ppm chlorpropham. However, the performing laboratory noted that analysis of these samples was not conducted under GLP standards. In the absence of adequate data from commercial processing methods, the data reported in Table 3 must be considered the only valid data for establishing tolerances on potato skins.

Conclusion 5: The performing laboratory claimed that residues in skins dried in the laboratory are higher than residues that would be expected from commercial processing methods. However, in the absence of adequate data from potatoes processed by commercial methods, the data from skins dried in the laboratory must represent the basis for establishing tolerances.

Conclusion 6: Maximum residues of 3-chloroaniline detected were 398 ppb in whole potato, 4600 ppb in dry peel, and 622 ppb in potato processed waste. Although judgment on 3-chloroaniline residues is reserved in accordance with Conclusion 2, these data indicate that residues of 3-chloroaniline concentrate during processing of treated potatoes in dry peel and and potato processed waste.

Additional CBRS Comments

Previous review concluded that the proposed protocol would be acceptable provided 12 modifications were made (CBRS 9278, 4/17/92, S. Funk). In its cover letter with the present submission, E.R. Butts International addressed each required

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modification. The material below is organized by each proposed modification (1) to (12), followed by a description of the E.R. Butts International response and CBRS comment on the response.

Modification (1). The proposed application rate of 0.017 lb ai/1000 lb potatoes is only 50% of the maximum allowed use rate of 0.033 lb ai/1000 lb. The registrant must use the higher application rate or indicate nonsupport for the SLN registrations that permit the higher application rate.

Response (1). The application rate used in this study was appropriate to support the product label. This registrant does not intend to petition for a new label containing a higher application rate.

Modification (2). Only fogger/aerosol application for storage purposes is addressed. Data must also be generated for potatoes (fresh or from storage) sprayed with chlorpropham prior to shipment. Processed fraction data are required from only one of the two application methods, but the potatoes processed must bear measurable residues of chlorpropham.

Response (2). Pin Nip's registration is for the application of chlorpropham to potatoes contained in commercial storage facilities to prevent sprouting. Spray treatment of potatoes just prior to shipment is not a use specified on the Pin Nip 7A label. Therefore, the study being submitted determined residue levels only in stored potatoes.

CBRS comment (1) and (2), Conclusion 7: Residue data were submitted to support the use of an RTU formulation applied by aerosol/fogger at an application rate of 0.017 lb ai/1000 lb potatoes. Registrations, including SLN labels, which specify higher rates, other application methods, or other formulations, should be canceled, if other registrants do not submit data to support them.

Modification (3). The parent and all regulated metabolites must be determined. At present, this means chlorpropham and hydroxyisopropyl N-(3-chlorophenyl) carbamate. Apparently, the analytical method determines chlorpropham and 3-chloroaniline. This may be acceptable if the registrant's procedure converts the metabolite to 3-chloroaniline prior to analysis. Clarification is required.

Response (3). Prior to the initiation of the study, guidance was obtained from EPA regarding the analysis of residues of concern....However, after receiving the comments from Drs. Funk and Rathman, the Study Director obtained a very small amount of hydroxyisopropyl N-(3-chlorophenyl) carbamate reference standard. The retention time of [this metabolite] was determined in the HPLC procedure used to quantify chlorpropham and 3-chloroaniline.

While not part of the definitive study and therefore not included in the final report, the hydroxylated metabolite was found to separate from both chlorpropham and 3-chloroaniline and show on the chromatogram as a definitive peak. Analysis of several extracts of chlorpropham-treated potatoes showed very little, if any, hydroxylated metabolite present (below 200 ppb).

CBRS comment (3). The finding of little of the hydroxylated metabolite is consistent with data reported on the nature of the residue in treated potatoes (CBRS 8942ff, 3/10/93, J. Abbotts). In addition, the HED Metabolism Committee concluded that residues other than parent chlorpropham and 3-chloroaniline are not of concern in potatoes treated post-harvest (Memo, 3/31/93, J. Abbotts).

Conclusion 8: Data on residues other than parent and 3-chloroaniline are not required for potatoes treated post-harvest.

Modification (4). The analytical method summary states that Barban is added "to each sample as an internal standard." This is acceptable only if the Barban is added to the final extract prior to analysis. It may not be used as an internal standard if it is added to the raw sample prior to extraction, i.e., internal standards may not be used to correct for poor extraction/workup efficiency.

Response (4). The internal standard, barban ... was added to partially processed potato samples, not to the final extract. However, this is acceptable because recovery was excellent and the standard was not used to account for extraction inefficiency....

CBRS comment (4). Because they were not added to the raw sample, the use of internal standards was acceptable.

Modification (5). Storage stability will not be required for those potatoes going directly to the laboratory, because preparation and analysis are to be conducted within 5 days of sampling. However, the time from sampling to processing into granules and the time from granule production to granule analysis are not specified. Each of these times must be less than about 10 days. Otherwise, storage stability data will be required for potatoes used to make granules and/or for potato granules.

Response (5). The protocol specifies that all samples will be analyzed within 5 days of collection. Drs. Funk and Rathman allow up to 20 days between sample collection and analysis. Almost all samples were analyzed within the 20 day allowance, including the granules. Therefore, storage stability need not be determined.

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CBRS comment (5). The requirements of the previous review have been met, and storage stability data are not required.

Modification (6). The final report submitted to the Agency must contain typical chromatograms and associated raw data for each of the raw and processed commodities.

Response (6). As suggested, the final report contains typical chromatograms and associated raw data.

CBRS comment (6). The data provided are acceptable. It should be noted that the chromatograms show interfering uv peaks from potato matrices with mobilities near those of chlorpropham.

Conclusion 9: While not a requirement, if methods development is pursued, method sensitivity might be improved with HPLC conditions which provide better separation of interfering matrix peaks from peaks of the residues to be regulated.

Modification (7). Conditions (temperature, humidity, light) of potato storage must be described in the final report and must conform to typical industry practice.

Response (7). The conditions under which the potatoes were stored are provided in the report. The treated potatoes were a commercial harvest stored in a typical potato farmer's storage building. Storage conditions conformed to typical industry practices.

Modification (8). Details of the custom fogger operation must be described in the final report, including details of air recirculation rates through the stored potatoes for the 48 hours immediately after application.

Response (8). As suggested, details of the custom fogger operation are described in the final report. Ventilation of the potato pile is also described.

CBRS comment (7) and (8). The details provided are acceptable.

Modification (9). CBRS recommends that the potato sampling schedule be amended to include sampling at about 48 hours to 72 hours (3 days) after treatment.

Response (9). The recommended sampling at 48 to 72 hours after treatment was not performed because the study had progressed beyond the first week before EPA's comments were received. The relatively small decrease in residue levels at the early sampling times suggest sampling at 48 to 72 hours would not have provided significant additional information on the rate of degradation of the test substance, chlorpropham.

CBRS comment (9). As Table 3 indicates, changes in residue levels between 2 hours and 15 days after treatment were modest. This omission is acceptable.

Modification (10). Potato waste from the granule processing should be analyzed also. Such waste is an animal feed commodity.

Response (10). As suggested, potato waste from granule production was analyzed.

Modification (11). Processing (both laboratory and granule) must be described in the final report. Extraction procedures must be detailed. Precautions should be taken during the laboratory peeling to prevent any transfer of residue from peel to potato flesh.

Response (11). All processes, including sample preparation, extraction, granule production, and analysis are described in detail. Precautions taken to prevent inadvertent transfer of residue from potato peel to the pulp during the peeling process, are described.

Modification (12). The final report must provide some detail of the sampling operation. The method used to obtain potato samples from the various levels of the pile must be explained.

Response (12). The procedure by which samples were taken from each of the six locations of the potato pile are described in the final report, as suggested.

CBRS comment (10), (11), (12). Concur. Residue data were provided on potato waste, and details on processes and sampling operations were acceptable.

Recommendations: The submitted study can be upgraded to an acceptable status if additional information is provided to resolve CBRS Conclusions 1, 2, 3, and 4 above. Consistent with Conclusion 7, registrations not supported by the data submitted or other registrants should be canceled.

Additional information in response to the Conclusions may alter residue data. In addition, uses supported by other registrants may require higher tolerances than the use supported here. However, based on the data provided, tolerances on potato commodities should reflect the following residue levels (refer to Table 3):
For parent chlorpropham, 12 ppm in whole potatoes, 140 ppm in dry peel, and 40 ppm in potato processed waste.

cc:Circ, Abbotts, RF, Reg. Std. File, SF
RDI:FBS:3/25/93:SVH:4/1/93:MSM:4/15/93:EZ:4/16/93
H7509C:CBII-RS:JAbbotts:■chlorpro.4:CM-2:Rm805A:305-6230:4/16/93

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