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Memorandum

OFFICE OF  
PESTICIDES AND TOXIC SUBSTANCES

Subject: 87-FL-09. Section 18 Request for the Use of  
Mancozeb on Mangoes.  
No Acc. Number  
RCB Nos. 1908, 1930

From: Michael S. Metzger, Chemist  
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Thru: Edward Zager, Section Head, SRS 2  
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To: Emergency Response and Minor Use Section  
Registration Division (TS-767C)

and

Toxicology Branch  
Hazard Evaluation Division (TS-769C)

The State of Florida recently declared a Section 18 Crisis Exemption (1/30/87) and now requests a Specific Exemption authorizing the use of mancozeb on mangoes to control anthracnose. The formulations used are Manzate™ 200 (EPA Reg. No. 352-341; 80% a.i. wettable powder), Manzate™ 200 Flowable (EPA Reg. No. 352-398; 37% a.i., 4 lbs.a.i./gallon) and Dithane® M45 (EPA Reg. No. 707-78; 80% a.i.). Total acreage to be treated is not stated.

Tolerances are established for residues of the fungicide which is a coordination product of zinc ion and maneb (manganous ethylene-bisdithiocarbamate) containing 20% manganese, 2.5% zinc and 77.5% ethylene-bisdithiocarbamate (the whole product calculated as zinc ethylene-bisdithiocarbamate) in or on numerous commodities ranging from 0.1(N) ppm in or on asparagus to 65 ppm in or on peanut vine hay. Numerous tolerances are pending (40 CFR 180.176, 180.319, 180.3(e)(3); 21 CFR 123.460, 561.410). A Registration Standard has been completed for mancozeb (Residue Chemistry Chapter, 8/15/86).

The proposed use calls for a maximum of 12 applications of mancozeb at 2.4-4.0 lbs.a.i./A/application at 7-12 day intervals. A 21-day PHI would be imposed.

The metabolism of mancozeb in plants is not considered adequately understood (see Mancozeb Registration Standard, Residue Chemistry Chapter, p.2). Previously submitted metabolism studies show that mancozeb can undergo stepwise degradation resulting in the formation of N-acetylene ethylenediamine. For the purposes of this Section 18 only, we consider the residue of concern in plants to include parent [calculated as zinc ethylene-bisdithiocarbamate (EBDC)] and the ethylene thiourea (ETU) metabolite.

Residue data were submitted with this Section 18. These data were generated using the methods of Keppel for EBDC (Keppel, JAOAC, 54(3), 528-32, 1971; PAM II, Method III) and Onley for ETU (Onley, JAOAC, 60(5), 1105-10, 1977). Both methods are adequate for data collection.

The method of Keppel involves addition of the RAC to a reaction flask containing water, concentrated HCl and SnCl<sub>2</sub>. The reaction flask is heated causing liberation of H<sub>2</sub>S (removed by NaOH/benzene trap) and CS<sub>2</sub> vapors. The CS<sub>2</sub> vapors are collected in a second trap containing the colored reagent, cupric acetate. Following completion of the reaction, the cupric acetate solution is removed, and its absorbance is measured at 435 nm. Concentration is determined using a standard curve. The limit of detection for this method is 0.05 ppm. Recovery data are not available for mangoes.

The method of Onley (1977) for determining ETU in various commodities is a GLC method which has been adequately reviewed previously (see Registration Standard, Residue Chemistry Chapter, p.42). The limit of detection for this method is reported as 0.01 ppm.

The method of Keppel for EBDC determination is currently not considered adequate for enforcement purposes because this colorimetric method is not specific for mancozeb. However, in the absence of appropriately validated GLC or HPLC methods, and for the purposes of this Section 18 only, these methods will be considered adequate for enforcement.

Residue data submitted with this Section 18 are shown on the next page. Summary tables only were provided. Based on these data, and for the purposes of this Section 18 only, we conclude that residues of EBDC on mangoes are not likely to exceed 1.5 ppm, and residues of ETU are not likely to exceed 0.03 ppm as a result of the proposed use.

Residues of EBDC and ETU in Mangoes

Commodity	Application Rate (lbs.a.i./A)	Number of Apps.	PHI (days)	Residue (ppm)	
				EBDC	ETU
Whole fruit <sup>1</sup>	4.8 (Dithane <sup>®</sup> M45)	15	0	4.2	<0.01
			7	2.3	<0.01
			14	1.5	<0.01
			21	1.1	<0.01
Edible pulp			0	<0.13	0.02
			1	0.13	0.02
			7	<0.06	0.02
			14	<0.05	<0.02

<sup>1</sup>Samples stored frozen for 17 months. Storage stability data are not available showing stability of residues longer than 12 months for EBDC and 6 months for ETU.

Meat, Milk, Poultry and Eggs

Mangoes are not a major animal feed item. Therefore, secondary residues are not expected in eggs, milk or in the meat, fat and meat by-products of cattle, goats, hogs, horses, poultry and sheep as a result of the proposed use.

Conclusions

- (1) For the purposes of this Section 18 only, the residue of concern for application of Dithane<sup>®</sup> M-45 to mangoes will be considered to include EBDC and ETU.
- (2) Combined residues of EBDC and ETU in mangoes are not likely to exceed 1.5 ppm as a result of the proposed use (ca. 1.5 ppm EBDC, 0.03 ppm ETU).
- (3) Mangoes are not a major animal feed item. Therefore, secondary residues are not expected to occur in eggs, milk, or in the meat, fat and meat by-products of cattle, goats, hogs, horses, poultry and sheep as a result of the proposed use.
- (4) For the purposes of this Section 18 only, the following analytical methods will be considered adequate for enforcement:

EBDC: Keppel, JAOAC 54(3), 528-32, 1971; same as PAM II, Method III.

ETU: Onley, JAOAC 60(5), 1105-10, 1977

(5) Analytical Reference Standards are available from the Pesticides and Industrial Chemicals Repository.

Recommendations

TOX considerations permitting, RCB has no objections to this Section 18. An agreement should be made with the FDA regarding the legal status of the treated commodities in commerce.

cc: Mancozeb (Dithane®) S.F., R.F., Section 18 S.F., Circu,  
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