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Evaluation of Data to Support Petition 770520  
For a Tolerance of 35 PPM  
For 2-aminobutane on Oranges  
Submitted by Elanco, Eli Lilly  
Filed August 10, 1966

INTRODUCTION

This is a postharvest use of 2-aminobutane (CA name sec-butylamine) on whole unpeeled oranges. The product is 98% para, [redacted] It is volatile B.P. 63° and flammable. Specific gravity 0.72, 5.68 pounds per gallon.

Trade name "Fruite" formerly "Futane." Reference to data with Experimental permit 1471-Exp-198. Temporary tolerance of 20 ppm on apples, lemons, and oranges.

DIRECTIONS FOR USE

Used as a gas in "de-greening room." Concentration 100 ppm - 180 ppm for 4-5 hours. Temperature of fruit at least 65°.

Dip, Drench, or Spray: 1% solution. Adjust to pH 9 with hydrochloric, sulfuric, acetic, or phosphoric acid. Carbonated solution, made using compressed carbon dioxide, may also be used.

Dip: 1-5 minutes.

Drench: Not less than 3 minutes.

Spray: One gallon per 30-35 bushels of fruit.

Sodium lauryl sulfate may be used as a wetting agent.

ANALYTICAL METHOD

An electron-capture GC method (E. W. Day, T. Golab, and J. R. Koons offered for publication in Anal. Chem.) involving reaction with 2,4-dinitrofluorobenzene and GC on a 2% diethyleneglycol succinate column.

INVEST INGREDIENT INFORMATION IS NOT INCLUDED

The fruit is ground, 50 g placed in a Kjeldahl flask, and steam distilled into dilute sulfuric acid. The solution is neutralized, extracted with carbon tetrachloride and reacted with DMFB in a borate buffer. It is extracted with 10 ml cyclohexane and injected into GC.

If interfering substances are present (dimethylamine from ferbam, thiram, and ziram), the DMFB derivatives are separated into three zones by TLC on silica gel and eluted with chloroform; then GC.

**Procedures:**

- 5801310 - General procedure (without TLC)
- 5801340 - TLC, visual estimate
- 5801350 - TLC, followed by GC
- 5801360 - In citrus oil (acid extraction first with TLC).

**DATA (SUMMARY)**

Maximum residue 25 ppm in whole fruit 27.33 ppm in orange molasses and dried fruit pulp. Sensitivity 0.1 ppm.

90% recovery for 2 ppm from peel samples. 87% from citrus pulp.

Many gas chromatograms were submitted.

Table III A-2 - Dip & drench	whole fruit ppm	peel
0.5%	0.1 - 7.4	0.2 - 15.6
1.0%	0.2 - 20.0	0.5 - 28.9
2.0%	1.6 - 29.3	3.3 - 64.4

Days after treatment 4 to 21. Residues in pulp are low.

III B-1 - Used as gas 100-150 ppm

Whole Fruit	8.8 - 24.6 ppm
Peel	18.8 - 44.9 ppm
Pulp	Up to 0.3 ppm
Days treatment to assay 7-40.	

III C-2 - As spray 0.4 - 6.8 ppm  
Days after treatment 3, 4, 8.

Residues are almost entirely in the peel.

Controls and recoveries were run. Recoveries are 80 - 100% generally, except for the processed orange products. Controls were very low.

Table III - D

Processed products, drench treatment.

	Treatment	PPM
Molasses	1 $\frac{1}{2}$	25.2
	2 $\frac{1}{2}$	27.8
Dried pulp	1 $\frac{1}{2}$	33.3
	2 $\frac{1}{2}$	35.3
Peel	1 $\frac{1}{2}$	9.3
	2 $\frac{1}{2}$	11.6
Whole fruit	1 $\frac{1}{2}$	3.3
	2 $\frac{1}{2}$	8.8

DISCUSSION

We should verify that the dip and the spray treatments used to obtain data were in accordance with label directions. The drench treatment should be "3 to 5 min."

Residues for whole oranges were within the proposed tolerance of 35 ppm. The data are insufficient to show that residues in dried pulp and molasses would be below the proposed tolerance.

Many of the gas chromatograms showed extra peaks, in particular a very strong peak following the sec-butylamine by 4-5 cm.

CONCLUSION

We can give a favorable opinion with a comment that a food additive tolerance may be required for some processed orange products (dried pulp). Ralph Hill was called August 30, 1966; he will supply additional information on the time of dipping and dosage of spraying.