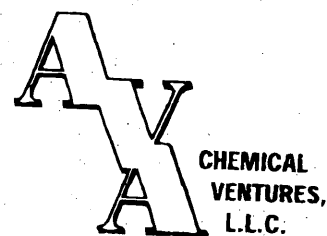


May 27, 2004

National Organic Standards Board
C/O Robert Pooler, Agricultural Marketing Specialist
USDA/AMS/TM/NOP
Room 2510 - So.
Ag. Stop 0268
P.O. Box 96456
Washington, D.C. 20090-6456



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SUBJECT: Amendment to Petition to Allow Use of Sucrose Octanoate Esters as a Synthetic Substance in Organic Production

Dear Mr. Pooler:

I refer to the, "Petition to Allow Use of Sucrose Octanoate Esters as a Synthetic Substance in Organic Livestock Production", dated January 22, 2004.

Included herein is additional information to support an Amendment to the January 22, 2004 petition to include the use of sucrose octanoate esters as an insecticide as allowed by EPA. The additional uses covered by this Amendment are as an insecticide/miticide for foliar spray on greenhouse, nursery and field crops and for *Sciariid* fly control in mushroom growing media.

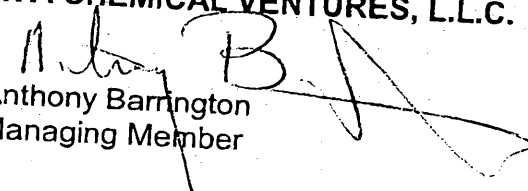
This Amendment applies to the following sections of the January petition:

3. Intended Use
4. Crops, Rate & Method of Application
7. Registrations
12. Petition Justification Statement

I appreciate your attention to this matter and I look forward to any questions.

Very truly yours

AVA CHEMICAL VENTURES, L.L.C.


Anthony Barrington
Managing Member

**AMENDMENT TO PETITION TO ALLOW USE OF SUCROSE
OCTANOATE ESTERS IN ORGANIC PRODUCTION**

SUBMITTED

TO

NATIONAL ORGANIC STANDARDS BOARD

BY

AVA CHEMICAL VENTURES, L.L.C.

[AMENDS PETITION DATED JANUARY, 2004]

MAY, 2004

3. INTENDED USE

The January petition was limited to *Varroa* mite control on honeybees. This Amendment extends the petition to include the other EPA-approved pesticide uses; namely, foliar spray on greenhouse, nursery and field crops and *Sciarid* fly control in mushroom growing media.

4. CROPS, RATES AND METHODS OF APPLICATION

Please see **Attachment A-1**, which includes the EPA-approved labels for foliar spray on greenhouse, nursery and field crops and for *Sciarid* fly control in mushroom growing media.

7. EPA, FDA AND STATE REGULATORY AUTHORITY REGISTRATIONS

California Department of Pesticide Regulation (CDPR): The label covering *Sciarid* fly control in mushroom growing media has not been submitted to the CDPR. The label covering foliar spray on greenhouse, nursery and field crops has received conditional CDPR approval. As noted in the January, 2004 petition, the condition has to do with the presentation of analysis data for five commercial batches.

Other State Registrations: The label for *Varroa* mite control on honeybees has been approved in all states except New York, where a registration is pending. The uses covered by this Amendment have not yet been registered in any of the states.

12. PETITION JUSTIFICATION STATEMENT

The Petition Justification Statement is expanded to include the additional uses covered by this Amendment, namely, foliar spray on greenhouse, nursery and field crops and *Sciarid* fly control in mushroom growing media.

General Statement: Sucrose Octanoate Esters is effective primarily against soft-bodied insects (eg, whiteflies, aphids, mealybugs) and mites. Applicant notes that there are a very limited number of materials approved for organic production that are effective against these categories of pest.

Hawaii Pineapple: Applicant has received a request from a large pineapple grower in Hawaii to have Sucrose Octanoate Esters approved for organic production. The grower currently has about 1.5% of his acreage in organic pineapple production. He wishes to expand this acreage significantly, but is limited by the lack of effective controls for mealybug. (in non-organic pineapple production, diazinon provides very effective control of mealybug).

The grower provided a copy of a report prepared by Glenn Taniguchi of the University of Hawaii Cooperative Extension Service titled, "Search and Evaluation of New Insecticides for Mealybug Control and Ant Control", December 19, 2003. A copy of the Taniguchi report is included as **Attachment A-2**.

The Taniguchi report included products based on the following active ingredients that are approved for organic production, although only one of the products tested (M-Pede Insecticidal Soap) is an OMRI-approved formulation:

Azadirachtin

Potassium salts (soap)

Pyrethrum

In three trials (shown in Table 1 of the Taniguchi report), M-Pede showed essentially no control of mealybug one week after application of the highest rate (2%) tested. The azadirachtin-based product (Azatin XL) showed no control of mealybug one week after application. The pyrethrum-based products (Diatect, Pyrenone) also showed little or no control one week after application. (Table 3). These results caused the Hawaii pineapple grower to conclude that it would be impractical to expand his organic acreage based on the one existing OMRI-approved product, or those that might be formulated from the other active ingredients included in the trial that are approved for organic production.

Sucrose Octanoate 1%, one week after treatment, showed 69% control (Table 3, Trial 1); 100% control (Table 3, Trial 2); and 96% control (Table 3, Trial 3). This same treatment also showed some control one month after treatment. These results caused the Hawaii pineapple grower to conclude that expansion of his organic acreage may be possible if Sucrose Octanoate Esters were available for organic production.

Shiitake Mushroom Cultivation: The following statement was provided by the Director of Biological Operations for an organic mushroom growing facility.

" We are a certified organic shiitake mushroom farm growing 6-10,000 lbs. shiitake (*Lentinula edodes*) weekly. The pests that we need to control are sciarid flies (fungus gnats), *Neoempheria spp.* (related to sciarid flies) and a mite, (*Histiogastor rotundus*). In the past, we used a neem extract product called Amazin to control the flies. It was the only fly control product on the market that was labeled for mushrooms and was certified by OMRI. It took care of the fly problem, but was very broad-spectrum and apparently killed off all of the beneficial insects in our growing rooms. A staphilinid beetle was often seen before the treatments, and very rarely seen afterwards. These beetles could have been eating the mite eggs.

Over time the mite population built to where it was damaging over 70% of all the developing mushrooms. There are no available controls for mites, except sanitation. This was devastating to us financially, but with thorough sanitation and gradually providing all growing rooms with new substrate we were able to reduce the mite population. This took about one year.

Another product became organically certified and labeled for mushrooms; Azadirect, which is also a neem extract. We tentatively use this product since we are fearful of a return of the devastating mite problem. We treat only when losses from the fly larvae approach 20% of our crop. This is not a satisfactory solution. Just recently the mites have been seen again.

Our only other choice is Gnatrol DG (*Bacillus thuringiensis*). This is extremely expensive and has not been tested on the *Neompheria sp.* fly for efficacy. It may not be compatible with our growing method and needs further investigation. We calculate that it would cost \$3000 for just one application of this material. This is prohibitive, as three applications, one week apart, are usually needed to achieve control.

The fact that Sucrose Octanoate Esters has activity against mites as well as flies is an added bonus. We need to have choices for treatment, so that resistance does not build up in the population. Also, currently, as detailed above, we really do not have products available that are certified organic and labeled for mushrooms. If we are to remain organic growers of shiitake mushrooms we need this product."

ATTACHMENT A-1
EPA-APPROVED LABELS

MUSHROOM MEDIA TREATMENT - USE SUBLABEL

AVACHEM SUCROSE OCTANOATE [40.0%]

Biochemical Insecticide For Sciarid Fly Control in Mushroom Growing Media

ACTIVE INGREDIENT

Sucrose Octanoate Esters (α -D-Glucopyranosyl - β -D-fructofuranosyl - octanoate),
mono-, di-, and triesters of sucrose octanoate

40.0%

OTHER INGREDIENT

60.0%

TOTAL

100.0%

EPA Reg. No. 70950-2

EPA Est. No. 075917-CA-001

U.S. Patent #'s 5, 756,716; 6,384,266

STOP - READ THE LABEL BEFORE USE

KEEP OUT OF REACH OF CHILDREN

WARNING - AVISO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.
(If you do not understand the label, find someone to explain it to you in detail.)

FIRST AID	
If in eyes:	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If swallowed:	<ul style="list-style-type: none"> • Call poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the poison control center or doctor. • Do not give anything by mouth to an unconscious person.
HOT LINE NUMBER: 888-229-7414	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact AVA Chemical Ventures, L.L.C. at 603-431-4242 for emergency medical treatment information.	

Manufactured for:
AVA Chemical Ventures, L.L.C.
80 Rochester Avenue, Suite 214
Portsmouth, NH 03801

Net Contents: 5 Gallons

EP Label Mushroom.doc
Revised 09/16/02

PRECAUTIONARY STATEMENTS**Hazard to Humans and Domestic Animals:**

WARNING: Causes substantial but temporary eye injury. Do not get in eyes or on clothing. Wear protective eyewear (goggles or face shield). Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse.

Personal Protective Equipment (PPE):

Applicators and other handlers must wear: Long sleeved shirt and long pants, shoes plus socks and protective eyewear.

Follow the manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations:

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Environmental Hazards:

Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash waters.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

EP Label Mushroom.doc

Revised 09/16/02

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 48 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- coveralls,
- shoes plus socks,
- protective eyewear, and
- waterproof gloves.

GENERAL INFORMATION

AVACHEM SUCROSE OCTANOATE controls the emergence of adult sciarid flies when applied to mushroom casing and/or compost prior to spawning. It is primarily a contact insecticide with limited residual activity. To achieve good control this product must be brought into contact with immature stage sciarid flies in the mushroom growing media. It does not directly affect adult sciarid flies.

MIXING AND APPLICATION

Shake or stir before use.

AVACHEM SUCROSE OCTANOATE dissolves readily in water. To achieve and to maintain the suspension, add the appropriate quantity to water with agitation and maintain gentle agitation during application.

Rates: Use 1.25% to 2.50% v/v solution of this product, depending on the severity of the infestation.

Compost Treatment: Use 100-300 gallons of total mix volume per 8000 square feet of mushroom growing area. Apply between filling and spawning time or concurrently with spawning by thorough incorporation such as with a spawning machine.

Casing Treatment: Spray 200-400 gallons of total mix volume per 8000 square feet of mushroom growing area.

Rate Table		
Total Mix Volume	% v/v Solution	Amount English (Metric)
100 gal. (378.5 liters)	1.25%	5.0 quarts (4.7 liters)
	2.50%	2.50 gallons (9.5 liters)

Test Application

Test AVACHEM Sucrose Octanoate for possible effects on mushroom growth rates prior to large scale use.

Application

- Do not apply this product through any type of irrigation system.
- To achieve good control this product must come into contact with immature stage sciarid flies in the mushroom growing media.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

Pesticide Storage: Store in a cool, dry location.

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or

EP Label Mushroom.doc

Revised 09/16/02

puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

WARRANTY STATEMENT, DISCLAIMER

AVA Chemical Ventures, L.L.C. (AVA Chemical) seeks to present reliable information concerning the composition, properties and use of the product, however: (1) All advice concerning selection and use of this product is provided at no charge and with no warranty. (2) No warranty is made hereby. The product described herein is warranted to conform to AVA Chemical specifications, therefore, only at the time of sale. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY LAW OR CUSTOM, INCLUDING BUT NOT BY WAY OF LIMITATION, THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. Remedy for any breach of warranty is limited to replacement of the defective product. (3) AVA Chemical assumes no responsibility for any patent liability arising from the use of the product in a process, manner or formula not designed by AVA Chemical. Nothing in the listed information shall be construed as an inducement or recommendation to use any process or to produce or use the product in conflict with existing or future patents.

FOLIAR USE

AVACHEM SUCROSE OCTANOATE [40.0%]

Biochemical Insecticide/Miticide for Greenhouse, Nursery & Field Crop Use

ACTIVE INGREDIENT

Sucrose Octanoate Esters (α -D-Glucopyranosyl - β -D-fructofuranosyl - octanoate),
mono-, di-, and triesters of sucrose octanoate 40.0%

OTHER INGREDIENT 60.0%

TOTAL 100.0%

EPA Reg. No. 70950-2

U.S. Patent #'s 5,756, 716; 6,419,941

EPA Est. No. 075197-CA-001

STOP - READ THE LABEL BEFORE USE

KEEP OUT OF REACH OF CHILDREN

WARNING - AVISO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.
(If you do not understand the label, find someone to explain it to you in detail.)

FIRST AID	
If in eyes:	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If swallowed:	<ul style="list-style-type: none"> • Call poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the poison control center or doctor. • Do not give anything by mouth to an unconscious person.
HOT LINE NUMBER: 888-229-7414	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact AVA Chemical Ventures, L.L.C. at 603-431-4242 for emergency medical treatment information.	

Manufactured for:
AVA Chemical Ventures, L.L.C.
80 Rochester Avenue, Suite 214
Portsmouth, NH 03801

Net Contents: 5 Gallons

PRECAUTIONARY STATEMENTS**Hazard to Humans and Domestic Animals:**

WARNING: Causes substantial but temporary eye injury. Do not get in eyes or on clothing. Wear protective eyewear (goggles or face shield). Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse.

Personal Protective Equipment (PPE):

Applicators and other handlers must wear: Long sleeved shirt and long pants, shoes plus socks and protective eyewear.

Follow the manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations:

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Environmental Hazards:

Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash waters.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

EP Label Foliar.doc

Revised 07/02/03

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 48 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- coveralls,
- shoes plus socks,
- protective eyewear, and
- waterproof gloves.

Do not allow spray to drift from the application site and contact people, structures people occupy at any time and the associated property, parks and recreational areas, non-target crops, aquatic and wetland areas, woodlands, pastures, rangelands or animals.

For ground boom applications, apply with nozzle height no more than 4 feet above the ground or crop canopy and when wind speed is 10 mph or less at the application site as measured by an anemometer. Use fine or coarser spray according to ASAE 572 definition for standard nozzles or VMD for spinning atomizer nozzles.

For orchard/vineyard airblast applications, do not direct spray above trees/vines and turn off outward pointing nozzles at row ends and outer rows. Apply only when wind speed is 3-10 mph at the application site as measured by an anemometer outside of the orchard/vineyard on the upwind side.

The applicator also must use all other measures necessary to control drift.

GENERAL INFORMATION

AVACHEM SUCROSE OCTANOATE is a biochemical insecticide/miticide for use against the soft-bodied insects listed on this label, similar insect types, mites and thrips. It is primarily a contact insecticide with limited residual activity.

- ◆ Do not apply this product through any type of irrigation system.
- ◆ Apply as soon as infestation begins.
- ◆ Use in sufficient water to achieve adequate coverage.
- ◆ Repeat applications, as necessary, at intervals of 7 - 10 days, to maintain control.
- ◆ Thorough spray coverage of plant foliage, including the undersides of leaves, is essential for good control of the pest.
- ◆ May be applied up to and including day of harvest.

PESTS CONTROLLED

This product may be used as a foliar spray to control or suppress soft-bodied pests which include: adclgid, aphids, caterpillars, glassy-winged sharpshooter, lace bug, leafhopper, mealy bug, plant bug, psyllid, soft scale, mites, tent caterpillar, thrips and whitefly.

MIXING AND APPLICATION

Shake or stir before use.

AVACHEM SUCROSE OCTANOATE dissolves readily in water. To achieve and to maintain the suspension, add the appropriate quantity to water with agitation and maintain gentle agitation during application.

Rate

- Use a 0.8% to 1.0% v/v solution of this product, depending on the severity of infestation.

Use between 25 and 400 gallons of total mix volume per acre. The amount of total mix required to achieve adequate coverage will vary with the type, growth stage and/or spacing of the treated crop.

Rate Table		
Total Mix Volume	% v/v Solution	Amount English (Metric)
25gal. (94.63liters)	0.8%	25 Fl. Oz. (3 Cups) (740 ml)
	1.0%	1 Quart (950 ml.)
100 gal. (378.5 liters)	0.8%	3 Quarts + 1 Cup (3.0 liters)
	1.0%	1 gallon (3.8 liters)

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Revised 07/02/03

25gal. (94.63liters)	0.8%	25 Fl. Oz. (3 Cups) (740 ml)
	1.0%	1 Quart (950 ml.)
100 gal. (378.5 liters)	0.8%	3 Quarts + 1 Cup (3.0 liters)
	1.0%	1 gallon (3.8 liters)

Timing of Application

Initiate applications as soon as pest is observed. Repeat applications, as necessary, at intervals of 7 - 10 days to maintain control.

Test Application

This product has been tested on many crops and ornamentals. However, it is not possible to evaluate all plant species or varieties for tolerance to this product. Test AVACHEM Sucrose Octanoate for possible phytotoxic responses by treating a few plants at the label use rate prior to large scale use.

Mixing

The user at his discretion can tank mix pesticides currently labeled for the same crop unless the product labels specifically prohibit such use. AVACHEM Sucrose Octanoate has not been extensively tested for use in tank mixes with many commonly used insecticides, fungicides or spray tank adjuvants. Test all tank mix combinations for physical compatibility by first performing a jar compatibility test using proper proportions of chemicals and water.

- Always determine the compatibility of water, pesticides and other tank additives, such as penetrators, spreader stickers or activators, gibberellic acid, calcium nitrate or diatomaceous earth, foliar nutrients and alkaline based chelating agents such as EDTA, with this product prior to addition to the spray tank.
- For best results, use freshly mixed spray made with soft water. If water has high mineral content (hardness >300 ppm or 17.5 grains/gallon), check for compatibility as described above. If needed, add a compatibility agent to the tank prior to the addition of this

product. Do not lower the pH of the final spray mixture below 7.0.

- A defoaming agent may be needed for use in sprayers equipped with an agitator.
- Use freshly prepared spray solutions.

When using this product in a tank mix, read and follow all product labels. Mix in this order:

- Compatibility agent (if needed)
 - Wettable and soluble powders
 - Flowable liquids
 - Emulsifiable oils and concentrates
 - AVACHEM Sucrose Octanoate
- Application of spray mixtures must conform to use precautions and directions for all products included in the tank mix. Spray promptly after mixing and keep combinations agitated to achieve and maintain the suspension.

Application

- This product may be applied with ground spray equipment. Do not apply this product through any type of irrigation system.
- This product must come into contact with the targeted pests to be effective. Complete coverage of plant foliage is essential for maximum control.
- Apply promptly after mixing with other pesticides to avoid or reduce alkaline hydrolysis of certain pesticides.

INSECTICIDAL/MITICIDAL USES

VEGETABLES, HERBS AND SPICES

(Greenhouse and Outdoor)

Vegetables: Artichoke, Asparagus, Brassica (cole), (such as: bok choy, broccoli, broccoli raab, Brussels sprouts, cabbage, cauliflower, Chinese broccoli, Chinese cabbage, collard greens, kale, kohlrabi, mustard greens, napa cabbage and Swiss chard), **Bulb** (such as: green onion, leeks, garlic, onion and shallot), **Cucurbit** (such as: cucumber, melon, pumpkin and summer squash), **Fruiting** (such as: eggplant, pepper and tomato), **Leafy** (such as: celery, endive, escarole, lettuce and spinach), **Legume** (such as: bean, pea and soybean), **Root and tuber** (such as: beet, carrot, horseradish, potato, radish, rutabaga, sugarbeet and yam), **Herbs and spices** (such as: basil, chive, dill, marjoram, mint, parsley and sage), **Watercress**.

EP Label Foliar.doc
Revised 07/02/03

Pests Controlled: Aphids, caterpillars, leafhoppers, mites, thrips, whiteflies.

FRUIT AND NUT CROPS

Citrus fruits (such as: citron, grapefruit, kumquat, lemon, lime, tangelo, and tangerine), **Pome fruits** (such as: apple, crabapple, pear and quince), **Stone fruits** (such as: apricot, cherry, nectarine, peach, plum and prune), **Small Fruits and Berries** (such as: blackberry, blueberry, cane berries, cranberry, currants, grape, raspberry, strawberry, boysenberry, and olallieberry) **Tree nuts** (such as: almond, chestnut, filbert, pecan, pistachio, black and English walnut).

Pests Controlled: Aphids, glassy-winged sharpshooter, leafhoppers, mites, mealy bug, psyllid, soft scale, thrips, whiteflies.

FIELD CROPS

Alfalfa, Canola, Cotton, Peanut, Soybean, Tobacco and Wheat

Pests Controlled: Aphids, caterpillars, mites, thrips, whiteflies.

HOPS, COFFEE, BANANA AND PINEAPPLE

Pests Controlled: Aphids, leafhoppers, mealy bug, mites, plant bug, soft scale, thrips, whiteflies.

ORNAMENTAL LANDSCAPE TREES AND SHRUBS, CHRISTMAS TREES, ROSES, FLOWERS AND BEDDING PLANTS

Pests Controlled: Adelgid, aphids, lace bug, leafhopper, mealy bug, mites, plant bug, psyllid, soft scale, tent caterpillar, thrips, whiteflies.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

Pesticide Storage: Store in a cool, dry location.

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

WARRANTY STATEMENT, DISCLAIMER

AVA Chemical Ventures, L.L.C. (AVA Chemical) seeks to present reliable information concerning the composition, properties and use of the product, however: (1) All advice concerning selection and use of this product is provided at no charge and with no warranty. (2) No warranty is made hereby. The product described herein is warranted to conform to AVA Chemical specifications, therefore, only at the time of sale. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY LAW OR CUSTOM, INCLUDING BUT NOT BY WAY OF LIMITATION, THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. Remedy for any breach of warranty is limited to replacement of the defective product. (3) AVA Chemical assumes no responsibility for any patent liability arising from the use of the product in a process, manner or formula not designed by AVA Chemical. Nothing in the listed information shall be construed as an inducement or recommendation to use any process or to produce or use the product in conflict with existing or future patents.

ATTACHMENT A-2

**SEARCH AND EVALUATION OF NEW INSECTICIDES FOR
MEALYBUG CONTROL AND ANT CONTROL**

FINAL REPORT

Search And Evaluation Of New Insecticides For Mealybug Control And Ant Control

December 19, 2003

Glenn Taniguchi

Search and Evaluation of New Insecticides For Mealybug Control and Ant Control

Introduction

The control of the ant-mealybug wilt complex is one of the most limiting factor affecting pineapple production in Hawaii. The control of mealybug wilt starts with an effective ant control program, mainly for the big-headed ant, *Pheidole megacephala* and fire ants, *Solenopsis geminata*. Other minor ants such as, the long legged ant, *Anoplolepis gracilipes*, and white footed ant, *Technomyrmex albipes*, are occasionally encountered in the pineapple fields and has a tendency to nurture mealybugs. However they are not controlled with Amdro. The rationale and justification for screening alternative ant baits is to seek a bait which is not sensitive to light and water such as Amdro. Two ant baits, Clinch(Abamectin), and Extinguish(Methoprene), need to be evaluated. Once the laboratory trials are complete, Extinguish can be field tested immediately since it already has a label for general agricultural use. Also Bayer Corporation and Griffin Corporation is in the process of developing new numbered compounds which will be made available for testing.

With effective ant control, mealybugs (*Dysmicoccus brevipes* and *Dysmicoccus neobrevipes*), can be controlled by parasites such as *Anagyrus* sp. With the use of parasites, Diazinon can be used sparingly to avoid insect resistance, as this is the only registered insecticide for mealybug control in pineapple. Currently, Diazinon is classified as restricted and is under review by EPA, as is all organo-phosphorus compounds which may be potentially hazardous. Therefore, evaluation and registration of new insecticides is important to optimize control of mealybugs in pineapple cultivation.

The purpose of this project is to evaluate three insecticides for mealybug control. They are Admire(Imidacloprid), M-Pede(Potassium Salts) and Tri-Star(Acetamiprid). Admire was tested 5-6 years ago as a foliar spray which was not effective in controlling mealybugs. Since that time Admire has been proven to be most effective as a drench application. M-Pede is a new compound which has not been tested. Tri-Star was scheduled to be tested in 1998-00 under DOA contract number 44128, however Rhone-Poulenc did not want to commit on a supportive registration on pineapple. However the situation has changed recently such that Rhone-Poulenc is now willing to be supportive of pineapple pending the results.

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Objectives:

- A. Evaluate and collect efficacy data on Admire, M-Pede and Tri-Star for pineapple mealybug control.
- B. Evaluate and collect laboratory efficacy data on Clinch for big-headed ant and fire ant control and a field trial with Extinguish for big-headed ant control.

- C. Evaluate and collect efficacy data on numbered compounds from Bayer and Griffin Corporation for big-headed ant and fire ant control.
- D. Initiate large scale plantation trials with ant bait stations with the use of Amdro/Distance ant baits.

Objective A

Materials and Methods

Objective A has been modified as in other projects dealing with efficacy studies dealing with screening insecticides for mealybug control. Where it is not possible to locate sizeable areas with significant populations of mealybugs to work with, an alternative method was developed where by mealybugs were reared on Kabocha pumpkins in the laboratory. A liberal amount of crawlers and 1st instar mealybugs were collected and placed on small pineapple plants grown from sections in the greenhouse. Mealybugs were allowed to colonize the individual plants. When mealybug populations have built up, usually at 3-4 months of age, individual plants were used as replicates within a treatment.

Pre-treatment and post treatment sampling consisted of taking the third leaf from the heart of each plant and counting all live mealybugs on it. The sampling schedule consisted of a pre-treatment count, one week, one month, two month and three month post treatment count.

Due to the timely completion of this objective, other compounds were selected for testing. All compounds tested were as follows:

Tri Star (Acetamiprid) 70% a.i. WSP
 M-Pede (Potassium salts) 49% a.i. L
 Admire (Imidacloprid) 21.4% a.i. F
 Baythroid 2 (Pyrethroid) 25% a.i. EC
 Actara (Thiamethoxam) 25% a.i. WG
 Regent (Fipronil) 40% a.i. SC
 Calypso (Thiacloprid) 40% a.i. SC
 Renounce (Pyrethroid) 20% a.i. WP
 Azatin XL (Azadirachtin) 3.0% a.i. C
 Avachem Sucrose Octanoate (Sucrose octanoate esters) 40% a.i. C
 Diatect Multipurpose Insecticide II (Pyrethrins, piperonyl butoxide, silicon dioxide) 84.1% a.i. WP
 Pyrenone Crop Spray (Pyrethrin) 6% a.i. C

All chemical treatments except Admire were applied as hand calibrated foliar sprays per acre rate and 200 gallons of water per acre rate with 3-4 replications as plants were available. Respective rates used were minimum and maximum actual product recommended by the label or manufacturer.

The rates used for testing were as follows:

Tri Star	20gm/A and 40 gm/A
M-Pede	1% v/v and 2% v/v
Admire	0.078ml/pot, 0.13ml/pot, and 0.26 ml/pot
Baythroid 2	0.8oz/A and 3.2oz/A
Actara	1.5 oz/A and 5.5 oz/A

Regent	0.98 oz/A and 1.3 oz/A
Calypso	4.0 oz/A and 8.0 oz/A
Renounce	2.0 oz/A and 4.0 oz/A
Azatin XL	5.0 oz/A and 21.0 oz/A
Avachem sucrose octanoate	0.8% v/v and 1.0% v/v
Diatect Multipurpose Insecticide II	3 lb/A and 6 lb/A
Pyrenone crop spray	1oz/A and 12 oz/A

Admire, when used as a soil drench per 4" pot, was applied at the respective rates in 200 ml of water per pot and allowed to saturate the potting mix for 24 hours by means of a plastic petri dish under the pot to serve as catchments. It was theorized that Admire used as a crown dip might be taken up by the root primordial in the crown and translocated to provide control of mealybugs. Crowns were field collected and dipped at the respective recommended rates of 0.39 ml/l, 0.65 ml/l, and 1.3 ml/l. In a second study based on the initial results of the first study, rates of 2.69 ml/l, 3.90 ml/l, and 6.5ml/l were used. These rates are 5, 15, and 25 times the normal high rate for dipping. Crowns were allowed to dry for a few hours and planted in a 2 gallon pot with potting mix. Crowns were irrigated a week later and regularly there after. Crowns were inoculated with a liberal amount of mealybug crawlers at 3 weeks post planting and at weekly intervals the first month and at two week intervals the second month.

The compound Applaud(Buprofezin) was tested in 1999 and was found to be ineffective. Since that time new facts(vapor action), about the test compound has been disclosed that may have had an effect on the results. Consequently more testing were conducted with Applaud at 1 lb and 2 lb/A.

Results and Discussion

All compounds tested as foliar sprays were ineffective in controlling the pineapple mealybug. **Tables 1, 2, and 3.** In a comparative test for the sake of curiosity if the screening methodology was effective, Diazinon, the standard insecticide used currently for mealybug control, was included. The results reassured that the methodology was valid **Table 2.** Diazinon was the only compound which has consistently produced 100% control within the first week of application and for 1-2 months there after, in this and other studies done in the past.

Admire used as a soil drench at the manufacturer's recommended rate produced exceptional control (100% mortality) at all rates tested **Table 4.** Admire was theorized as being able to be taken up by the root primordial in the crown. Preliminary studies with recommended dip rates of 0.39 ml/l, 0.65 ml/l, and 1.3 ml/l indicated a slight reduction of mealybug populations at the high rate. In a second test with increased rates of 2.69 ml/l, 3.9 ml/l, and 6.5 ml/l or 5, 15 and 25 times the recommended high rate for dipping, produced exceptional results. At all rates tested, the residual activity of Admire was able to prevent mealybug infestation for 4-6 months with a single dip **Table 5.**

Re-testing of the compound Applaud showed that it was ineffective in controlling mealybugs. Similar results were obtained in testing this product in 1997.

Table 1. Efficacy studies with Tristar and M-Pede for mealybug control. Data presented as mean number of live mealybugs.

Trial 1

Treatment	Pre-Treat	1 wk Post	1 mo. Post	2 mo. Post	3 mo. Post
Tri-Star 20 gm./A	24.5	20.25	7.5	39.25	48.0
Tri-Star 40 gm./A	30.25	20.75	13.0	31.5	28.25
M-Pede 1% vol/vol	21.0	10.25	14.75	30.75	51.75
M-Pede 2% vol/vol	28.75	21.75	12.25	32.75	50.5
Control	23.5	18.0	35.0	39.5	35.75

Trial 2

Treatment	Pre-Treat	1 wk Post	1 mo. Post	2 mo. Post	3 mo. Post
Tri-Star 20 gm./A	47.25	45.25	19.0	33.5	26.75
Tri-Star 40 gm./A	27.75	29.0	11.5	21.0	12.25
M-Pede 1% vol/vol	18.75	47.0	71.0	54.75	19.25
M-Pede 2% vol/vol	24.5	26.25	20.5	24.0	13.5
Control	31.75	30.25	56.0	33.25	21.75

Trial 3

Treatment	Pre-Treat	1 wk Post	1 mo. Post	2 mo. Post	3 mo. Post
Tri-Star 20 gm./A	52.75	51.0	20.0	24.0	30.0
Tri-Star 40 gm./A	54.25	55.5	20.5	28.0	23.75
M-Pede 1% vol/vol	58.75	58.75	63.25	68.25	73.75
M-Pede 2% vol/vol	53.75	51.25	51.5	45.0	45.5
Control	71.75	72.75	72.75	83.25	79.0

Table 2. Efficacy studies with various insecticides for mealybug control. Data presented as mean number of live mealybugs.

Trial 1

Treatment	Pre-Treat	1 wk post	1 mo post	2 mo post	3 mo post
Baythroid 0.8 oz./A	19	26	61	25	16
Baythroid 3.2 oz./A	28	10	8	12	13
Actara 1.5 oz./A	25	8	42	16	54
Actara 5.5 oz./A	28	8	33	40	53
Regent 0.98 oz./A	28	15	54	33	49
Regent 1.3 oz./A	26	14	49	32	40
Calypso 4 oz./A	23	17	26	51	72
Calypso 8 oz./A	22	7	27	51	64
Renounce 2 oz./A	36	20	48	48	49
Renounce 4 oz./A	22	12	50	69	80
Control	30	26	65	78	73
Diazinon 2lb./A	27	0	0	0	0

Trial 2

Treatment	Pre-Treat	1 wk post	1 mo post	2 mo post	3 mo post
Baythroid 0.8 oz./A	53	56	48	48	45
Baythroid 3.2 oz./A	41	32	56	39	65
Actara 1.5 oz./A	38	23	42	41	55
Actara 5.5 oz./A	32	20	27	27	38
Regent 0.98 oz./A	57	48	41	32	39
Regent 1.3 oz./A	84	70	44	42	26
Calypso 4 oz./A	47	32	33	91	77
Calypso 8 oz./A	47	13	30	44	59
Renounce 2 oz./A	38	37	51	48	52
Renounce 4 oz./A	51	48	32	28	35
Control	42	40	52	22	38
Diazinon 2lb./A	51	0	0	4	18

Trial 3

Treatment	Prc-Treat	1 wk post	1 mo post	2 mo post	3 mo post
Baythroid 0.8 oz./A	20	8	100	90	83
Baythroid 3.2 oz./A	39	9	33	47	84
Actara 1.5 oz./A	27	7	26	49	64
Actara 5.5 oz./A	48	16	55	61	55
Regent 0.98 oz./A	25	11	48	60	86
Regent 1.3 oz./A	19	6	38	28	38
Calypso 4 oz./A	37	15	25	48	40
Calypso 8 oz./A	21	10	23	68	82
Renounce 2 oz./A	25	9	33	41	61
Renounce 4 oz./A	41	20	35	30	75
Control	18	17	56	68	13
Diazinon 2lb./A	25	0	0	1	3

Table 3. More efficacy studies with various insecticides for mealybug control. Data presented as mean number of live mealybugs.

Trial 1

Treatment	Pre-treat	1 wk post	1 mo post	2 mo post	3 mo post
Azatin XL 5 oz./A	73	66	117	124	143
Azatin XL 21 oz./A	81	72	109	106	122
Sucrose Octanoate 0.8% v/v	51	33	70	101	116
Sucrose Octanoate 1% v/v	61	19	47	67	93
Diatect Multi Insec II 3 lb./A	73	56	63	92	112
Diatect Multi Insec II 6 lb./A	83	83	55	63	71
Pyrenone Crop Spray 1 oz./A	95	85	71	77	73
Pyrenone Crop Spray 12 oz./A	81	78	71	93	85
Control	84	82	177	148	148

Trial 2

Treatment	Pre-treat	1 wk post	1 mo post	2 mo post	3 mo post
Azatin XL 5 oz./A	35	31	20	69	91
Azatin XL 21 oz./A	35	34	50	54	61
Sucrose Octanoate 0.8% v/v	53	4	18	85	76
Sucrose Octanoate 1% v/v	45	0	13	34	64
Diatect Multi Insec II 3 lb./A	50	28	104	114	112
Diatect Multi Insec II 6 lb./A	54	11	48	67	72
Pyrenone Crop Spray 1 oz./A	52	33	50	112	122
Pyrenone Crop Spray 12 oz./A	90	71	119	110	89
Control	99	93	110	142	153

Trial 3

Treatment	Pre-treat	1 wk post	1 mo post	2 mo post	3 mo post
Azatin XL 5 oz./A	58	71	157	150	116
Azatin XL 21 oz./A	56	60	85	97	104
Sucrose Octanoate 0.8% v/v	88	16	57	70	92
Sucrose Octanoate 1% v/v	94	9	56	98	99
Diatect Multi Insec II 3 lb./A	52	48	52	74	98
Diatect Multi Insec II 6 lb./A	32	26	74	109	105
Pyrenone Crop Spray 1 oz./A	49	41	58	93	101
Pyrenone Crop Spray 12 oz./A	72	56	118	110	121
Control	92	86	108	101	102