



**GOOD AGRICULTURAL PRACTICES**  
for  
**Production, Handling and Shipping**  
of  
**FRESH PRODUCE**



**Compiled by:**

*Frank J. Dainello, Extension Horticulturist- Commercial Vegetable Crops*  
**Department of Horticultural Sciences**

**Sponsored by:**

**The Wintergarden Spinach Producers Board**



# CRITICAL HAZARD CONTROL POINTS

## Harvest and post-harvest operations of fresh market spinach

*(Areas of potential problems for spinach contamination with food borne pathogens)*

<u>Worker Hygiene</u> field shed	<u>Containers</u> Bulk bins totes	<u>Water</u> Irrigation Wash	<u>Equipment</u> Harvesters Graders	<u>Sanitation</u> Field Sheds	<u>Transportation</u> Field trucks Semis	<u>Temperature</u> Storage Semis
--	---	------------------------------------	---	-------------------------------------	--	--

### PRODUCTION

Land prep

∕

Planting

∕

Water and Irrigation

∕

Pest control

### HARVEST

*Machine/Hand harvest*

∕

*Field transporting*

∕

### POST HARVEST/SHED

*Unload*

∕

*Wash*

∕

*Grade/Sort*

∕

*Hydrocool*

∕

*Centrifuge dry*

∕

*Box/ container pack*

∕

*Top ice*

∕

*Palletize*

∕

*Temporary cold storage if needed*

### TRANSPORTATION TO MARKET

*Truck sanitation*

∕

*Load for transport and delivery*

## **CHECK LIST: Minimizing pathogen contamination in fresh market spinach production**

### **PROMOTE WORKER HYGIENE**

*One of the major sources of food borne pathogen contamination is worker's hands. Therefore the single most effective method of preventing spinach contamination with these organisms is proper hand washing*

#### **Hand washing:**

- \* *Provide clean restroom facilities with soap, clean water and single use towel*
- \* *Teach all workers about the microbial risk and the importance of good hygiene*
  - *Poor hygiene can cause themselves as well as and others to become sick and even die*
- \* *Train all field, shed and office workers in proper hand washing techniques*
  - *20 seconds with vigorous scrubbing with soap and hot water*
  - *Thoroughly dry with disposable hand towels*
  - *Properly wash hands after each visit to rest rooms facilities and/or before handling equipment, machinery and raw spinach*

#### **Injuries and illnesses:**

- \* *Do not allow workers with open wounds to work*
  - *Open wounds can contaminate fresh spinach*
  - *Bandages are necessary to protect wounds but can become contaminated themselves, best to have workers with bandaged wounds to work only in areas that do not come in contact with fresh spinach*
  - *If hand wounds are bandage, latex rubber gloves must be worn to prevent the bandages from becoming a source of contamination*
- \* *Workers who exhibit symptoms of illnesses should not be allowed to work*
  - *Explain to them that they can transmit their sickness to other and that is why they are not allowed to work*
- \* *Supply and demand workers coming in contact with fresh spinach to wear latex gloves*
  - *Gloves can also become contaminated*
  - *Change and discard gloves periodically*
  - *Never use gloves with tears, holes etc in them*

### **PRODUCTION**

*Contamination of produce with E. coli 0157:H7 is a major health concern, especially as that organism relates to on-farm food safety. The major source of on-farm E. coli is from animal feces. Therefore, steps to*

***ensure contamination from animal waste should be a major priority when livestock and wildlife are common to the spinach production area; and/or when manures are used as fertilizers***

### **Land preparation:**

- \* **Select intended spinach fields carefully**
  - Review field history for animal manure use and avoid those recently used for animal grazing
  - Avoid fields near animal feed lots and grazing pastures
  - Prevent runoff or drift from animal operations from entering fields
  - Berm fields downstream from these operations if they must be used
- \* **Select fields upstream from animal operations**
- \* **Determine surface water uses upstream from potential spinach plantings**
  - Berm fields near streams having history of flooding
- \* **Select fields free of debris that might house harmful bacteria**
- \* **Clean and disinfect tractors, plows, and bedders etc. prior to use in preparing spinach fields**
- \* **As much as possible, keep pets, livestock and wildlife out of fields**
- \* **Use only properly composted manure**
  - never use raw or non-composted manure
  - Store manure piles on down side of spinach fields
  - Obtain data on composting technique, maintain use records
- \* **Promote and enforce worker hygiene in the field**
  - Provide and maintain clean restroom facilities near work areas
  - Stock such facilities with soap, clean water (hot is possible), and single-use-towels for hand washing
- \* **Train all workers in good hygiene and demand that they follow these measures**
- \* **Maintain a daily log of all worker training and activities performed to insure maximum food safety of spinach grown, packed and shipped from facility**

### **Planting:**

- \* **Clean and disinfect tractors and planting equipment prior to entering a spinach field**
- \* **Promote and enforce worker hygiene in the field**
  - Provide and maintain clean restroom facilities near work areas
  - Stock such facilities with soap, clean water (hot is possible), and single-use-towels for hand washing
- \* **Train all workers in good hygiene and demand that they follow these measures**
- \* **Maintain a daily log of all worker training and activities performed to insure maximum food safety of spinach grown, packed and shipped from facility**

### **Water use and irrigation:**

- \* **Anytime water comes in contact with fresh spinach, its quality determines the potential for pathogen contamination since water can be a carrier of a number of organisms**

- \* **Test water source for bacterial contaminants**
  - Uncovered sources (rivers, tanks etc) every 3 months during the season
- \* **Surface water is a high risk source**
- \* **Potable well water has minimal risk if well casing is maintained and livestock is excluded from active recharge area**
  - Test well water at least annually
  - Chlorine treat wells if needed
  - Record test dates and keep test records
- \* **If municipal/District sources are used obtain and keep records of their test periods and results**
- \* **Clean vegetation areas around water sources: well heads, streams, rivers and tanks used as water sources**
- \* **Filter or use settling ponds to improve water quality when streams or rivers are the sources of irrigation water**
- \* **Store gated and sprinkler pipe above ground and take measures to prevent animals and birds from roosting in them when not in use**
  - clean pipe of debris, dead animals and/or their droppings
- \* **Maintain a daily log of all worker training and activities performed to insure maximum food safety of spinach grown, packed and shipped form facility**

### **Pest control:**

- \* **Use potable water for crop protection sprays**
- \* **Clean sprayers with potable water and store in protected structures after each use**
- \* **Take appropriate measures to keep birds and animals from nesting in spray tanks or on spray rigs**
- \* **Train all workers in good hygiene and demand that they follow these measures**
- \* **Maintain a log of all activities**

## **HARVEST**

### **Machine harvest:**

- \* **Clean harvester with high pressure wash and sanitize before and after each use and store in a protected structures**
- \* **Take appropriate measures to keep birds and animals from nesting in or on harvest equipment**
- \* **Inspect routinely and repair equipment as needed**
- \* **Keep pets and unauthorized personnel out of spinach fields**
- \* **Provide port-a-potties and sanitation facilities near in readily accessible locations near spinach fields.**
- \* **Train all workers in good hygiene and demand that they follow these measures**
- \* **Maintain a daily log of all worker training and activities performed to insure maximum food safety of spinach grown, packed and shipped form facility**

## **Field transportation:**

- \* Clean tote, bins and field wagons, truck etc. with high pressure wash and sanitize before each use*
- \* Prohibit workers from standing on spinach in bins, field wagons, trucks etc.*
- \* Store totes and bins in a protected areas*
- \* As feasible keep birds, rodents and pets out of areas where totes and bins are stored and use appropriate pest control measures to rid areas of rats, insects etc*
- \* Maintain a daily log of all worker training and activities performed to insure maximum food safety of spinach grown, packed and shipped from facility*

## **POST HARVEST/PACKING SHED**

*Water is the prime vehicle for spreading contaminants to fresh spinach. Once water becomes contaminated everything it comes into contact with can become contaminated. Therefore, preventing contamination of water in these facilities is one of the major keys to insuring consumers get a safe product.*

### **Wash water:**

- \* Include a disinfectant such as chlorine in the wash water*
- \* Use only potable water for all washing and rinsing activities*
- \* Avoid dump tank water temperatures 10 degrees F greater than the fresh spinach the field temperature (Higher temperature differential can cause any bacteria present to be sucked into spinach tissue*
- \* Continuously monitor and maintain water levels of:*
  - chlorine levels at 150 ppm*
  - pH level at 6.0-7.0*
- \* Final spinach rinse water use be maintained above 100 ppm*

### **ICE:**

- \* If ice produced at the shed, use only potable water*
- \* Clean and sanitize all ice making or crushing machines daily*
- \* Provide an elevated enclosed area to store crush ice*
- \* Clean and sanitize all shovels etc used to handle ice*
- \* Do not allow worker to walk in ice storage areas*
- \* Water is the prime source of contamination*
  - Ice is a solid form of water and can also cause contamination of clean spinach if it contains pathogens*

### **Facilities:**

- \* Provide clean well stocked restroom facilities (soap, hot water, single use hand towels)*
- \* Post signs encouraging the use of good personal hygiene*
- \* Prohibit smoking or eating in the work areas*

- \* *Provide a clean designated break room for eating, smoking etc.*
- \* *Prohibit pets, animals; birds etc. were practical from entering sheds*
- \* *Restrict facility to authorized individuals only and request all approved non worker to abide by personal hygiene and other sanitation regulations.*
- \* *Clean all work areas daily*
  - field soil that may have made it way into the shed may be source of contamination*
  - remove and discard all spinach leaves that have fallen onto floors*
- \* *Maintain a daily log of all worker training and activities performed to insure maximum food safety of spinach grown, packed and shipped form facility*
  - Include dates and function performed and by whom*
- \* *Appoint designate individuals responsibilities for supervising specific areas of critical hazard control points and maintaining logs of what and when preventive measures were accomplished*
- \* *Conduct routine self audits to insure **GOOD AGRICULTURAL PRACTICES** are being followed*
- \* *Maintain records of all of these activities*

### **Worker hygiene:**

- \* *Require works to wash hands and clean booths or shoes prior to entering work areas*
- \* *Require workers to wear clean clothing each day*
  - Avoid the use of clothing that enhance the possibility of collecting and distributing dirt and plant residue*
- \* *Require the use of latex gloves, clean booths/shoes and clothing*
- \* *Require workers to wash hands prior to and after eating, smoking etc.*
- \* *Train all workers in good hygiene and demand that they follow these measures*

### **Equipment sanitation:**

- \* *Inspect equipment for biofilm buildup (sticky to slimy accumulations of fungi and bacteria that accumulate on wet surfaces) and clean with high pressure wash and sanitize*
  - Sanitizers do not penetrate biofilms readily*
  - They can help prevent formation and buildup*
- \* *Conveyors, dump bins, grading and sorting tables should be cleaned with high pressure wash water and sanitized prior to the start of harvest and daily during the season*
- \* *Clean floors daily with high pressure wash*
- \* *Use only potable water for all washing and rinsing activities*
- \* *Train specific workers in procedures for cleaning equipment and facilities*

## **TRANSPORTATION TO MARKET**

***The final step in the spinach production process is loading in vans for shipment to distant markets. To insure that a clean boxed product does***

***not become contaminated by a dirty van, require that they cleaned and washed inside and out before loading the final product.***

**Trucks:**

- \* Check prior use of vans, require drivers to high pressure wash prior to loading***
- \* Make certain that evaporator coils and fins are cleaned as well***
- \* Sanitize vans if animal products were previously hauled***
- \* Pre-cool vans prior to loading***

**Acknowledgements:** Above information has been adapted from “Reduce Microbial Contamination with Good Agricultural Practices” Originally written and compiled by Anu Rangarajan, Marvin Pritts, Steve Reiners and Laura Pedersen and updated with assistance from Victoria Zeppelina and the Cornell University GAPS team

**Above information also supplemented with data from:**

**Fresh Produce Food Safety; Southeast Training Program Team, Coordinated by Drs. Doug Sanders, Dennis Osborne and Donn R. Ward, North Carolina State University**

**UC GAPs Primer A Microbial Food Safety Training and Farm Audit by Dr. Trevor Suslow, University of California-Davis**



# APPENDIX

**\*/ Good Agricultural Practices: A self-audit for growers and handlers (short form)**

**\*/ Sample Daily Pre-inspection Log**

**\*/ Sanitizers**

*\*/ Information from the UC GAPs PRIMER, A microbial food safety training and farm audit resource. Dr. Trevor Suslow, Department of Vegetable of California-Davis  
Davis, CA 95616*

**For a copy of the Primer email request to Dr. Suslow at:  
[tvsuslow@ucdavis.edu](mailto:tvsuslow@ucdavis.edu)**

## **Good Agricultural Practices A Self-Audit for Growers and Handlers**

Audit questions designated by \* are the most vital GAP considerations. Compliance with these issues is absolutely essential in controlling microbial risk, or with obeying the law (Code of Federal Regulations, Ca-OSHA, OSHA).

### **Land Preparation/maintenance**

#### **Physical Location**

- Yes No Topographical features (slopes, depressions, swales, etc.) exist near the field that might encourage run-off?
- Yes No \*Does the field have a well-documented land history?
- Yes No \*Do adjacent fields present microbial risks?
- Yes No \*is movement of animals controlled to prevent microbial contamination?
- Yes No Does the area have a continual or periodic high bird population?

#### **Pre-Plant Field Preparation**

- Yes No Fumigate
- Yes No Deep Rip
- Yes No Slip Plow
- Yes No Level
- Yes No Fertilize
- Yes No Compost
- Yes No Aged Manure

### **In-Season Cultivation**

- Yes No Rip
- Yes No Disc
- Yes No Springtooth
- Yes No Crowder
- Yes No Roto-Till
- Yes No Other: \_\_\_\_\_
- Yes No Non-Cultivation Used

### **Field Sanitation**

- Yes No \*Are appropriate containers used?
- Yes No Are containers inspected and replaced regularly?
- Yes No \*Are containers cleaned and sanitized according to a standard procedure?
- Yes No Is farm equipment cleaned and sanitized routinely?
- Yes No Are storage facilities cleaned and sanitized regularly, kept free of pests?

### **Field Transport Equipment (Bins, Totes, Buckets, etc.)**

- Yes No Containers are free of debris
- Yes No Containers are cleaned on a regular basis
- Yes No Containers are made of a washable material such as plastic
- Yes No Cleaning is documented Records are available for review at: \_\_\_\_\_
- Yes No Cleaning crew list of duties List is available for review at: \_\_\_\_\_

### **General Pest Control**

- Yes No Organic
- Yes No Conventional
- Yes No Licensed pest control advisor makes recommendations
- Yes No Applications made by certified applicator
- Yes No Fields posted when Category I materials are applied
- Yes No Applicators comply with applications restrictions
- Yes No Herbicide applications are restricted to periods when wind gusts do not exceed 10 mph for ground and 10 mph by air
- Yes No Applications avoid potential ground water contamination
- Yes No Reentry guidelines are observed
- Yes No Harvest intervals are observed Pesticide permit number: \_\_\_\_\_ Person responsible for permit: \_\_\_\_\_
- Yes No Pesticide application records on file with county Records are available for review at: \_\_\_\_\_
- Yes No Pesticides used according to label
- Yes No Pesticides authorized for crop by U.S. EPA
- Yes No Empty containers are disposed of properly
- Yes No Equipment is checked and maintained on a regular schedule
- Yes No Equipment inspections are standardized
- Yes No Equipment is kept clean
- Yes No Application services are subject to county, state ordinances
- Yes No Applicators are fully trained

### **Water**

- Yes No \*is the best water quality reserved for post-harvest operations?
- Yes No \* is contact minimized between irrigation water and the edible plant parts?
- Yes No Are wells constructed optimally for water protection?
- Yes No Is the water source protected from run-off and flooding?
- Yes No \*is water source protected from animal contamination?

- Yes No Is potable water used in dust-control operations?
- Yes No \*Are wells maintained and repaired regularly?
- Yes No Are all unused wells properly shut down?
- Yes No Are devices in place to prevent back-siphonage in all water lines?
- Yes No Is the water used to deliver chemicals and other amendments to plants of post-harvest quality?
- Yes No \* is post-harvest water clean and sanitary?
- Yes No Are standard operating procedures (SOPs) in place for changing water in post-harvest operations?
- Yes No \*is the equipment used to maintain post-harvest water quality inspected and repaired regularly?
- Yes No \*is the dump tank water properly maintained?
- Yes No Are appropriate wash methods used for produce?
- Yes No Is the wash water used efficiently?
- Yes No \*Are antimicrobials used properly in post-harvest water?
- Yes No \*is water reused counter to the production line?
- Yes No Are cooling temperatures maintained properly?
- Yes No Is cooling equipment maintained properly?
- Yes No \*is cooling medium maintained properly?
- Yes No Have any adverse water testing results been acted upon?

### **General Irrigation Practices**

- Yes No Well water
- Yes No Well is maintained
- Yes No Well casings are checked regularly Year built: \_\_\_\_\_
- Yes No Canal water Canals are maintained by: \_\_\_\_\_
- Yes No On-farm reservoir
- Yes No On-farm reservoir is “shocked” periodically
- Yes No Furrow irrigation
- Yes No Drip irrigation
- Yes No Drip line is buried
- Yes No Sprinkler irrigation
- Yes No Pipe?
- Yes No Center pivot
- Yes No Fertigation is practiced
- Yes No Chemigation is practiced
- Yes No “Gray water” is used?
- Yes No Gray water is treated with disinfectant
- Yes No Gray water is filtered
- Yes No Gray water is monitored daily Microbiological levels are not to exceed: \_\_\_\_\_
- Yes No Gray water is controlled by local ordinances
- Yes No Irrigation water is reused
- Yes No Reused water is treated with disinfectant
- Yes No Reused water is filtered
- Yes No Total Coliform and *E. coli* are analyzed
- Yes No Monthly
- Yes No Semi-annually
- Yes No Annually Results can be reviewed at: \_\_\_\_\_:
- Yes No Corrective action taken Corrective action documents at: \_\_\_\_\_
- Yes No Irrigation water tested for heavy metals Test results at: \_\_\_\_\_
- Yes No Heavy metal tests negative

### **Soil Amendments**

#### **Fertilization Practices**

- Yes No Inorganic fertilizers are applied Fertilizer supplier’s records are available at: \_\_\_\_\_
- Yes No Fertilizer supplier’s records are reviewed
- Yes No Fertilizer supplier’s records are current

- Yes No Supplier's records confirm compliance with state
- Yes No Animal manure is used
- Yes No Manure is composted
- Yes No Is the water used to deliver soil amendments sanitary?
- Yes No \*is only properly-composted or adequately-aged manure used on the fields?
- Yes No \*is aged manure applied only prior to planting?
- Yes No \*Are only reputable compost suppliers used?
- Yes No \*Are all compost applications documented?
- Yes No Are the supplier's records reviewed regularly?
- Yes No \*is compost stored in an appropriate manner?
- Yes No Is the crop considered before manure application?

**Growers that operate their own composting operations:**

- Yes No Are the proper minimum standards followed and permits obtained?
- Yes No Manure meets EPA Class A guidelines
- Yes No Manure supplier's records are available at: \_\_\_\_\_:
- Yes No Manure supplier's records are reviewed
- Yes No Manure supplier's records are current
- Yes No Manure application occurs prior to cropping
- Yes No Manure applications are incorporated into soil
- Yes No Manure piles are left out during the season
- Yes No Municipal waste is used as manure
- Yes No Municipal waste is composted
- Yes No Municipal waste meets EPA Class A guidelines Municipal waste supplier's records are available at: \_\_\_\_\_
- Yes No Municipal waste supplier's records are reviewed
- Yes No Municipal waste supplier's records are current
- Yes No Municipal waste application occurs prior to cropping
- Yes No Municipal waste application is incorporated into the soil

**Personnel**

**Hand Labor Use**

- Yes No Pruning
- Yes No Thinning
- Yes No Harvest
- Yes No Other: \_\_\_\_\_

**All employees**

- Yes No \*Are employees properly trained in personal hygiene and the prevention of microbial contamination of produce?
- Yes No Trained in use of equipment?
- Yes No Pesticides safety?
- Yes No \*Do employees feel responsible for food safety?
- Yes No Are training schedules, sanitation policies, and personal hygiene policies documented and accessible to employees?
- Yes No \*Are employees with illness and open wounds prohibited from handling produce?
- Yes No \*Are employees trained in proper hand-washing techniques?
- Yes No \*Are restrooms adequate and available to employees?
- Yes No Are head coverings and hair restraints used as necessary?
- Yes No Do employees wear clean garments every day?
- Yes No \*If gloves are used, are they used appropriately?
- Yes No Does the grower have hygiene policies in place for the fields?
- Yes No Are field workers provided a separate area for breaks and meals?
- Yes No First aid available
- Yes No Trained in emergency medical facilities and use?
- Yes No Fresh cool drinking water available?

- Yes No Are individual disposable drinking cups available?
- Yes No Chewing tobacco is restricted/prohibited from fields
- Yes No Eating and chewing gum is restricted/prohibited from fields
- Yes No Employees with rashes, cuts, etc. on their hands get first aid treatment and use gloves when working
- Yes No Employees who show signs of illness are not permitted to come into contact with raw products

### **Sanitary Facilities**

- Yes No \*Is there 1 toilet facility for every 20 workers of each sex, or fraction thereof?
- Yes No \*Is there 1 hand-washing facility for every 20 employees?
- Yes No \*Do toilets lock from inside?
- Yes No \*Is toilet paper held on a dispenser?
- Yes No \*Are toilets easily accessible, and can employees use them whenever they need to?
- Yes No \*Are toilet facilities maintained in a clean condition?
- Yes No \*Is sewage disposed of properly?
- Yes No \*Are portable toilets handled appropriately?
- Yes No \*Is drinking water provided for employees?
- Yes No Are the grower's sanitation policies documented?

### **Facility Pest Control**

- Yes No Identification of potential or present pests
- Yes No Traps are set for identified pests
- Yes No Potential nesting or hiding places are eliminated or monitored
- Yes No Sliding doors are kept closed to prevent birds and pests from entering the area
- Yes No All holes in the exterior walls are sealed
- Yes No Pest control log is maintained Pest control log is available for review at: \_\_\_\_\_

### **Packing Shed Sanitation**

- Yes No Is the building designed to prevent cross-contamination?
- Yes No Are bins and containers inspected regularly?
- Yes No Is this schedule documented?
- Yes No \*Are bins and containers washed and sanitized regularly?
- Yes No \*Are packing shed personnel trained in minimizing microbial risk?
- Yes No \*Is processing water clean and sanitary?
- Yes No \*Is food protected from contamination by the equipment?
- Yes No \* equipment designed to be easily cleaned?
- Yes No Are racks and forklifts inspected and cleaned regularly?
- Yes No Is the garbage kept covered?
- Yes No Is there a space of at least 18 inches between racks or pallets and the wall?
- Yes No \*Is equipment cleaned and inspected according to a schedule and standard procedure?
- Yes No \*Is a sanitizing step always preceded by a cleanser step?
- Yes No \*Are cleaning tools cleaned and sanitized regularly?
- Yes No \*Are cleaning tools kept separate according to their function?
- Yes No Are food-grade lubricants used?
- Yes No Are pests properly controlled according to a schedule and SOP?
- Yes No Is environmental sanitation carried out according to a documented schedule?
- Yes No Is environmental sanitation carried out according to a Standard Operating Procedure?
- Yes No Are samples for testing taken properly?
- Yes No \*Are packaging materials stored in a sanitary manner?
- Yes No Are cooling rooms and units cleaned and sanitized appropriately?
- Yes No Are cooler temperatures properly maintained?
- Yes No Is the outside property maintained in a clean condition?
- Yes No \*Do conditions at the loading dock minimize microbial risk?
- Yes No \*Are cross-contamination conditions minimized in the transport truck?

## Cleansers and Sanitizers

Yes No Are appropriate water temperatures used for cleaning and sanitizing?

Yes No \*Is a surface cleanser always used before a sanitizer?

Yes No Is there a method to test sanitizer concentration?

Yes No Are employees properly trained to use chemical cleansers and sanitizers?

Yes No Are all chemical hazards and risk areas clearly indicated?

Yes No Are chemicals safely stored?

### Sanitizers

<u>Effective against</u>	<u>Chlorine</u>	<u>Iodine</u>	<u>Quats</u>	<u>Acid-anionic</u>
Gram positive bacteria (lactics, clostridia, Bacillus, Staphylococci)	Good	Best	Good	Good
Gram negative bacteria (E. coli, Salmonella)	Best	Good	Poor	Good
Yeast and molds	Best	Good	Poor	Poor

### Affects on

<u>Property</u>	<u>Chlorine</u>	<u>Iodine</u>	<u>Quats</u>	<u>Acid-anionic</u>
Corrosive	Mod-High	Mod-Low	Low	High
Affect by hard water	No	Slightly	Yes	Slightly
Skin irritant	Yes, >100 ppm	Not all levels	No	Yes
Maximum level permitted by FDA based on type without rinse	200 ppm	25 ppm	200 ppm	200-400 ppm
Affected by organic material	High	Moderate	Low	Moderate
Cost	Low	Low	High	High
Stability	Low	Varies with temperature	High	High
Leaves active residue	No	Yes	Yes	Yes
Incompatible with	Phenols, amines, soft metal	Starch, silver,	Anionic wetting agents soaps wood, cloth, cellulose, nylon	Cationic surfactants, alkaline cleaners
Activity	Fast	Fast	Fast	Fast
Penetration	Poor	Good	Excellent	Good

## Packing Shed Sample Daily Pre-Inspection Log

(Include initial by individual performing inspection)

Week of: _____	Mon	Tues	Wed	Thur	Fri	Sat	Sun
<b><i>Receiving Area</i></b>							
Floors swept and clean of trash, debris and broken equipment							
Area is free of rodents and rodent droppings							
Walls and ceilings are clean and free of debris and cobwebs							
Trash cans are clean and emptied							
Doors are sealed properly, with no gaps							
<b><i>Warehouse</i></b>							
Floors swept and clean of trash, debris and broken equipment							
Walls, ceilings, pipelines and fans are clean and free of debris and cobwebs							
Cooler perimeter is free of debris and rodent droppings							
<b><i>Product Storage Room</i></b>							
Floors swept and clean of trash, debris and broken equipment							
Walls, ceilings, pipelines and fans are clean and free of debris and cobwebs							
Cooler perimeter is free of debris and rodent droppings							
<b><i>Packing Material Storage</i></b>							
Floors swept and clean of trash, debris and broken equipment							
Walls, ceilings, pipelines and fans are clean and free of debris and cobwebs							
Sanitation equipment is cleaned and properly stored							
Employee gloves, personal belongings and personal tools are properly stored							
<b><i>Sanitation Supply Area</i></b>							
Floors swept and clean of trash, debris and broken equipment							
Walls, ceilings, pipelines and fans are clean and free of debris and cobwebs							
Sanitation equipment is cleaned and properly stored							
Employee gloves, personal belongings and personal tools are properly stored							
<b><i>Maintenance Room</i></b>							
Floors swept and clean of trash, debris and broken equipment							
Walls, ceilings, pipelines and fans are clean and free of debris and cobwebs							
Sanitation equipment is cleaned and properly stored							
Employee gloves, personal belongings and personal tools are properly stored							
<b><i>Restrooms</i></b>							
Floors swept and clean of trash, debris and broken equipment							

Sinks, toilets and urinals are clean and in working order							
Mirrors are clean and unbroken							
Soap and hand towels dispensers are full and working properly							
Trash cans are emptied and clean							
Toilet tissue, soap and hand towels are in dispensers ONLY							
Floor drains are clear and clean							
<i>Rest Area</i>							
Trash cans are clean and emptied							
Tables are clear and clean							
Floors are clean and free of trash							
The area is free of rodents							
Walls, ceilings, pipelines and fans are clean and free of debris and cobwebs							
<i>Building exterior</i>							
Parking lot is clean and free of trash							
Parking lot is free of rodents and rodent droppings							
Grounds are clean and free of trash and cigarette butts							
Dumpster area is clean and free of trash							
Dumpster is not leaking							
There are no areas of standing water near the facility							
The dock area is free of trash and bird activity							
<i>Packing Area</i>							
Floors swept and clean of trash, debris and broken equipment							
Walls, ceilings, pipelines and fans are clean and free of debris and cobwebs							
Drainage system is clean and free of debris							
Equipment is clean and sanitized, free of debris							
Equipment is free of excessive Lubrication and temporary repairs							
Trash cans are emptied and clean							
No personal belongings are in the area							
Lighting has an intact bulb shield							
<i>Box Make Up Area</i>							
Floors swept and clean of trash, debris and broken equipment							
Walls, ceilings, pipelines and fans are clean and free of debris and cobwebs							
Drainage system is clean and free of debris							
Equipment is free of excessive Lubrication and temporary repairs							
Equipment is free of excessive Lubrication and temporary repairs							
Trash cans are emptied and clean							
No personal belongings are in the area							



Lighting has an intact bulb shield							
<b><i>Holding Area</i></b>							
Floors swept and clean of trash, debris and broken equipment							
Walls, ceilings, pipelines and fans are clean and free of debris and cobwebs							
<b><i>Cold Room</i></b>							
Floors swept and clean of trash, debris and broken equipment							
Walls, ceilings, pipelines and fans are clean and free of debris and cobwebs							
Perimeter is free of rodents and rodent droppings							
<b>SUPERVISOR VERIFICATION</b>							
<b>Signature:</b>				<b>Date:</b>			
A supervisor should be notified of any problems seen during inspection. Problems should be corrected immediately.							
<b>Date</b>	<b>Corrective Action Required</b>			<b>Name of Supervisor Notified</b>			

## Documentation

\_\_\_ \_\_\_ Are Standard Operating Procedures (SOPs), policies and schedules documented and kept where employees have access to them?

A daily, weekly or monthly log such as shown above for the packing shed should be developed for the field production phase as well.

### **SOPs and schedules should be available for cleaning and sanitizing:**

- Yes No Ceilings, overhead lamps and pipes
- Yes No Drains
- Yes No Forklift
- Yes No Waste hopper
- Yes No Boxes bins, etc.
- Yes No Waxing equipment
- Yes No Conveyors and belts
- Yes No Cooling units
- Yes No Facility floors and walls
- Yes No Wash tanks and immersion tanks
- Yes No Warehouse and other storage rooms
- Yes No Packing materials
- Yes No Restrooms
- Yes No Water tanks for washing and drinking (refill)
- Yes No Hand tools
- Yes No Farm equipment

### **SOPs and schedules should be available for the following tasks:**

- Yes No Stocking paper towels, toilet paper, drinking cups
- Yes No Container inspection
- Yes No Testing water quality
- Yes No Changing postharvest water (dump tanks, cooling, etc.)

Yes No Sewage disposal  
Yes No Container inspection  
Yes No Pest control

**Schedules should be available for the following tasks:**

Yes No Review of manure-supplier records

**Logs should be maintained for the following operations:**

Yes No Wash water (include disinfectant concentration, pH)  
Yes No Immersion wash (include disinfectant concentration, oxidation-reduction potential, pH,  
temperature)  
Yes No Master sanitation schedule  
Yes No Daily pre-inspection log

**The following must be documented:**

Yes No Manure application (supplier, lot number, composition)  
Yes No Land history (physical description of the soil, crop history, soil amendment history)  
Yes No Field and shed sanitation policies  
Yes No Personal hygiene policies  
Yes No Training schedule  
Yes No Medical leave and reporting policy

**Documentation (Record of Due Diligence)**

**The only recourse a grower or shipper has in his defense in the event of a food safety violation charge is his records showing he did everything possible to insure a safe product is being produced and shipped to consumers. Remember if it is not documented and recorded it did not occur!**

**Acknowledgement:**

**The above information found in this appendix was taken from the UC GAPs Primer developed by Dr. Trevor Suslow of the Vegetable Crops Department of the University of California @ Davis.**