



HACCP FEASIBILITY – 2009

EQUIPMENT & FACILITY RECOMMENDATIONS

Food Safety Upgrades for Salad Greens Packing

As you review your farm to reduce food safety risks, whether in preparation for a 3rd party audit or to improve your own quality standards - you might consider **equipment** and **facility** upgrades.

Making the most of your investment

When considering whether to invest in equipment upgrades, the search should focus on items that reduce risk. But in order to make worthwhile purchases, we recommend looking for equipment that has *multiple benefits* for the business – both *improving food safety* practices, as well as increasing *efficiency* for increased returns, *ergonomics* for worker health and longevity/satisfaction, and *quality infrastructure* for long-term use.

Equipment is the easy part – then there's oversight and documentation...

We should point out that the purchase of food-safe equipment is not going to bring a packing operation into compliance with food safety programs alone. While equipment may be the “easy” (although potentially expensive) part of upgrades, equipment is part of a system of due diligence with *oversight* and *documentation* – and these last items tend to be the most time-consuming factors in food safety programs.

CRITERIA

While there are varying standards for equipment used in packing houses, if you are looking to follow Good Manufacturing Practices (GMPs)¹ as a prerequisite to HACCP (voluntary) or because you intend to use the same set-up for processed products (state or local mandates apply), there are several criteria to use in judging equipment options.

All materials (countertops, utensils, bins, lugs, wash tubs, buckets, spinners, packaging, etc.) that come into contact with food must be:

- Made of **approved food contact materials** such as stainless steel or an FDA-approved plastic – non-toxic, corrosion-proof, sanitizable materials that can withstand the wear and tear of their intended use. Food equipment suppliers can identify, and guarantee, products that are food contact approved.
- **In good condition** – kept clean and in good repair, smooth and free of cracks for easy cleaning.

¹ These equipment criteria are based on the US Code of Federal Regulations Part 21, Section 110.
http://edocket.access.gpo.gov/cfr_2002/aprqrtr/pdf/21cfr110.40.pdf

Sourcing – Equipment List

CISA researched a list of equipment options, prices, and sourcing for the western Massachusetts area. We followed leads from food processors, larger greens growers in the Northeast, equipment vendors, and food safety experts. In the separate *Equipment List* we've listed basic references for equipment that you might want to consider for your salad greens packing set-up. We also testing out the spinner (20 gallon Dito Dean Greens Machine) with a local farmer – see the *Equipment Review: Greens Spinner* for trial conclusions.

Costs & Scale

Upgrading equipment to meet retailer requirements for packing salad greens can mean simple upgrades – for example, switching out wooden tables for used stainless steel restaurant-supply tables that are in good condition. But if you're also looking to up production and efficiency, it can mean significant investment.

We found that finding equipment options for *medium-scale* salad greens operations that want to move beyond manually handling all product is a major challenge. (Note: as a working definition for medium-scale we're thinking in the order of 3-4 people packing orders, or production of over 500 lbs/week). Greens spinners jump from \$180 manual options and adapted washing machines² to \$1,800 to \$9,800 to-the-trade models approved for GMPs. Rinse systems for salad greens are even more of a challenge, going from several hundred dollars for a series of good rinse tubs (with hand transfer between them), to a \$17,000 bucket wash system or a \$35,000 conveyor jet-spray wash system³. This is where a cash flow is essential to help figure out if the increased efficiency is balanced out with 1) market demand, 2) at a sufficient price point, and 3) your ability to produce to fulfill it. See CISA's *Salad Greens Cash Flow Scenarios* for examples.

Benefits

With good equipment choices, your business may benefit in the following ways:

- **Sanitization** – Smooth surfaces, bonded seams, and easy dismantling make sanitization straightforward and promote proper cleaning.
- **Efficiency & Quality** – Specialized equipment may save labor and make work more accurate, for example greens that are properly dried. *Ex.* One farmer told us it would take an employee 20 minutes to hand-spin 20 gallons worth of salad greens – an electric spinner takes less than 5 minutes.
- **Durability & Economics** – Equipment upgrades may mean financial savings if you purchase quality items with a longer life that save you time, waste, and replacement costs.
- **Maneuverability** – Buying equipment that can be easily moved around (e.g. with casters or light-weight materials) for the purposes of sanitization or multi-uses can improve convenience for workers.
- **Ergonomics** – The design features of to-the-trade pieces can save workers from injury and frustration.
- **Rethinking set-up** – Getting new equipment allows you time to rethink workflow to gain efficiencies and improve practices.

² Our understanding from food processing/food safety experts is that these converted spinners might incur deductions for third-party audited GMPs due to the fact that they are not designed for food contact, and sanitizers might not access all parts of the external drum where standing water might be a concern. We have not yet had a third-party auditor verify this. More information about this option can be found at: <http://attra.ncat.org/attra-pub/postharvest.html>.

³ See CISA's *Equipment List* for other pricing and equipment options.

FACILITIES

While equipment was the original focus of our project, the bigger variables to control according to GMPs relate to **facilities**. Upgrading facilities is as important as new hardware, as workflow and packinghouse conditions are an important consideration in Good Manufacturing Practices and any new equipment purchases need to align with packinghouse set-up.

GMPs are a prerequisite for third-party HACCP audits, and are a particularly challenging prospect for small farms because they require facilities for “processing” (like commercial kitchens) even though salad greens would typically only require “packing” as a raw agricultural commodity. This can be a daunting project and mean much larger capital costs if you don’t have amenable conditions currently on your farm.

GMP FACILITY GUIDELINES

Developed for CISA by Brian Norder, Vermont Food Venture Center

These facility guidelines are based on the US Code of Federal Regulations Part 21, Section 110 which gives general guidance on construction, sanitation and process controls. This guidance is applicable to a wide range of packing and processing operations, including salad greens packinghouses.

Plumbing and Waste Water

Plumbing codes on the use of grey water or wash water disposal on farms is generally vague and may end up being a discretionary call by local regulators in the event of a complaint or inspection (see *Infrastructure Upgrades: Plumbing* below for recommendations). Applying common sense to packing room run-off will go a long way in facility design. Issues to address are proper drainage to avoid standing water and analysis of any load of cleaning and sanitizing chemicals. Sources of this water would be the produce wash water, bin and surface wash and rinse water and drain water from hand washing sinks; toilet wastes must be disposed of in a proper, sanitary fashion.

Using GAP-based water runoff guidance will help in this area. Water should flow away from the packing facility and should avoid areas of concentrated animal waste that could create issues downstream.

If the potable water source is from a well or other private source, an annual test is required and records of that test must be maintained. All hoses and faucets must be equipped to avoid any chance of a backflow of contaminated water into potable water systems. Sink faucets are designed to have an air gap between the top of the sink bowl and the faucet itself. If a hose is attached to that faucet, it must be equipped with a check valve or other backflow prevention device and such devices are recommended on garden hose faucets. These check valves can be purchased for a few dollars at any hardware store.

All processing areas must be equipped with a hand washing area consisting of a sink with hot and cold running water, liquid soap, paper towels or electric hand dryer and a waste basket. If hot water is not readily available, 110 volt under sink water heaters are available for under \$200.

Construction Materials, Fixtures and Food Contact Surfaces

Materials for construction of food processing area walls, floors and ceilings are expected to meet the following simple standard: durable, smooth, impervious and easily cleanable. Thus, the range of material for walls and ceiling can go from sheet rock with semi-gloss enamel at the low end of the budget to FRP (fiberglass reinforced panel) at the top end. Similarly, floors can range from sealed, crack-free concrete to tile, linoleum or to poured epoxy.

Sheet rock walls in a wet environment, particularly if built onto wood studs, will, after a couple to few years, begin to show signs of rot and deterioration and will need maintenance or replacement at that time. Doors should be equipped with self-closing devices and should fit to the frame snugly to keep pests out of the facility.

Light bulbs must either be shielded or shatterproof to prevent glass from broken bulbs from contaminating food.

Wash and Sanitizing Chemicals

There are two main objectives in selection of cleaning and sanitizing chemicals: safety and effectiveness. Simply, cleaning reduces the amount of dirt on a surface, sanitizing reduces microorganisms to a safe level.

There are many types of cleaners for different jobs and there are now a number of low or non-toxic options which are effective and eliminate or reduce hazards associated with skin, eye or internal contact or with accidental contamination of food due to spillage or improper rinsing. Simple Green Crystal is an example of this. This is a form of the popular degreaser that has the color and perfume removed to make it acceptable for food contact surface contact.

There are many different sanitizers available. Perhaps the most widely used is common household bleach. Bleach is toxic and corrosive if misused so its wide availability should not lead to casual handling. Fragranced bleaches must be avoided and chemical test strips must be used to ensure proper concentration (between 50 and 200 ppm) if used on food contact surfaces. One teaspoon of bleach per gallon of water will yield approximately 100 ppm. (Note: bleach dissolved in hot water (over 120 F.) will dissipate rapidly and will not be an effective sanitizer.) At this concentration, the sanitizer can be used as a spray, swab or dip and will not require a further rinse although some processors choose to use a fresh water rinse prior to further handling.

Support for this project provided by the Massachusetts Department of Agricultural Resources

Infrastructure Upgrades: Plumbing

On-farm upgrades and packinghouse renovations can entail a multi-step process of planning, requesting approvals, expert input, estimates, and implementation. For example, plumbing work may be required to improve access to hot water for handwashing or for washing tools, containers, or packing room space. Plumbing activities should be completed to meet town and state requirements.

Process

Is there current plumbing on location?

Who did it? Was it permitted? If so, ask the plumber for guidance on making modifications.

Determine occupancy

What is your occupancy designation (type of building and use) with the town? This will determine the type of plumbing required.

- *Agricultural Exemptions*

According to licensed plumbers, there are no agricultural exemptions currently on the books in MA. Agricultural operations are considered commercial operations and the same plumbing requirements apply across the board. However, some agricultural activities, such as irrigation systems, may have specific allowances (e.g. use of plastic piping) as long as the city water supply is protected.

Pull a plumbing permit

Applications are filed by property owner and a licensed plumber. This process will require you to comply with all aspects of your town's building and plumbing code.

Request a variance

If you feel the plumbing permit requirements are overly burdensome for the use of the farm building, you can petition the local Board of Health or town Building Inspector to submit a variance request to the State Plumbing Board.