



GOOD MANUFACTURING PRACTICE (GMP) GUIDE FOR SPICES

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I. Introduction

Spices are dried plant products used to enhance the flavor of foods. Their safety and wholesomeness are of utmost concern to the spice industry, their customers, consumers, and regulators. As with any agricultural product, safety, quality, and consistency of a spice product may be compromised by one or all of the many processes it undergoes between the farm and table. The American Spice Trade Association (ASTA) has sponsored many programs to assist its members in assuring that spices sold to food processors and consumers are safe and wholesome. This guide focuses specifically on the spice manufacturing environment, and combines recommendations and best practices from ASTA member companies.

The good manufacturing practices (GMPs) recommended are given below. Although each section focuses on a particular area or process within the manufacturing environment, the specifics should not obscure the core principles on which GMPs are based. These core principles are:

- Suitable facility design and maintenance
- Thoughtful equipment design and maintenance
- Documentation that includes procedures, forms and manuals
- Process validation
- Corrective actions
- Control of non-conforming products
- Traceability
- Management of incidents and product recall
- Job training and competence
- Hygiene and sanitation
- Waste removal
- Pest control
- Chemical and physical product contamination control
- Dispatch and transport
- Allergen management
- Product packaging and labeling
- Personal hygiene
- Internal audits for hygiene, food safety and quality

This document is intended to serve as a resource for spice companies in providing safe, quality products to their customers. Members of the spice trade are encouraged to use this document together with other sources of information to develop and implement programs that assure the spices they sell meet the highest internal, regulatory, and consumer standards.

II. Facility Standards

Sanitary design, construction, and maintenance of food processing facilities are essential for producing safe and wholesome food. ASTA recommends that all of its members, their suppliers, and employees adhere to the following GMPs relevant to the physical plant.

A. Facility requirements

1. Plant buildings and structures are of suitable size, construction, and design to facilitate maintenance and sanitary operations for food manufacturing purposes.
2. Plant construction and layout must be such that exposed product is adequately separated and protected from any operations that could cause contamination.
3. Facilities must be designed so product, product ingredients, and primary packaging materials do not come into contact with non-product zones, e.g., floors, walls.
4. Personnel and forklift doors must be effectively protected with air curtains or by other effective means.
5. Ceilings and walls must be constructed of smooth, non-porous, and easily cleanable material.
6. Ceiling surfaces as well as other overhead equipment, e.g. ventilation units, light fixtures, conveyors, pipes, and catwalks must be clean, in good repair, free of flaking paint, rust, holes, unsealed openings, or other conditions that could result in product contamination.
7. Overhead structures, e.g., ventilation units, light fixtures, electrical piping, and conveyors must be clean and free of product build-up, dust, mold, rust, peeling paint, and condensation.
8. There must be no evidence of water leaks on the ceilings.
9. Seal all openings in ceilings and walls where pipes or equipment pass.
10. Keep walls free of dust, dirt, and flaking paint, as well as cracks, holes and crevices that would inhibit cleaning or provide harborage for soil or pests.
11. Close windows when outside conditions exist that may expose the plant to airborne contamination; any window that can open should be insect screened. All skylights, transoms, windows, or similar openings must be free of damage, tight fitting and properly screened.
12. Construct floors that are smooth, easy to clean, and sloped toward drains.
13. Maintain floors in a clean and dry condition, with no standing water.
14. Construct drains to prevent gas back-flow and equip them with traps and drain covers.
15. Wherever possible any horizontal surface should be sloped for easy cleaning.
16. Ensure adequate provisions are in place to prevent against pests, dirt, trash, and filth that may be a source of food contamination.
17. The roof of the facility should be clear of clutter, standing water, bird, and pest harborages.

18. The plant roof must be easily accessible to plant security and inspectors, but not for non-authorized personnel.
19. Outside opening doors shall be self-closing, tight fitting, and maintained in good repair.
20. No uncovered or unsealed pipes or other equipment that may present pest control issues or harborages are allowed.

B. Ventilation

1. Provide appropriate heating, ventilation, or refrigeration to maintain proper environmental and sanitary conditions for ingredients, finished product, equipment, and packaging materials.
2. All ventilation systems must be cleanable, properly functioning and designed to prevent product contamination from condensation, mold, bacteria, insects, dust, odors, steam, or noxious fumes.
3. Balance heating and ventilation to prevent condensation on walls or ceiling in product areas.
4. Ventilation fans in walls should be screened so that there is no insect ingress when fans are turned off.
5. Ventilation fans in roofs should be protected to prevent rain access and should not be located above any open processing or storage areas. If this is unavoidable, catch trays should be located below the vents.
6. All toilet facilities, locker rooms, labs, and chemical storage areas must be mechanically ventilated to the outside.
7. Maintain critical processing areas under positive air pressure to prevent dust, flying insect entry, and cross-contamination of unfiltered air.
8. Screen and filter all incoming air for processing areas; air filters must be routinely inspected and replaced or cleaned.

C. Refrigerators and freezers

1. Ensure refrigeration unit drip pans are adequately sized, properly drained, and contain sanitizing blocks.
2. Care should be taken to avoid locating refrigeration units above products that can be affected by leaking units.
3. Fit all freezers/coolers with thermometers and automatic controls for regulating temperature.
4. Set up a system for documented monitoring of humidity and temperature.

D. Employee areas: Break rooms, locker rooms, and restrooms

1. Ensure employee areas are well lit, clean, orderly, and effectively ventilated.
2. Provide a designated storage area for employees' lunch items.
3. Lockers should facilitate the segregation of clean and used protective clothing.
4. Signs should be posted informing employees of what is permitted or banned within their locker.

5. Periodic locker inspections should be in force for hygiene purposes.
6. Food preparation areas should meet restaurant standards for sanitation and cleanliness.
7. Suitable refrigeration units should be provided if employees are permitted to bring in their own meals.
8. If used, these fridges should be on a cleaning and inspection program and should have temperature monitoring devices.
9. Careful consideration must be given to allergens in any food supplied or any vending operation, and suitable controls should be in place.
10. Post signs instructing employees to remove protective clothing before entering the toilet facilities.
11. Construct toilet doors to be self-closing and not open into areas where food is exposed to possible airborne contamination, except where alternate means have been taken to protect against such contamination, e.g., double doors/vestibules, positive air-flow systems.
12. Post signs in locker rooms, toilet facilities, and at entrances to work areas instructing employees in the proper hand washing and sanitizing procedures before starting work and when leaving toilet facilities.

E. Hand washing facilities

1. Provide adequate and convenient hand washing facilities in locker rooms, toilet facilities, and at entrances to work areas.
2. In high-risk areas, make hand washing and/or sanitizing stations convenient to employee workstations.
3. Hand washing facilities must include:
 - a) A sufficient number of sinks/basins to accommodate personnel without delay
 - b) Liquid, non-scented soap
 - c) Warm water
 - d) Hands-free tap (e.g., knee- or elbow-operated) where possible
 - e) Single-use paper towels or other drying device; cloth rolls are prohibited.
 - f) A foot-operated waste bin where paper towels are used
4. Emphasize the need to dry hands thoroughly before going into a dry area.
5. Ensure all plumbing conforms to applicable sanitary codes.
6. Use hand wash areas for hand washing only (utensil washing should be elsewhere).

F. Equipment design and maintenance

Processing, packaging, and storage equipment should be designed, installed and maintained in such a manner as to produce a quality product without introducing foreign objects or pathogens into the product. ASTA recommends that all of its members, their suppliers, and employees adhere to the equipment guidance below.

1. General
 - a) Equipment design and construction should allow for proper cleaning, sanitization, and inspection.
 - b) Equipment should be free of flaking paint, rust, or other contaminants that could become detached; stainless steel is preferred.
 - c) Tanks or other vessels containing food products must be covered where the potential exists for contamination.
 - d) Thermometers, recording charts, and pressure gauges must be accessible and convenient to read.
 - e) Utensils, tools, and equipment should have designated and sanitary storage areas, where food-contact surfaces should be protected from contamination.
 - f) Equipment should be designed or located to preclude condensate or to divert condensate away from product and product contact surfaces.
 - g) Wherever possible, equipment should be manufactured with continuous welds to facilitate easy cleaning and prevent microbial risk.
2. Preventative maintenance
 - a) It is good practice to have a fully documented preventative maintenance program that takes food safety into consideration. This should include all equipment within the facility and should prescribe the frequency at which the preventative maintenance should be carried out.
 - b) There should be a risk assessment carried out on the program to ensure that this maintenance activity does not give rise to the introduction of hazards. To this effect all lubricants should be food-grade.
 - c) The program should be documented and verified by a designated person.
 - d) If the maintenance has to be carried out while production is in progress, there should be a formalized documented program to show that the risks are being managed and to ensure that any debris created by the activity is removed from the area and any equipment affected is sanitized.
 - e) All equipment should be inspected for hygiene and damage on a regular basis. A line start-up check is suggested so that any damage to equipment, which cannot be repaired before the production line is started, can be documented so that any further damage that could occur can be identified and immediate corrective or preventive action taken.
 - f) If outside contractors are required for preventive maintenance or equipment repair, there should be a formalized system for the management of food safety.
 - g) Engineering companies seldom give their staff suitable training to work within a food factory, thus either select a supplier of this service that does give this training or ensure the engineer is briefed upon arrival on site.
 - h) Visiting contractors should be asked to read and comply with a simple procedure before they start their work. This will form part of the risk assessment before work commences.

- i) The risk assessment should cover the tools that the contractor is using, especially the previous use of that tool before it arrived on site.
 - j) The contractors will be requested to follow the instructions given to them and once all the work is completed, the area in question should be inspected and cleaned.
 - k) Maintenance activities in high-risk and high-care areas shall respect the segregation requirements of the area. If possible, there shall be dedicated tools and equipment for each area.
3. Temporary repairs
- a) Temporary repairs are not encouraged and thus should be a key focus during any GMP audit.
 - b) Temporary repairs should be recorded in a temporary repair log and permanent repairs made promptly.
 - c) Categorize temporary repairs as critical, i.e., a food contact part or location at imminent risk of product contamination or non-critical.
 - d) Assure that critical repairs will not add a food safety or quality risk, and decide what additional product testing, if any, is required for the batch being processed.
 - e) Make critical repairs only to allow a batch of material to be processed to completion and then make a permanent repair.
 - f) All non-critical temporary repairs should be dated and inspected on a weekly basis.
 - g) Where possible, all temporary repairs should be made using blue/metal detectable materials, or other food-safe items.
 - h) The use of temporary fasteners such as string, wire, or clear tape should not be permitted.
4. Use of wooden equipment
- a) ASTA does not recommend the use of wooden food-contact surfaces, as they are potential contaminants and are a good harborage for microbial contamination. It is almost impossible to sanitize wooden equipment.
 - b) It is not unusual in the spice and herb industry for wooden frames screen decks to be used in box or plan sifters. If this is the case, then an inspection program when the sieve is assembled, plus when the sieve is taken to pieces for cleaning, should be in place and should be documented.
 - c) The operator should be trained and guided towards the risk of wood and other contaminants. For example, in a plan sifter it is not unusual to have wooden sieve frames, staples, screws, nylon or steel screen and rubber screen balls all in one sieve deck. A picture showing all these potential contaminants helps the operator to undertake a suitable check.

G. Chemical control within the plant

1. Ensure the following to manage the use, storage and handling of non-food chemicals to prevent chemical contamination:

- a) Establish a list of all chemicals that are on site.
- b) Identify which chemicals are food-grade and which ones are not.
- c) Ensure each chemical has a material safety data sheet and a specification.
- d) Define which chemicals are allowed in a food-processing environment.
- e) Avoid strongly scented products. Where strongly scented or taint-forming materials have to be used, necessary attention shall be given to prevent the risk of taint contamination of products.
- f) Label and/or identify containers of chemicals at all times.
- g) Designate storage area with restricted access to authorized personnel.
- h) Limit use of chemicals to trained personnel only.

H. Zone control in a kill step facility

When a lethality step is needed to inactivate potential contaminants such as *Salmonella*, post-processing controls are required to prevent recontamination. ASTA recommends that all of its members, their suppliers, and personnel adhere to the following guidelines for zone control in a kill-step facility.

1. Where product is at different levels of risk from contamination, there shall be areas designated as high-risk, high-care, ambient high-care, low-risk, enclosed product areas, and non-product areas.
 - a) High-care product is a product that requires chilling or freezing during storage, is vulnerable to the growth of pathogens, has received a kill-step of typically 1-2 log reduction, and is ready to eat or heat. Thus, a high-care area is defined as an area designed to a high standard where practices related to personnel, ingredients, equipment, packaging and environment aim to minimize product contamination by pathogens. Where physical barriers are not in place, there shall be a complete documented risk assessment of the potential for cross contamination and effective, validated processes in place to protect products from contamination.
 - b) High-risk product is a chilled ready-to-eat or heat product where there is a high risk of growth of pathogens. High-risk areas shall be physically segregated and designed to a high standard of hygiene. Segregation shall take into account the flow of product, nature of products and packaging, equipment, personnel, waste, airflow, air quality, utilities, and drains.
 - c) Where ambient high-care areas are required, documented risk analyses shall be conducted to determine the risk of cross-contamination with pathogens, including products, flow of raw materials, equipment, personnel and waste, airflow and air quality and utilities including drains.
2. Access points of personnel, products and packaging shall be clearly defined for these areas. Location of transfer points shall not compromise the segregation between these areas.

3. Careful consideration shall be given to transfer equipment as forklifts, pallets, conveyors, scales, trans-pallets, and sewing machines that may be used in multiple zones. Risks shall be clearly identified and measures taken.
4. For personnel entering the high-risk areas, it is recommended to have a separate colored uniform and dedicated footwear. The access shall be through a separate additional hygienic entrance into these areas. Staff working in the high-risk areas shall be appropriately trained.
5. Cleaning material used in high-risk and high-care areas shall be dedicated, color-coded and kept in these areas.
6. Cleaning standard operating procedures shall be detailed, and verification of cleanliness shall be documented.

I. Foreign Body Control

The exclusion of foreign material is essential to producing a clean, safe product. Magnets, metal detectors, and sieves are often designated as critical control points within a manufacturing environment. Thus, proper location and maintenance of these devices are critical to food safety. ASTA recommends that all of its members, their suppliers, and personnel follow the foreign body control guidelines below.

1. Magnet installation, use and cleaning
 - a) Assess the depth of field of the magnet to determine the depth of product that can pass over the magnet or the gap between the magnetic bars, thus ensuring all products passes through the magnetic field.
 - b) When installing magnets:
 - (1) Set the product flow over the magnet at a slow rate and control the depth of the product.
 - (2) Pay particular attention to the corners of conveying lines or process hopper to ensure that there is no gap where material can avoid the magnetic field.
 - (3) Consider staggering magnets, especially when product bridging is an issue.
 - (4) Ensure magnets can be easily taken out of the product flow for cleaning.
 - c) Because fine metal dust can be difficult to remove from rare earth magnets, consider use of:
 - (1) Magnets that are equipped with removable outer stainless steel housings; when these housings are removed, the metal falls away from the magnets
 - (2) Self-cleaning magnets
 - d) Establish cleaning intervals (usually no less than once per shift)
 - (1) Document each cleaning.
 - (2) Retain and investigate any item detected, and take corrective action.
2. Metal detection

- a) Use the appropriate size metal detection equipment for the product and process application.
 - b) Limit risk of recontamination by placing the metal detector at the end of the production line, and designate all areas after the metal detector as 'high-care' to ensure that recontamination does not occur.
 - c) Establish metal detection system standard operating procedure that includes measures to:
 - d) Verify and maintain equipment performance
 - (1) Maintain equipment cleanliness.
 - (2) Control rejected items to ensure that they are not mistaken for approved products.
 - e) Ensure all metal detectors are calibrated on at least an annual basis by an approved certification body. During this calibration, identify the least sensitive part of the field within the metal detector (usually the center of the induction coil) per HACCP guidelines; this should be the designated location for the application of the test pieces.
 - f) Use test pieces made from ferrous, non-ferrous and stainless steel to confirm accurate performance of the detector prior to use.
 - g) Recalibrate any time a test piece is not detected.
 - (1) The detector cannot be used in production until the test piece application check is satisfactory.
 - (2) All products manufactured since the last successful test piece application must be isolated, identified and put on hold. This isolated material must be reprocessed through the metal detector.
 - h) Document all tests, results, and corrective actions.
3. Control of glass and brittle plastic
- a) Exclude or protect from breakage glass/brittle plastic in areas where open products are handled.
 - b) Identify, document, and protect/cover all glass and brittle plastic within the factory (except packaging material) and check against breakage with frequency based on the level of risk to the product.
 - c) Segregate storage of product packed in glass/brittle plastic containers from raw materials and other packaging materials (e.g., paper bags, cartons).
 - d) In the case of a broken glass/brittle plastic,
 - (1) Stop production and quarantine the affected area.
 - (2) Alert the supervisor.
 - (3) Remove broken material.
 - (4) Clean the area using dedicated cleaning materials and use dedicated waste bins with lids.
 - (5) Discard any potentially-contaminated product.

- (6) Uniforms should be changed and footwear inspected.
- (7) Document the incident and the cleanup.

4. Sieve control and inspection

- a) Number all sieves with a permanent identification system.
- b) Record sieve number against each batch of product manufactured so there is full traceability to allow for any potential corrective actions.
- c) Use sieves (and their housings) that are made of stainless steel and food-grade nylon; mild steel sieves can be used in dry environments, provided there is no risk of product contamination.
- d) Ensure that sieves that have nylon mesh have their edges heat-sealed to prevent fibers from falling into the product; metal sieves can have their edges soldered or glue-sealed.
- e) Assign sieves with wooden parts to the highest level of control due to the risk of wood contamination, as well as the presence of staples and other fastening devices.
- f) Inspect sieves for hygiene and damage before each production run; document inspection, and label and isolate defective sieves.
- g) If visual inspection is not possible, use a check sieve to verify the particle size of the material being produced. Large particles indicate sieve damage.
- h) If damage is discovered at the end of a batch, the batch must be quarantined for reconditioning.
- i) If stainless steel sieves are found to be damaged, check the reject box at the metal detector to ensure that missing metal was successfully rejected.
- j) Routinely clean and thoroughly dry sieve screens, with care to separate dirty and clean screens.
- k) Use a hot box to dry fine mesh screens after wet cleaning.
- l) Set up a program of documenting and investigating the presence of any exceptional item that is found during the screening operation.
- m) Ensure that clean sieves that are stored ready for use are off the floor and away from potential contamination.

5. Control of sharp objects

- a) Make knives, blades, and similar sharp objects available in designated checkout areas only.
 - (1) Register each item in a logbook and number each item for easy identification.
 - (2) Require employees to sign the logbook on checkout and check-in, designating the tool used.
- b) Do not allow employees to replace blades or disassemble knives while working on a project. If a blade dulls or breaks, the employee must return the knife and check out a new one.

- c) Blade breaks must be reported to a supervisor immediately; the supervisor will report the incident and recommend corrective actions if necessary.
 - d) After every workday, a designated employee should replace all dull or broken blades, and ensure all tools are returned.
 - e) If any tools are missing at the end of the workday, the supervisor will report the incident and recommend corrective actions, which may include stopping all shipments until the tool is located.
6. Bag stitcher control
- a) Designate the area immediately prior to packing, e.g., a metal detector area post-induction coil as a high-care area, as any potential contamination in this area would not be detected by any further processing.
 - b) If a stitcher is in use, label it for use in high-care areas only.
 - c) The stitcher needs to have a part count and the needle (because it is metal and very sharp) must be checked after each batch.
 - d) A needle can lose the tip of its point and still operate; make sure the tip is intact.
 - e) Ensure that the bag stitcher is clean with no oil or grease leaks.
 - f) Never store the bag stitcher on the floor between uses.
 - g) Use blue stitching for easy detection of any fibers that may fall when the bag is opened.
 - h) Establish a sanitation program for the part of the stitcher that touches the bag.
 - i) Document all stitcher checks.

J. Sanitation

1. Facility and equipment sanitation
- a) Premises and equipment shall be maintained in a clean and hygienic condition.
 - b) Documented cleaning procedures shall be kept and include:
 - (1) Responsibility for cleaning
 - (2) Item/area to be cleaned
 - (3) Frequency of cleaning
 - (4) Method of cleaning, including dismantling equipment when required
 - (5) Cleaning chemicals and concentrations
 - (6) Cleaning materials to be used
 - (7) Cleaning records and responsibility for verification

- c) Frequency and methods of cleaning shall be based on risk. This shall include the risk from cleaning chemical residues on food-contact surfaces.
- d) For food-contact surfaces and processing equipment, limits of acceptable and unacceptable cleaning performance shall be defined. This shall be based on the potential hazards, e.g. microbiological, allergen, product-to-product contamination. Acceptable levels of cleaning may be defined by visual appearance, microbiological or chemical testing. Where cleaning procedures are part of a defined pre-requisite program to control the risk of a specific hazard, the cleaning procedures and frequency shall be validated and records maintained.
- e) Cleanliness of the equipment shall be checked prior to production and recorded.
- f) Cleaning equipment shall be:
 - (1) Hygienically designed
 - (2) Color-coded or labeled
 - (3) Cleaned and stored in a hygienic manner to prevent contamination
- g) Equipment used for cleaning in high-care and high-risk areas shall be visually distinctive and dedicated for use in that area.

2. Wet cleaning and sanitation in a dry area

Wet cleaning in a dry area gives an added risk of introducing water into the area or the equipment, which, if not correctly managed, can create the hazard for microbial growth.

- a) Use the minimum amount of water possible to ensure effective cleaning without compromising the dry area.
- b) Establish a master-cleaning schedule, which shows the frequency that all parts of the facility are cleaned.
- c) Remove waste through the use of vacuum cleaners, brushes, scrapers, etc. before any liquid is used.
- d) If liquid is to be used, avoid the use of high-pressure hoses in production areas as these can create a liquid aerosol effect that can spread bacterial contamination around the facility. The same principle applies to the use of air guns, thus consideration must be given to where the dust is being blown in this type of operation.
- e) Use color-coded cleaning equipment (i.e., blue food-grade brushes for food-contact surfaces, an alternative color for inside the factory, and another color for outside the factory). All colors shall be in contrast to the general color of the product so that bristles are easy to identify if they become detached.
- f) For equipment cleaning, standard operating procedures should explain to the operator which parts of the equipment must be removed for cleaning. If these parts are to be wet-cleaned, they should be removed to an area where this can be conducted, without the risk of the dry process area becoming wet.

- g) Procedures should be in place to ensure that any equipment is fully dry before being returned to the manufacturing area. This may require the use of a hot box, to ensure that difficult to dry items, like fine screen meshes, are dried completely. Alternatively, drying may be facilitated by the use of an alcohol-based sanitizer, once the majority of the water has been removed.

K. Environmental Monitoring

Environmental monitoring is an essential component for microbial control, as it provides insight into a plant's microbiological profile as well as an assessment of cleaning effectiveness. Results of environmental monitoring provide critical information that should be used to improve microbial control. The zone concept is recognized throughout the food industry as an appropriate approach to environmental monitoring. ASTA recommends that all of its members, their suppliers, and employees adhere to the environmental monitoring guidance below.

1. The environmental monitoring plan
 - a) Define zones based on the proximity and likelihood of the food being contaminated by the environment as in Table 1.
 - b) Based on risk assessment, decide which bacteria to swab for, and at what frequency each zone should be swabbed. Zone 1 should be swabbed with greatest frequency. In general, *Salmonella* swabbing can be done every 2 weeks on all the production floors, and *Listeria* swabbing can be done every 4 weeks for spice manufacturers.
 - c) Within each zone, determine where to sample based on a systematic review of process flow and potential sites of contamination, with the major emphasis placed on locations likely to grow bacteria. HACCP guidelines may help.
 - d) Ensure areas swabbed are random and include all shifts of production. The individual doing the sampling must:
 - (1) Sample with the aim of finding target microorganisms.
 - (2) Focus sampling on areas with dirt, grease, moisture, product residue or condensate.
 - e) Do not composite or pool samples.
 - f) When a problem area is identified, determine the source(s) of contamination through further sampling. Sample from the top to the bottom to identify the source of pathogens in:
 - (1) Air handling systems where dirt and condensation have accumulated
 - (2) Overhead pipes, especially ones that have condensate and product residue
 - (3) Equipment, especially where product or condensate may have fallen (the more complex the equipment, the more difficult it is to maintain its cleanliness)
 - (4) Equipment with any porous or irregular surfaces, or rust

- (5) Non-welded joints, rough welds, dented surfaces, dead spots, cracks, or crevices
 - (6) Pistons, pump housings, agitator shafts, motors, valve assemblies, hollow rollers, rubber belts, bearings, bearing housings, hollow castings, hollow legs, and carriages, under tanks, and any horizontal surface containing moisture, condensate, or built-up product
 - (7) Conveyors (both top and bottom side), conveyor chains, conveyor scraper blades, guides or bars, conveyor belts, especially if they are cracked, contain a fabric back, or contain a splice or joint
- g) Consider additional sources of contamination:
- (1) Forklifts and other equipment that move between departments
 - (2) Wet, unfiltered, compressed air
 - (3) Cleaning materials such as brooms, brushes, squeegees, towels, buckets, green pads, hoses, shop vacs, and aprons used during cleaning
 - (4) Personnel, including management, QC personnel, and mechanics
 - (5) Packaging supplies and wooden skids or pallets
 - (6) Drains, especially those that are not free-flowing
- h) Follow up positive results from a piece of equipment in one location with swabbing of similar equipment in other locations to assure that pathogens are not present.
- i) Document all sampling activities and results.

Table 1. Zone assignments

Zone	Description	Examples
Zone 1	<ul style="list-style-type: none"> • Direct product contact surfaces immediately after a kill step and before packaging • If no kill step, any point at which the product is exposed to the plant equipment before packaging 	<ul style="list-style-type: none"> • Utensils • Grinders • Funnels
Zone 2	<ul style="list-style-type: none"> • Non-product contact areas that are adjacent to product contact surfaces (i.e., Zone 1) 	<ul style="list-style-type: none"> • Equipment framework supports • Drip shields that may drip onto exposed product • Panel/operator buttons • Dust on overhead lights
Zone 3	<ul style="list-style-type: none"> • Non-product contact areas that are within the processing area but removed or far away from product contact surfaces but could result in cross-contamination. 	<ul style="list-style-type: none"> • Floors • Trash cans • Pallets
Zone 4	<ul style="list-style-type: none"> • All non-product contact surfaces outside the processing room 	<ul style="list-style-type: none"> • Cafeteria • Loading docks • Offices

2. Swabbing procedures

- a) Use a sampling kit that contains:
 - (1) Pre-soaked sponges in buffer solution
 - (2) EZReach Polyurethane Samplers™ or the 3M SpongeSicle™
 - (3) Disposable gloves
 - (4) Permanent waterproof marker for labeling samples
- b) Carefully wash and sanitize hands and put on a clean outer lab coat.
- c) Wear new plastic gloves when handling sterile sponges.
- d) Change gloves before taking each new swab; additionally wash hands between swabbing of all non-contact zones and contact sites to prevent cross-contamination.
- e) Apply an alcohol sanitizer to un-gloved hands every 2 swabs; do not use sanitizer on gloves.
- f) Aseptically remove the pre-soaked sponge from the plastic package; grasp the exposed sponge with a gloved hand.
- g) Rub the sponge at least 5 times in each direction over a minimum of a one square foot area, e.g. 12 x 12 inches, 6 x 24 inches.
- h) Carefully drop the sponge into the original package, and gently flatten the package to remove excess air.

- i) Mark each sample clearly with date, time, and sample location. Record the same information in a logbook.
- j) Immediately refrigerate all sponge samples and keep them refrigerated at <40°F (do not freeze) until laboratory analysis.

L. Waste and by-product management

1. Waste management

Waste materials have the potential to be contaminants and to be a harborage for pests. For this reason there should be a formalized waste management system for all types of waste within a facility.

- a) It is recommended that each type of waste container be clearly marked to show the type of waste that should go into the container.
- b) Waste bins themselves should be on a cleaning regime to ensure that they do not become the harborage for bacteria or pests.
- c) If the waste bin is to have a lid then it is recommended that this lid is foot operated so that employees do not have to soil their hands by lifting the dirty waste bin lid.
- d) Larger waste bins that are located outside of the building should be fitted with lids to prevent pest activity and should be located away from doors that open regularly to prevent any pest activity becoming an issue within the facility.
- e) Consideration should be given to protective clothing contamination if process operators are required to access exterior waste containers.
- f) Under no circumstances should finished product containers, i.e. bags, cartons, be used for holding waste products.

2. By-product management

Items such as mill tailing (oversize material) or materials that are generated during physical cleaning, large or small leaf, etc. may still have an intrinsic value and thus these products are often classified as by-products.

- a) All by-products must be clearly marked to make sure that they are not used or dispatched by mistake.
- b) Normally by their nature these product require further processing and thus they are classified as non-conforming products. There should be documentation that explains the nature of the non-conformance and what remedial action is required to remove the non-conformance or the further processing that is necessary.
- c) These products should still be managed correctly in terms of shelf-life, especially where a product may be reworked more than one time. In this case the original shelf-life of the product should be taken into consideration.
- d) It is important that full traceability is maintained if product is re-used.
- e) If by-products are to be sold, e.g. animal feed, they must be clearly marked to avoid misuse.

M. Pest Control

1. The pest control program should list all pests that are covered by the program and consideration must be given to local pests that might be applicable, e.g. lizards.
2. As pest control devices and chemicals are potential contaminants, it is important that proper care is given to the use of all pest control equipment.
3. The use of toxic chemicals should be avoided if possible. If they are used, they should be carefully controlled to prevent product and process contamination.
4. Make all personnel aware that pesticides are toxic and may be inadvertently inhaled, ingested, or absorbed through the skin. Employees shall also report any evidence of pest activity to a designated manager.
5. Only certified contracted pest control operators, or employees trained as pest control technicians should apply pesticides; both must follow all local laws and regulations and must strictly adhere to the instructions on the pesticide labels.
6. Store pesticides in a designated, locked room.
7. Limit and control applications of pesticides in food areas, and keep pesticides, traps, and other devices away from open food products.
8. Institute a method for tracking each trap/bait device number, date and time of each inspection, and all activity for each device.
9. Set up a protocol of what to do when pest activity has been identified at one of the devices.
10. Establish a method and location for storing and maintaining all records relating to pest control services. At a minimum, these records should include:
 - a) A site plan noting the locations of all traps, bait devices, and other pest control equipment, as well as locations where use of pesticides is permitted.
11. Maintain an approved pesticide list, indicating for each the storage location, level of toxicity, and labeled instructions for proper use. An accurate log must be kept of:
 - a) All chemicals used and the stock balance
 - b) Entries detailing each inspection/service (what was used, where, how much, and by whom)
 - c) Tracking data and trend data for each device
 - (1) If trends are identified, or variations from trends are identified, investigate the reason and take appropriate corrective or preventive action.
12. Fly killer devices and/or pheromone traps shall be placed correctly. If there is a danger of insects being expelled from these devices and contaminating the product, the units should be relocated or fitted with a catch tray that prevent insect fragment ingress into the product or the process.

13. In the event of an infestation or any evidence of pest activity, immediate action shall be taken and any potentially affected products should be handled according to non-conforming product procedure.
14. Table 2 summarizes potential methods to control insects, rodents, and birds.

Table 2. Pest Control Methods

Pest	Pest Control Methods
Insects	<ul style="list-style-type: none"> • Exclusion <ul style="list-style-type: none"> ○ Use screens on windows and doors ○ Ensure doors are kept closed when not in use ○ Fit pedestrian doors with self closers ○ Fit larger doors with rapid rollers or strip curtains • Electronic fly catchers- electrocuting or sticky boards • Pheromones traps <ul style="list-style-type: none"> ○ Ensure pheromone is replaced at a frequency based on risk assessment • Pesticides <ul style="list-style-type: none"> ○ Dust pesticides ○ Residual pesticides ○ Aerosols ○ Emulsifiable concentrates ○ Wettable powder ○ Encapsulated Pesticides
Rodents	<ul style="list-style-type: none"> • Exclusion <ul style="list-style-type: none"> ○ Store trash bins and items that hold water away from the building. ○ Use strip curtains to “seal” doorways that are often left open. ○ Attach brittle strip to fill gaps under doors ○ Put screens over drain channels ○ Use exterior/perimeter baiting and trapping • Interior control <ul style="list-style-type: none"> ○ Multi-catch automatic traps ○ Snap traps ○ Glue boards • Exterior control <ul style="list-style-type: none"> ○ Bait stations (solid baits preferred to avoid spillage)
Birds	<ul style="list-style-type: none"> • Exclusion <ul style="list-style-type: none"> ○ Remove ledges ○ Use variable tone speakers or bird of prey decoys ○ Attach netting under canopies ○ Eliminate food/water sources ○ Look for and remove roosting locations • Interior control <ul style="list-style-type: none"> ○ Live trapping and relocation ○ Mist nets ○ Narcotic seed baiting

15. Additional information: Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) <http://www.epa.gov/agriculture/lfra.html>

N. Receiving

1. The first opportunity to ensure that a raw material will not contaminate the facility is when the raw material arrives on site. Thus a formal inspection should be in place to ensure that this cannot happen.
2. For materials that have a history of issues, such as infestation, this inspection should occur before the pests can gain access to the storage facility. This may require opening the delivery vehicle in a covered remote area where pest ingress will not occur.
3. As a minimum, the inspection should cover the vehicle condition, whether it has any holes and/or water damage, any condensation caused by the varying temperature zones the product may have gone through while being delivered, any damage to product packaging, any type of contamination to the packaging, checking that there are no non-food items on the truck, etc.
4. In addition, the inspection should focus on the presence of any allergens that could be present due to contamination from previous loads. If allergens are being delivered, then pack integrity is important and procedures should be in place on how to handle the damaged allergen pack. This becomes especially important when mixed loads of allergens and non-allergens are supplied.
5. The reception area should be protected from the weather, have sufficient lighting to allow for accurate inspection, and have good pest protection devices.
6. During the inspection and unloading procedure, systems should be in place to prevent birds, insects and other pest gaining entrance to the facility.
7. Where recycled packaging is used for raw material delivery, great care should be given to ensure that the previous use of the packaging does not give rise to any product contamination. For this reason, plant protection chemical bags, other non-food bags, or allergens should not be used for raw material delivery, unless there are documented steps to show that the contamination risk has been managed.

O. Storage and Pallet Control

Companies shall perform their own risk analysis to maintain product safety and quality during storage. Storage and pallet control measures may include:

1. Segregation of products to avoid cross-contamination (physical, microbiological or allergen).
2. Storage of materials off the floor (on plastic or wooden pallets) and away from walls.
 - a) This area is best painted in a light color to ease inspection for rodent activity.
3. Suitable temperature control equipment, thermometers, temperature recording devices, alarms, and manual checks (typically every 4 hours) where temperature control is required
 - a) If air conditioning units are in place then the risk of condensation from these units must be managed. Catch trays or storage free zones can help eliminate this risk.

4. Careful management of chilled or frozen product transfer between temperature-controlled areas.
5. Storage of packaging away from products. Any partly used packaging still suitable for use shall be protected from contamination and identified before being returned to the storage. Obsolete packaging shall be stored in a separate area and systems shall be in place to prevent accidental use.
6. Pest protection devices (Table 2).
 - a) The pest control devices should be situated using a risk assessment and thus areas that contain items with a historical problem should have more pest control devices than areas that do not have this issue.
 - b) If electronic fly killing (EFK) or Insect Light Traps (ILT) units are used in the storage areas they should be located so that they are not above product, thus eliminating the risk of contamination with insect fragments.
 - c) Any EFK or ILT should be permanently turned on, as they are most effective when other lights are off, and should be located so they are not visible from outside the building as this could attract insects when doors are open.
 - d) If items of stock are to be sampled there should be a way of sealing the pack to prevent product leakage or the ingress of water or pests.
7. Avoiding storage of materials that contain volatile components at high points where their quality could be affected.
8. Periodic review of material that is close to or just passed its shelf life.
9. Measures to protect outdoor bulk storage vessels used for food product or ingredients. Protective measures include:
 - a) Security and structural considerations
 - b) Cleaning and inspection on a schedule based on the type of material in the vessel
10. Checking anything stored outdoors for suitability before bringing it into the facility.
11. A formalized procedure for the purchasing and management of pallets:
 - a) Pallets, whether plastic or wooden, should only be purchased from approved suppliers that can give assurances on the hygiene and structural soundness of the pallet.
 - b) Upon arrival on site, the pallets should be inspected to ensure that they meet the purchasing specification. Wooden pallets need to be checked to ensure that they are clean, dry, free from wooden or metal contamination and have not been treated with unsuitable chemicals (as a wood preservative).
 - c) Wooden splinters are a concern and thus if wooden pallets are to be used they should be inspected immediately before use and a hygiene slip sheet put on the pallet to prevent moisture from the pallet and/or splinter damaging the product packaging. Wet pallets should not be used.

- d) Plastic pallets should be inspected to ensure they are undamaged and in particular that there are no holes or cracks in the pallet posts that may contain water or other contaminants.
- e) If product is to be double-stacked, a slip sheet should also be put on the top of the lower pallet, to prevent the bottom of the top pallet contaminating the product/packaging.
- f) Storing products on pallets should allow for easy inspection and cleaning and help prevent any risk of product dampness from condensation from the floor.
- g) Employees should be made aware of the risks associated with contaminating outer packaging as any item on the outside of the bags has the risk of falling into a product hopper when that product is used.
- h) Any product that is block stacked should have sufficient inspection gaps, which should be large enough for cleaning and inspection.
- i) Pallet condition should be a part of the regular GMP audit format, checking for damage and the risk of wooden splinters created during product transfer.

P. Dispatch and transport

1. Before dispatching a product, the vehicle or container should be inspected to ensure it is suitable for food use.
2. This inspection should be documented and should include: holes that can allow pests or rain to get onto the product, aroma of the container, flaking paint, door seals, presence of allergenic material, presence of non-food residues, condition of any wooden part to check for damage or insect activity, presence of any oil, grease or other liquid.
3. There should be a system in place to ensure that only the designated items go into the container and that the container is suitably sealed to ensure that the material within cannot be tampered with. Suppliers should have systems in place to ensure that there is no risk of accidental or deliberate contamination during transport.
4. There should be a documented vehicle breakdown or damage procedure that ensures that product is protected in these instances. This should be communicated to the transport company so that they know what to do in the event of a breakdown or damage.
5. Only food items are allowed to be delivered in any container or any vehicle, they should not be mixed with non-food items.
6. If pallets are to be used for final dispatch there should be suitable systems in place to ensure that these pallets are clean, dry, free from wooden or metal contamination and have not been treated with unsuitable chemicals (as a wood preservative). It is recommended that a hygiene slip of clean cardboard or plastic sheeting be used to protect the product from contamination by the pallet.
7. Suppliers should take steps to prevent condensation during transportation and should use dry pack or Kraft paper, if they feel the situation requires it.

8. Where temperature control is required, transport shall be capable of maintaining product temperature within specification with data-loggers or monitoring systems.
9. Maintenance and cleaning procedures shall be maintained for all vehicles and equipment used for loading/unloading.
10. Where third-party contractors are employed, all the requirements indicated here shall be defined in the contract and verified.

III. Product Control

A. Packaging, purchase, storage and use

1. When purchasing food contact packaging, the supplier shall be made aware of any particular characteristics of the food, e.g. high fat content, pH, that may affect packaging suitability.
2. Food-grade certificates shall be available on site for all food-contact packaging.
3. All packaging should go through a formalized QC check when it arrives on site.
4. Product liners and bags for use directly with raw materials shall be appropriately colored and resistant to tearing to prevent accidental contamination.
5. Only the packaging for immediate use shall be available at the packaging machines.
6. Documented checks shall be carried out at product changes to ensure that packaging from the previous production have been removed from the line before changing to the next production.
7. Procedures shall be in place to ensure that the products are packed into correct packaging and correctly labeled. These will be: at the start, during the run, when changing batches and at the end of each production.
8. Outer packaging should be clean, hygienic and free from potential hazards such as staples, etc.
9. When online vision equipment is used to check labels, procedures shall be in place to ensure the system is correctly set up and capable of alerting or rejecting the product when packaging information is out of spec.
10. If packaging is stitched or sealed with a tape, the stitching or tape should be a contrasting color to the product.
11. All packaging should have or receive a traceability number when it arrives on site. This number should be detailed when the packaging is used.

B. System for stock status control

1. All stock, raw materials, semi-finished products, by-products and finished products should be clearly marked with the following information
 - a) Batch identification number
 - b) Product name and/or reference number
 - c) Shelf-life or expiration details
 - d) Stock status (ie, approved, under test, rejected or restricted use)
2. Stock should be used on the first in first out (FIFO) basis, but if this system is not followed there should be documented information to support this decision.

C. Labeling

Product labeling shall comply with legal requirements and contain information to enable the safe handling, display, storage and preparation of the product.

1. Labels shall meet the legal requirements for the designated country of use, and there shall be a process to verify that ingredient and allergen labeling is correct, based on the product recipe.
2. Labeling information shall be reviewed whenever changes occur to the product recipe, raw materials, suppliers, legislation, or country of origin.
3. Where a product is designed to satisfy a consumer group, i.e. “free from”, the company shall ensure that the product formulation and process is fully validated to meet the stated claim.

D. Allergen management

Effective allergen management minimizes the risk of allergen contamination of products and meets legal requirements for labeling in the country of sale. ASTA recommends that all of its members (and suppliers) adhere to the following guidance regarding allergen management.

1. Train all relevant staff to handle allergens.
2. Insist that suppliers maintain allergen control programs, including proper labeling of allergen-containing raw materials per appropriate country regulations.
3. Identify and document all allergen-containing materials, e.g. raw materials, processing aids, semi- or finished-products.
4. Obtain additional information from suppliers to understand the allergen status of a raw material, its ingredients, and the facility in which it is produced.
5. Conduct a documented risk assessment to identify routes of allergen contamination. This shall include:
 - a) Consideration of the physical state of the allergenic material (i.e., powder, liquid, particulate)
 - b) Identification of potential points of cross-contamination through the process flow
 - c) Assessment of the risk of allergen cross-contamination at each process step
 - d) Inclusion of allergen assessment in HACCP programs
6. Establish procedures to prevent cross-contamination into products not containing the allergen. This may include:
 - a) Physical or time segregation from allergen-containing materials being stored, processed or packed
 - b) Use of separate or additional protective over clothing when handling allergenic materials
 - c) Use of dedicated equipment and utensils for processing
 - d) Scheduling of production to reduce changeovers from products containing an allergen to products not containing the allergen
 - e) Systems/traffic patterns that restrict the movement of airborne dust containing allergenic material
 - f) Avoiding introduction of allergens into a system that cannot be wet cleaned

- g) Waste handling and spillage controls
- 7. When allergen cross-contamination cannot be prevented, include a warning on the label per national guidelines or codes of practice, e.g., “may contain” labeling.
- 8. Where a claim is made regarding the suitability of a food for individuals with allergies or food sensitivities, conduct and document a validation of the production process that supports the stated claim.
- 9. Design equipment and area cleaning procedures to remove or reduce to acceptable levels any potential cross-contamination by allergens.
 - a) Validate and routinely verify cleaning methods to ensure they are effective
 - b) Cleaning equipment used to clean allergenic materials shall either be designated specifically for allergen use, single use, or effectively cleaned after use.
- 10. If re-work operations are carried out, the same principles and procedures apply.
- 11. Additional information:
 - a) ASTA (American Spice Trade Association). 2006. HACCP Guide for Spices and Seasonings.
 - b)** Food Allergen Labeling and Consumer Protection Act of 2004.
<http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/Allergens/ucm106187.htm>

IV. Personal Hygiene and Pathogen Control

Personal hygiene and pathogen control standards must be adopted by all personnel, including management, contractors, and visitors to the production facility. ASTA recommends that all of its members, their suppliers, and personnel follow the GMPs below to help ensure cleanliness and safety of spice products.

A. Uniforms and protective clothing

1. Communicate the rules regarding use of protective clothing, emphasizing the fact that protective clothing is used to protect the product from the employee, thus eliminating a potential source of contamination.
2. Ensure protective clothing is food grade and clean (at the beginning of the shift), with no potential to contaminate the product.
3. Keep protective clothing reasonably clean during the shift.
4. Do not wear protective clothing with pockets above the waist.
5. Buttons are a potential contamination risk, thus snaps or Velcro is preferred.
6. Use an approved contracted or in-house laundry for laundering of protective clothing. The laundry must use unscented detergent and must ensure:
 - a) Effectiveness of the laundering process
 - b) Segregation between dirty and clean clothes
 - c) Commercial sterilization where appropriate (e.g., for high-risk areas)
 - d) Protection of clean clothes from contamination (e.g., by dirty uniforms) before use
7. Change protective clothing at an established frequency, based on risk.
8. Clean and sanitize personal protective clothing that is not suitable for laundering (e.g., chain mail, gloves, aprons) at an established frequency based on risk.
9. Consideration should be given to color-coding protective clothing between areas of different risks or operator function, to facilitate easier management of the employee's activity.

B. Gloves and hand coverings

1. Adhere to guidance in Table 3, which summarizes GMPs regarding use, storage, and replacement of single- and multi-use gloves

Table 3. Glove Use, Storage and Replacement Requirement

Requirement	Single Use (SUDG)	Multi-Use, Food Contact	Multi-Use, Non-Food Contact
Made of impermeable material (non-latex)	Yes	Yes	Yes
Kept clean and sanitary at all times	Yes	Yes	Yes
Worn over clean hands	Yes	Yes	Yes
Disposed of before going to break/restroom	Yes	No	No
Properly stored before going to break/restroom	No	Yes	Yes
Cleaned with soap/water/sanitizer (non-cloth)	No	Yes	Yes
Laundered (cloth only)	No	Yes	Yes
Stored under sanitary conditions	Yes	Yes	Yes
Inspected periodically during use, checking for rips/holes	Yes	Yes	Yes

C. Footwear

1. Dedicated footwear shall be provided to be worn in the high-risk areas with an effective system to segregate areas for wearing high-risk and other footwear, i.e., a barrier or bench system.
2. Where an operation includes a high-care area, dedicated footwear shall not be worn outside the factory.
3. Footwear shall be removed and kept in the personnel entrance during the use of toilets.
4. Footwear shall be designed for easy cleaning.
5. Environmental monitoring shall be established to assess the effectiveness of footwear sanitation controls.

D. Hair and jewelry

1. Prohibit watches, jewelry (with the exception of a plain wedding band), false eyelashes, false fingernails, nail polish, and loose items that may fall into the product in the plant.
2. Use hairnets and beard-nets to contain all hair at all times in the plant.
3. For employees and visitors that cannot remove or will not remove jewelry for physical or religious beliefs, set up a system of monitoring the item into and out of production on a daily basis. Visitor's rings can be managed by using food-grade gloves.

E. Hand cleanliness

1. Prohibit smoking, eating, and drinking in the production facility.
2. Educate the employees and visitors of the increased danger of product contamination when touching the face, wiping the forehead, or placing fingers in the mouth, nose or ears.
3. Keep fingernails clean and properly trimmed.
4. Advise all employees and visitors regarding hand washing station locations and hand washing protocols.

5. Wash hands at the entrance of the plant, and at frequent intervals.
6. For high-care areas, consider secondary hand cleaning using alcohol sanitizers.
7. Recommend the following hand washing method:
 - a) Rinse hands with warm water.
 - b) Apply soap compound to fully cover hands.
 - c) Rub hands to obtain proper dispersion of soap and allow 20 seconds contact time of soap on hands.
 - d) Rinse with warm water.
 - e) Dry thoroughly with paper towel or air dryer; bacteria and particles are most likely to stick to wet surfaces.

F. Illness and injury

1. Prohibit any person who is affected with, has been exposed to, or is a carrier of communicable disease (in the past 10 days) from entering the production environment.
2. Set up procedures to ensure that no one with open sores, infected wounds, or other potential sources of microbiological contamination has access to any work area.
3. Set up procedures so that employees report any communicable disease to ensure that food safety is maintained at all times. Consideration should be given to relocating the employee to non-food activities, thus supporting the reporting program.
4. Once reported all employees should be released by a doctor before they recommence work.
5. Cover all cuts and grazes on exposed skin by a blue plaster, which is metal-detectable. Gloves may also be used.
6. The effectiveness of the metal detection of the plasters should be verified when each batch is delivered.
7. If in exceptional circumstances non-metal detectable dressings are used their presence and condition should be recorded at the start and end of each shift.

G. Visitor controls

1. There should be a formalized system for the management of all visitors to site.
2. Each visitor should be informed of the food safety and quality requirements associated with their visit and should sign to verify their health condition.
3. All visitors must, as a minimum, follow the same procedures as any employee.
4. If visitors, auditors, etc. wish to take any item into the production or storage areas, these items should have a documented procedure that verify their condition before and after visiting, to ensure that no contamination has occurred.

V. Food Safety and Quality Management System

A. Internal GMP auditing

A robust internal auditing system is one of the best tools available to ensure that safe, legal, and good-quality spices are manufactured. Company employees know where systems need improvement and should be encouraged to identify failings in the company's systems so that alternatives can be established. A GMP audit covers both food safety and quality, with a focus on the manufacturing environment. A good GMP auditing program ensures that the facility is operated in accordance with GMPs on a day-to-day basis. ASTA recommends that all of its members adhere to the following guidelines for internal GMP auditing.

1. Perform GMP audits according to a designated schedule and with a formalized output and corrective action system.
2. Incorporate all prerequisite programs as well as standard operating procedures into the GMP auditing program.
3. Audit one department at a time (Table 4) rather than the whole facility at once.
4. At a minimum, include the following attributes within the scope of the audit:
 - a) Pest control and proofing
 - b) Fabric of the building
 - c) Glass management
 - d) Personal practices and operating methods
 - e) Tool condition, design and control
 - f) Equipment condition and maintenance
 - g) Product control, labeling and storage
 - h) Facility cleaning
 - i) Allergen control
 - j) Process control and record keeping
 - k) Services, water, air, etc. and their food safety risk
 - l) Packaging storage and use
5. Use a numerical (rather than yes/no) scoring system to allow an accurate assessment and show degree of change from the last audit.
6. Develop a set of words for each score (specific to each audit point; e.g., "all doors and windows closed, screens in place and undamaged") to give the auditor a guide on how to score an audit point.
7. Review the output from GMP audits carefully, perform root cause analysis, and allocate resources for corrective action where needed.
8. Ensure that all audits are conducted by trained personnel, who are independent of the area being audited.

Table 4. Sample audit staging

Audit stage	Area
1	Building exterior and land
2	Raw material and finished product storage
3	Primary cleaning department
4	Milling or blending department
5	Laboratory, locker rooms, facility entrance and other ancillary areas

B. Control of non-conforming product

All out-of-specification products must be clearly identified, labeled, and quarantined to prevent unauthorized release. ASTA recommends that all of its members, and their suppliers, adhere to the following guidelines for control of non-conforming product.

1. Specific individuals should be responsible for decisions pertinent to non-conformance, release, rework, or destruction of product.
2. Products that are reported as non-conforming as a result of quality control activities, production, customer complaints, or external audits should be designated as “on-hold” and documented.
3. Clearly label and isolate “on hold” products so that they are not accidentally released.
4. Products should only be released after necessary controls are made and specification limits are achieved.
5. Inform brand owner if applicable.
6. Initiate corrective action in response to customer complaints.
7. If non-conformance does not affect the use or safety of the product, then corrective action completes the response.
8. If non-conformance affects the safety of the product, recall is initiated with management approval.
9. Until the recall is completed, products from the same lot cannot be shipped and must be quarantined.
10. Determine the corrective action required to eliminate non-conformance of future product, i.e., through re-work or other means. Upon completion, re-check the quality of the product to ensure the elimination of the non-conformance and seek approval for shipment.
11. Document any destruction/disposal of non-conforming product.
12. Where customer-branded products not meeting specifications are sold to staff or passed on to charities, this shall be with the prior consent of the brand owner, and shall be fit for consumption, meeting the legal requirements.

VI. Useful Links

International Organization of Spice Trade Associations, Good Agricultural Practice guide:
<http://www.astaspice.org/about-asta/leadership/iosta/>

General Principles of Food Hygiene, Composition and Labeling (CODEX document):
<http://www.inspection.gc.ca/food/non-federally-registered/safe-food-production/general-principles/eng/1352919343654/1352920880237>

Food Safety Practices Guidance For Spice Manufacturers:
<http://www.inspection.gc.ca/food/safe-food-production-systems/haccp-generic-models-and-guidance-documents/guidance-spices/eng/1366340448103/1366340494598>

Guide on equipment hygienic design - <http://edis.ifas.ufl.edu/fs119>

Guide on food safety, pest control -
http://www.aibonline.org/aibOnline_/www.aibonline.org/Standards/2013FoodSafety_web_ENG.pdf

Guide on food contact packaging:
http://www.aibonline.org/aibOnline_/www.aibonline.org/Standards/2013FoodContactPackaging_web_Eng.pdf

The American Spice Trade Association (ASTA) is committed to assisting companies in the spice trade, regulators, and the public in assuring an adequate supply of clean, safe spices. This Guide is intended to serve as a resource for anyone with an interest in the spice trade. For companies in the spice trade, this Guide may assist you in providing clean, safe spices to your customers, including food manufacturers and the public. For members of the spice trade, we encourage you to use this guide together with other sources of information to develop and implement your programs to assure that the spices you sell are clean and safe. ASTA is not responsible for either the use or nonuse of this Guide and the information in it, or any actions or failure to act by anyone using this Guide. It is each individual's responsibility to verify the information in this Guide before acting on it, and to comply with all relevant federal, state, and local laws, regulations, and ordinances. We urge you to consult with appropriate experts regarding circumstances relevant to clean, safe spices.

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