

Salmonella and filth contamination prevention and control throughout the supply chain.

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Presentation purpose

- I know that many of the people in this room are not the target audience for this section of the workshop.
- The challenge for us all is to get this information to all of our suppliers, and to those people involved in our trade that are not represented at ASTA or any other collaborative forum.

Minimise the risk

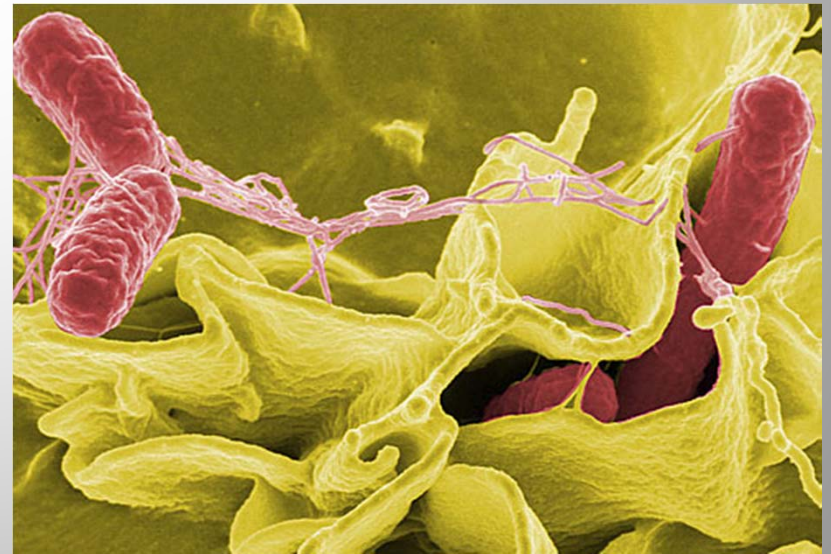
- As it is not possible to completely remove pathogenic bacteria in the growing and primary process stages of production, our challenge is to minimise the risk of contamination and put procedures in place that ensure that we do not add or encourage the growth of this bacteria.

Defect Action Levels

- DAL's are set for our products and are used as an indicator of poor hygiene.
- Thus this presentation will also cover our experience where we have seen opportunities to minimise the risk of filth contamination.
- Filth includes – mammalian excreta, rodent hair, insect and insect fragments, and other foreign materials. This will be my focus.

Main contamination sources and areas with growth potential

- In the agricultural environment
- Post harvest drying
- Pre and post drying packaging
- Post harvest storage
- Primary cleaning
- Secondary processing
- Transportation



Agricultural contamination

- It is very difficult to prevent contamination with insect fragments and pathogens during the growing cycle.
- 'Contamination' from birds and pollinating insects is a 'natural' part of the growing cycle.
- But the growing area can be enhanced with a few simple 'procedures'.
- The challenge - education!

Growing environment



- As a 'creeper' it is not possible to prevent soil contamination on the outside of the crop.
- As root crops Ginger and Turmeric are also good examples of this issue.

IOSTA

- A good starting point for agricultural control is posted on the ASTA website and is available to all free of charge.
- It is also available on the IPC, ISB and ESA websites.
- Through close co-operation within the IOSTA forum the document has now been translated into several languages, French, Spanish, Sinhalese, Vietnamese and Portuguese.
- A key aspect of this guide is that all players in the supply chain contributed to the document.
- Here are a few examples from this guide.

Natural fertilisers

- It is common practice for animal waste to be used to enrich the soil being used to grow agricultural products.
- If used, the 'compost' should be applied 2 weeks before planting and harvesting should not be for 6 months.
- For shorter growth cycle crops, if used, well composted manure should be used to minimise this potential risk.

Packaging

There are a number of different types of packaging making their way onto a small holding. These include, but are not limited to, animal feed, pesticide and fertiliser bags.

It is essential that as a minimum these bags are cleaned correctly and sanitised before use.



Water quality



- Irrigation water should come from a good source, so that the risk from pathogens and other contaminants is minimised, especially if it is applied close to harvest time.
- If 'liquid manure' is being used, and mixed with the water supply, then this should not be done during the growing cycle.

Crop protection

- Ensuring that both domestic animals and livestock are kept out of the growing area is critical.
- Again this control should be boosted as we get close to harvest time.



Other agricultural practices

- Hand washing during harvest time.
- Crop that has fallen to the floor should be separated and washed with clean water before further processing.
- Do not allow fresh crops to sit for long periods of time in large piles.
- Ensure intermediate storage area is clean.
- Only harvest the quantity that can be dried.

Drying

Traditional drying of cinnamon quills in the rook of the processing unit can help ensure air borne contaminants are minimised.



Sun drying

- There is always a risk of airborne contamination during sun drying.
- Badly designed drying areas add many other risks.



Sun drying

Drying on bare ground should be discouraged



Drying platforms

Whilst it is good practice to ensure that spices are dried off the floor, it is also important to ensure that the drying platform is not a source of insect harbourage.



Drying mats

Essential that they are kept clean and sanitised to prevent microbial contamination during drying.



Off the ground



- Drying on plastic sheets with perimeter barriers to prevent animal access.

Drying yard

Made of good quality concrete, with side walls to deter animal entry, sloping surface allowing wet cleaning



Netting to
prevent bird
feeding whilst
the product is on
the drying area.



Procedures need to be in place to prevent partially dried product getting 're-wetted' due to rain or night time humidity



Elevated drying yard

Sun drying

Using polythene tunnels, ground matting and product netting, helps reduce risk from contamination and condensation.



Green house drying

Attention must be paid to ensure the layer of product is thin and that the drier products are moved to the top shelves



Solar drying

When drying in a protected environment, however simple the structure, attention needs to be paid to air movement and condensation points.



It is not always
easy to know
when to change
from GAP to
GMP.

Needless to say
all parts of the
supply chain
should be
covered by one
of these
principles.



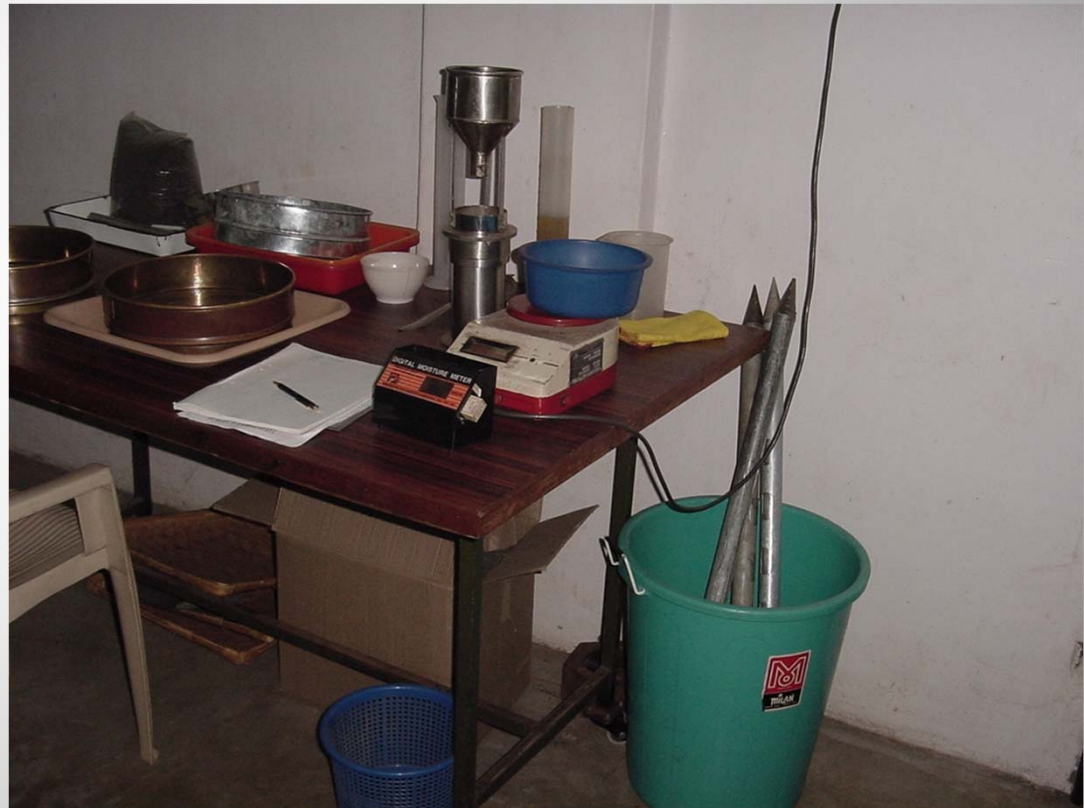
Pepper being transported for cleaning

Guidance

- In addition to the IOSTA GAP guide, we also referenced the FDA cGMP Regulation 21, together with the Codex general principles of good hygiene.
- There is also the ASTA HACCP guide and, when integrated together along with other reference material, provides a robust risk assessment and control system for any company.

Raw material sampling

A robust inspection and sampling procedure, at each transfer point in the supply chain, will ensure that substandard materials are handled correctly



Sampling

Care needs to be taken to ensure that any sample holes are sealed to prevent pest ingress.



Standard Operating Procedures referenced in 21 CFR 120.6

- Water supply
- Food contact surfaces
- Cross contamination
- Hand washing
- Packaging material
- Labelling and storage
- Employee Health
- Pest exclusion

Even at this primary processing stage it is essential to control water supply to ensure that it is potable.

Once wet processing is completed the removal of the excess water will help prevent microbial growth. For any wet process waste material must be removed to a suitable location to ensure that there is no growth potential.

Water quality



White pepper soaking

Water that is used for employee washing should be clean.

Water that is used as a food ingredient, e.g. Pepper in Brine, should be filtered immediately before use, unless the source is fully assured.

Water quality



Wooden equipment

Wooden equipment is almost impossible to clean from a microbiological point of view and thus it should not be used.



Food contact surfaces should be in good order and easy to clean.

Even within a primary processing unit the use of wooden equipment brings an additional risk.



Storage

For those spices that require cold storage, it is essential that there is a robust facility cleaning and GMP audit inspection program.

Materials of construction play a key role in ensuring that the facility is cleanable and is not a harbourage for bacteria.

Particular attention must be paid to potential condensation points e.g. under the chiller unit.



Storage

Storage on pallets, away from walls, with suitable pest control procedures to maintain the integrity of the product for the storage period.

Systems need to be in place to ensure block stacked products can be inspected and the area cleaned.



Cross contamination

- Segregation between departments that have different hygiene criteria should be designated and clearly marked with suitable signage.
- All employees should be aware of the procedures to move from one department to another.
- Colour coding works well to ensure zone identification.

Zone control

As more microbial reduction systems are set up throughout the supply chain zone control becomes critical to prevent cross or re-contamination.



HACCP

- As part of the HACCP plan there should be a full list of potential vectors for cross contamination.
- Such as – people (employees / visitors / contractors), water flow, air movement, tools (sample / engineering / production), waste routes, product containers, trucks, etc. etc.

Primary processing

Ensuring that employees have adequate hand washing and toilet facilities and suitable protective clothing is essential.



Hand selection

As many of our commodities are hand selected it is key to ensure that there is an employees' health and wellness scheme.



It is important that employees understand that they are handling a food ingredient and thus their processing procedures must match this requirement.

Operator hygiene



Hand washing

- Employees should have suitable hand washing facilities at the entrance to their work place.
- In addition there should be hand wash facilities at locations where there is a need to wash hands after undertaking a 'dirty' activity.



Packaging material



- As a potential source of insect activity, packaging material should be stored in a clean dry place until it is required in production.

Pest Control

In a tropical climate air movement within a facility can be essential for employee comfort and product control.

AIB say that a screen of no more than 6mm should be used to prevent the majority of insect ingress.



Pest Control

- From my experience this is an area of weakness in many producing countries.
- Producers do not have an extensive program covering all pests.
- Pest control equipment is often poorly designed and pest proofing often needs modification.

Pest control

An AIB recommendation is about pest control device spacing. Exterior baits 50 – 100 feet apart. Interior baits 20 – 40 feet apart



EFK's

An oversize
catch tray can
help prevent
insect
fragments
from
contaminating
a processing
unit.



- Insect identification is a key tool in putting in place corrective actions.
- Insect chart next to EFK's allow the operator to take swift corrective action.

Insect identification



Pallet control

Pallets can be a source of microbial contamination and a potential harbourage for pests.

Typically stored outside of a building they need to be controlled so they remain dry, clean and pest free.



Bird netting

A canopy protects product from poor weather during loading - netting prevent birds roosting over access points to the facility.



Shipping

Robust container inspection prior to loading is critical. Checking for holes, cleanliness, flaking paint, seal integrity and insect activity should all be documented.



Fumigation

Factors such as IPM and Organic pest control, the loss of Methyl Bromide, concerns about container availability and condition, it is not completely unexpected that on occasions insect levels may be higher than previously experienced.



Sticky boards

We now ask suppliers to put sticky board into our containers as an early warning system of any excessive insect activity during transit.



Container stuffing (IOSTA guide)

- Use dry pallet on floor – especially when condensation is a risk.
- Line container with Kraft paper and consider absorbent poles filled with calcium chloride - absorb around 100%.
- Use saddle stow method of stacking to minimise wall contact and allow better air flow.

Summary

- Supplier auditing now supplier development
- Through our supply chain and our work within the IOSTA forum it now falls on us all to ensure that all participants in our industry buy in to the changes that are required to make a significant difference and protect our industry.
- THANKS FOR LISTENING