



Department of
Primary Industries

Responding to microbiological test results

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PRODUCT TESTING is NOT the solution

Low presence of
pathogens

Non-uniform distribution
of pathogens

The ability to find a
positive depends upon the
number of samples to be
taken



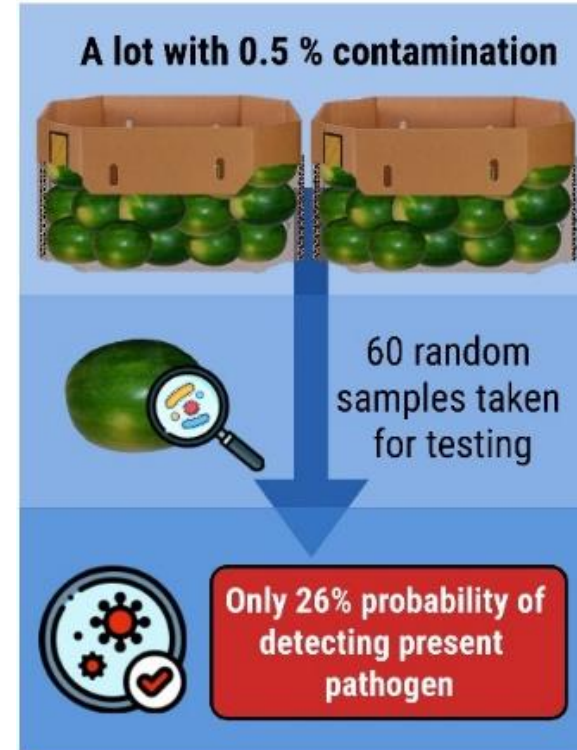
Probability of detecting pathogen in a contaminated lot depending on samples taken

Number of sample units

% Defective	15	30	60	100
0.1	0.01	0.03	0.06	0.10
0.5	0.07	0.14	0.26	0.39
1	0.14	0.26	0.45	0.63
2	0.26	0.45	0.70	0.87
5	0.54	0.79	0.95	0.99

Adapted from: Microorganisms in Foods 7 - Microbiological Testing in Food Safety Management, 2002

EXAMPLE



PROCESS TESTING is the SOLUTION

Microbiological testing of
soils, composts and water

Packhouse environment
management (seek and
destroy approach)

Frequency, number of
samples and target
pathogens



Microbiological testing

Product testing

- Compliance with QA programs (growers)
- Meeting with suppliers' requirements (growers/packers/processors/exporters)
- Public health/food authorities advice/direction

Process testing

- Environmental monitoring for pathogens
- Verification of food safety controls
- Peace of mind

Microbiological samples

Produce samples

- Fruit or vegetable

Environmental samples

- Irrigation water
- Postharvest water
- Compost/manure/soil
- Food contact surface
- Food non-contact surface

What is the expectation?

- ☺ Negative test report for all target pathogens and within microbiological limits
- ☹ Positive test report for one or more target pathogens

Respond

Rapidly

Accurately

Environmental monitoring program

1. Preventing transient pathogens from becoming entrenched, forming biofilms and spreading
2. Verifying effectiveness of control measures
3. Detecting pathogens before it can spread
4. Determining and undertaking corrective action



“Seek & Destroy bugs before they bug your business”

Seek & Destroy

Target pathogens?

Where and how to sample?

How frequent?

Microbiological testing?



Seek & Destroy

Target pathogens

- *Listeria species or L. monocytogenes*
- *Salmonella species*



Seek & Destroy

How frequently?

- One size does not fit all
- Produce volumes and packhouse risk history
 - weekly testing for large operations (>20 tonnes/shift)
 - bi-weekly for medium scale (3-20 tonnes/shift)
 - monthly for small packhouses (up to 3 tonnes/shift)
- Increase the frequency
 - Positive detection
 - Weather events (dust storms, flooding)



Seek & Destroy

How many samples?

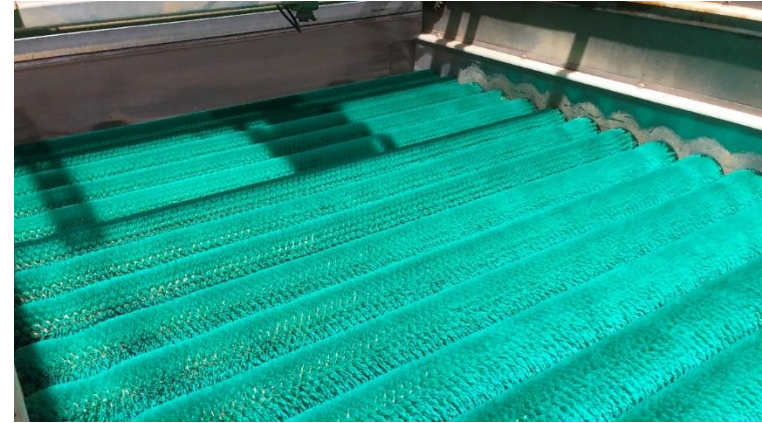
- Subjective question
- Trends & history
- Sampling spots
- 5-7 swabs from each zone
- 5 processed fruit samples



Seek & Destroy

When to sample?

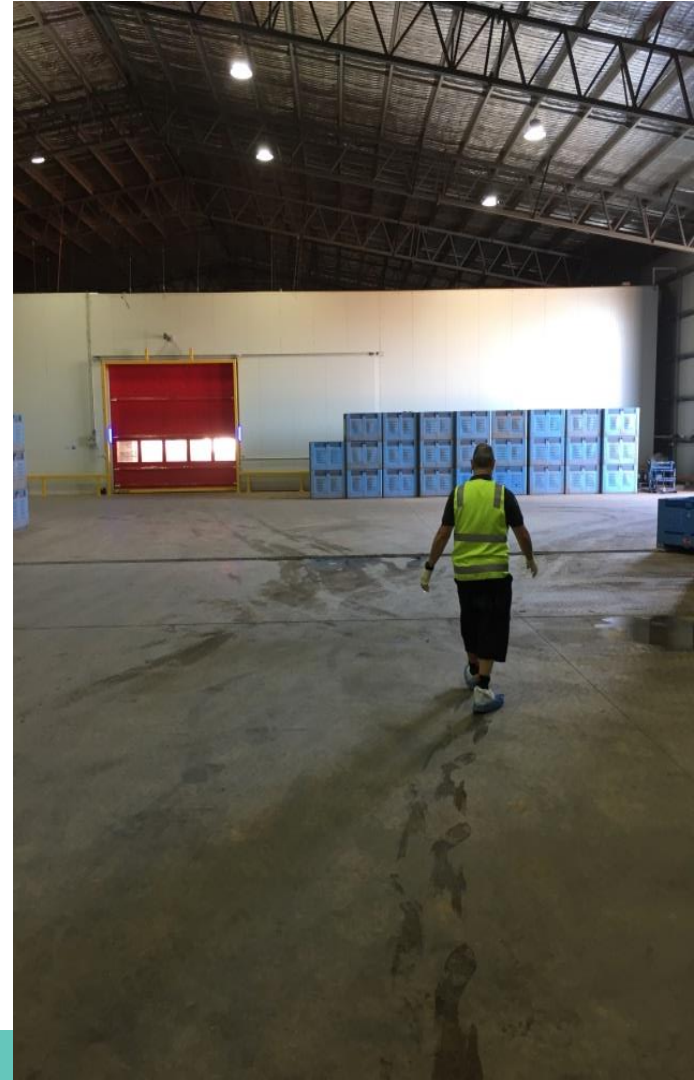
- after packhouse sanitation and prior to production
- during fruit processing (e.g., performed after equipment has been running with fruit for 2-4 h)
- after packhouse cleaning but prior to sanitation

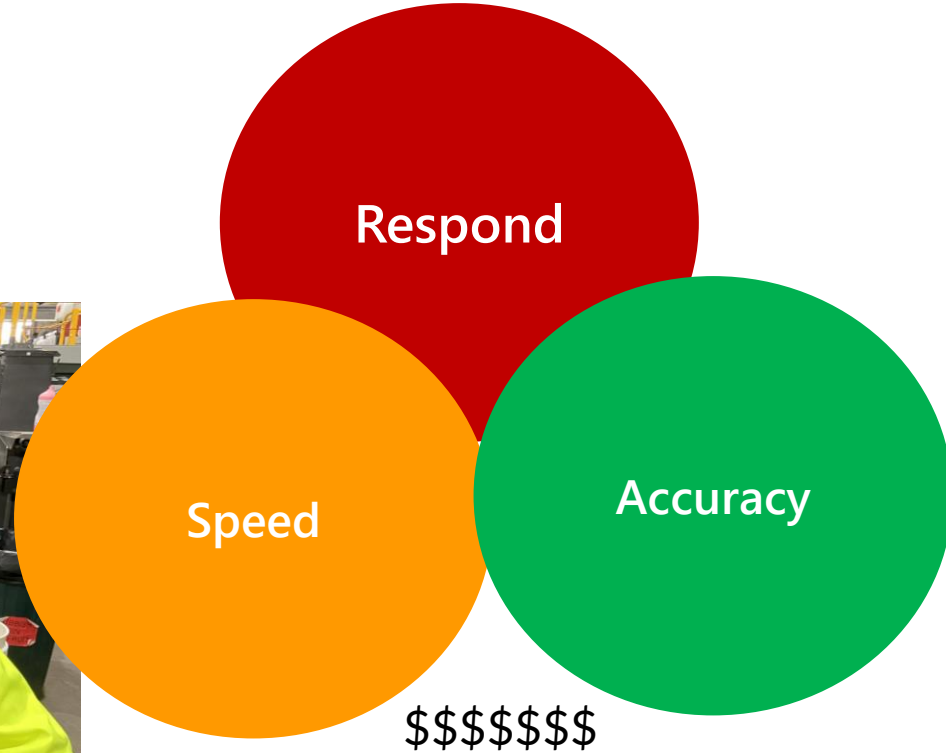


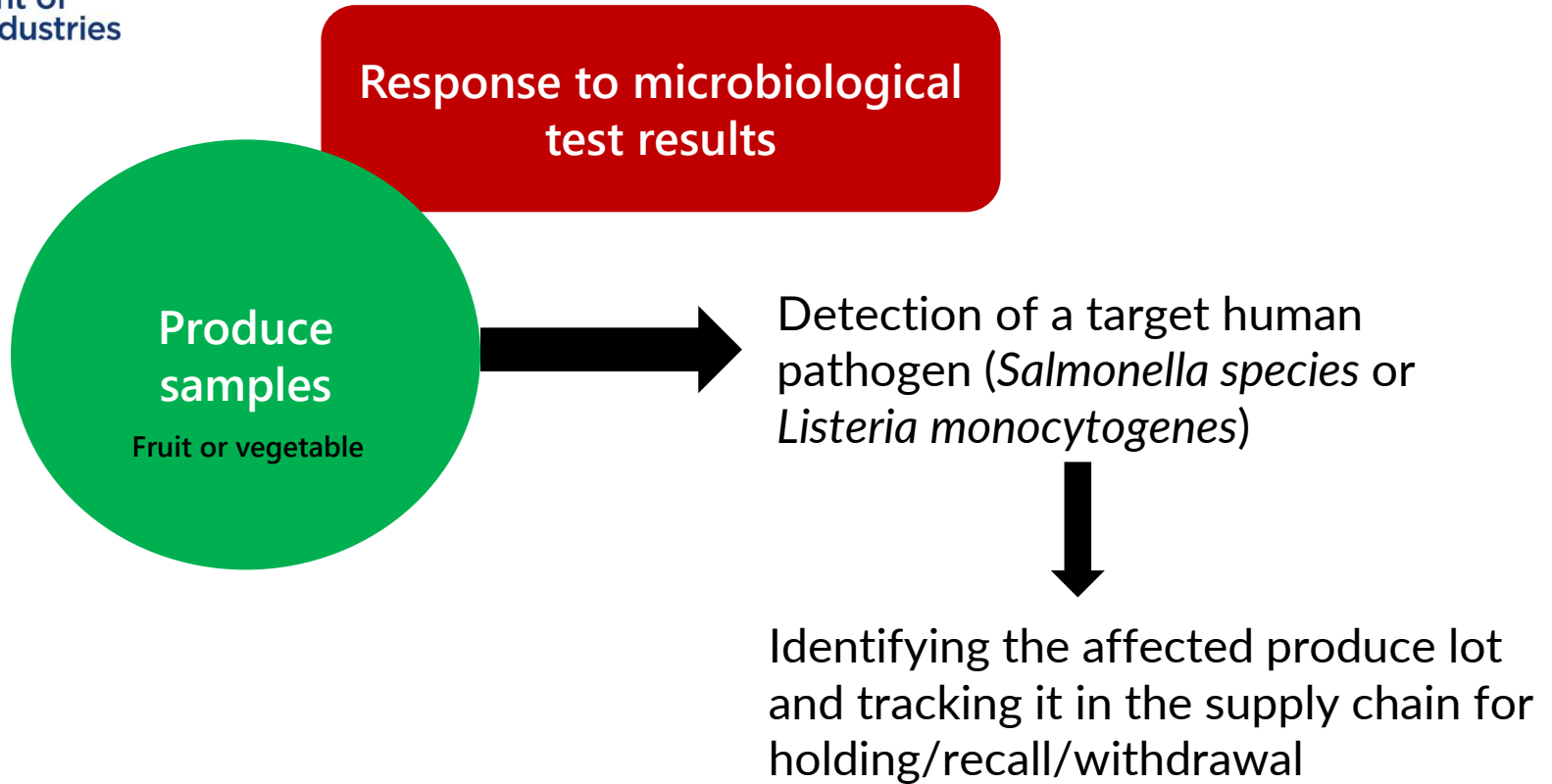
Seek & Destroy

How to collect and transport samples?

- Staff training in understanding the aseptic principles to follow the sampling schedule
- Sponge swabs for sampling larger areas
- Q-tip swabs for hard to reach niches
- Sample identification and documentation
- Avoid compositing for targeted harbourage identification
- Transport samples to laboratory with frozen gel-ice packs to maintain 0-4°C
- An accredited laboratory service provider.



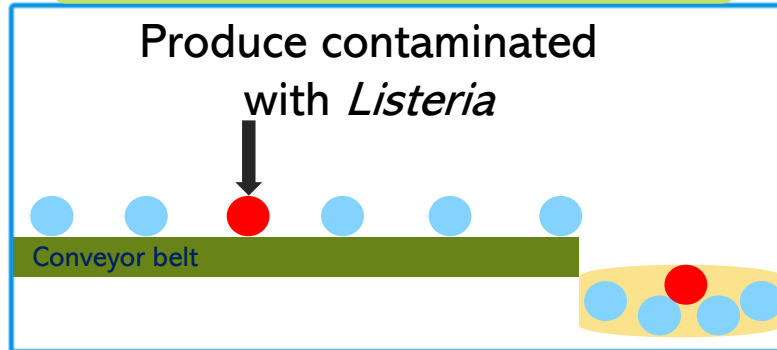




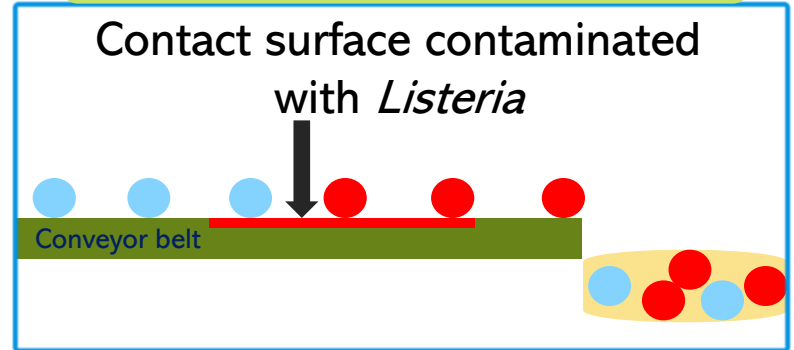
Cross-contamination

Pathogens will enter the packhouse, but don't let them become the residents

Transient Pathogen



Resident Pathogen

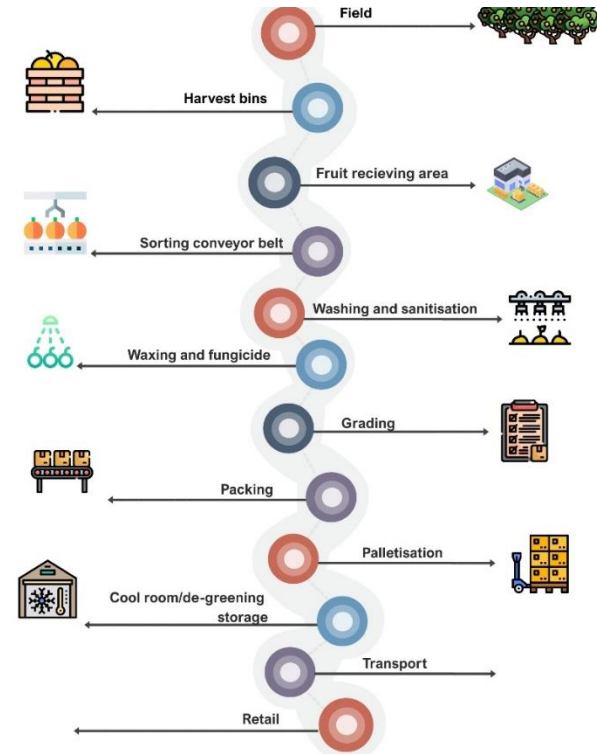


- Positive detection of *Listeria monocytogenes* (*L. mono*) on a processed fruit sample
- Differentiate between transient *L. mono* versus resident *L. mono* by consecutive sampling and testing schedule

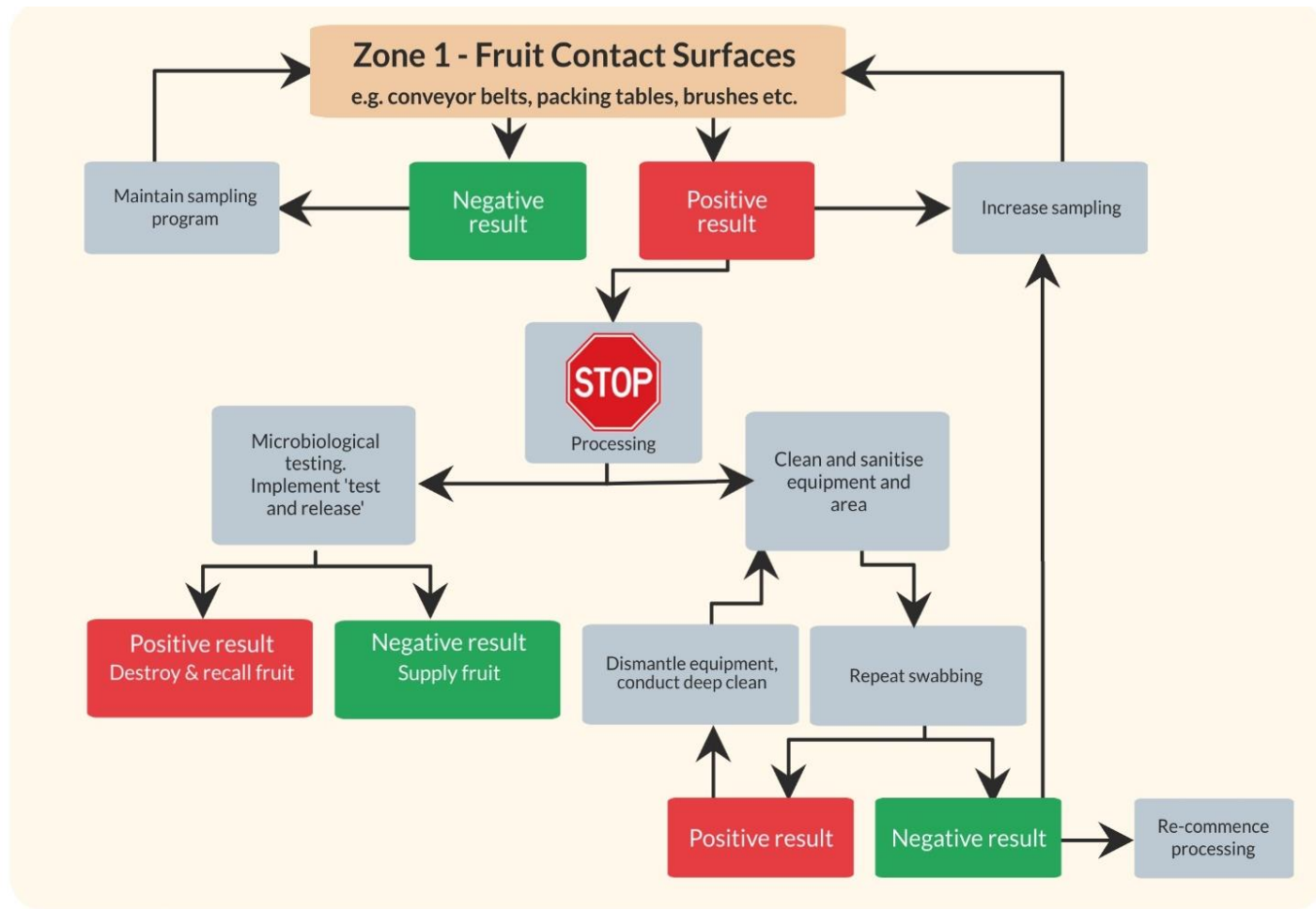
Response to
microbiological test
results

Environmental
sample

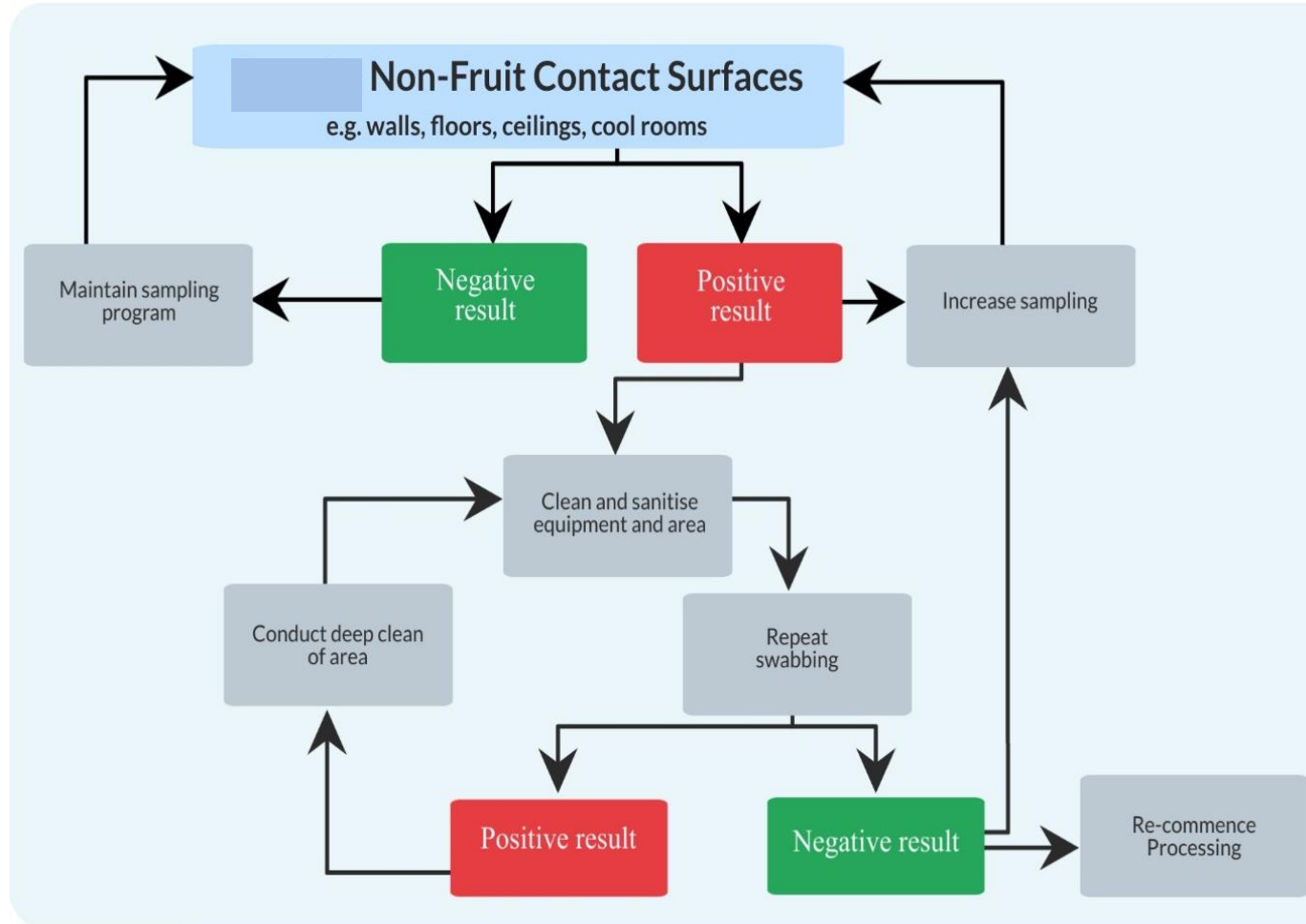
Response is complex, cumbersome,
costly and investigative

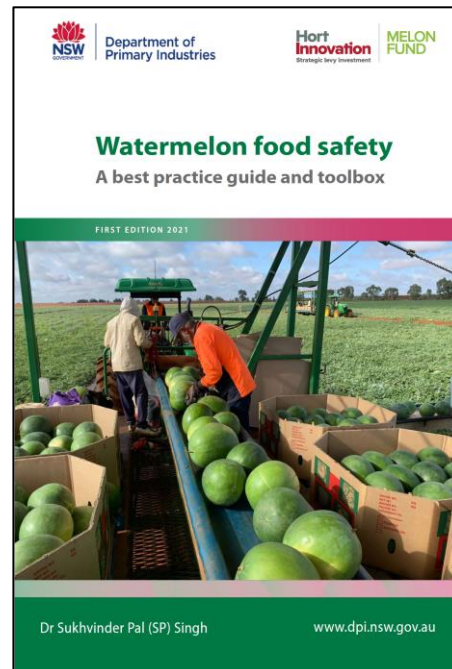
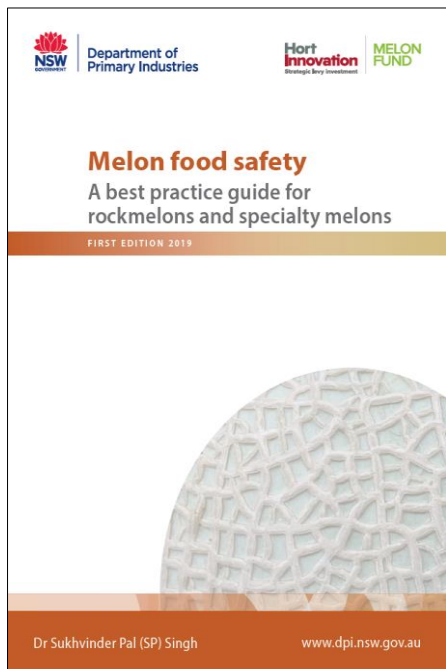


Response to microbiological test results



Response to microbiological test results





www.dpi.nsw.gov.au or ask Google- “melon food safety guide”

Environmental samples collected from a fruit packer



A few samples from brush rollers tested confirmed positive for *Listeria monocytogenes*



Packer stopped processing and undertook deep cleaning and sanitisation of brush rollers



Resampling from the cleaned and sanitised brush rollers (7 samples)



Six samples tested negative and one sample was still positive



Packer replaced the brush rollers as the contamination was too deeply seated





Department of
Primary Industries

Technical enquiries regularly received
from growers, packers, exporters,
importers and regulators



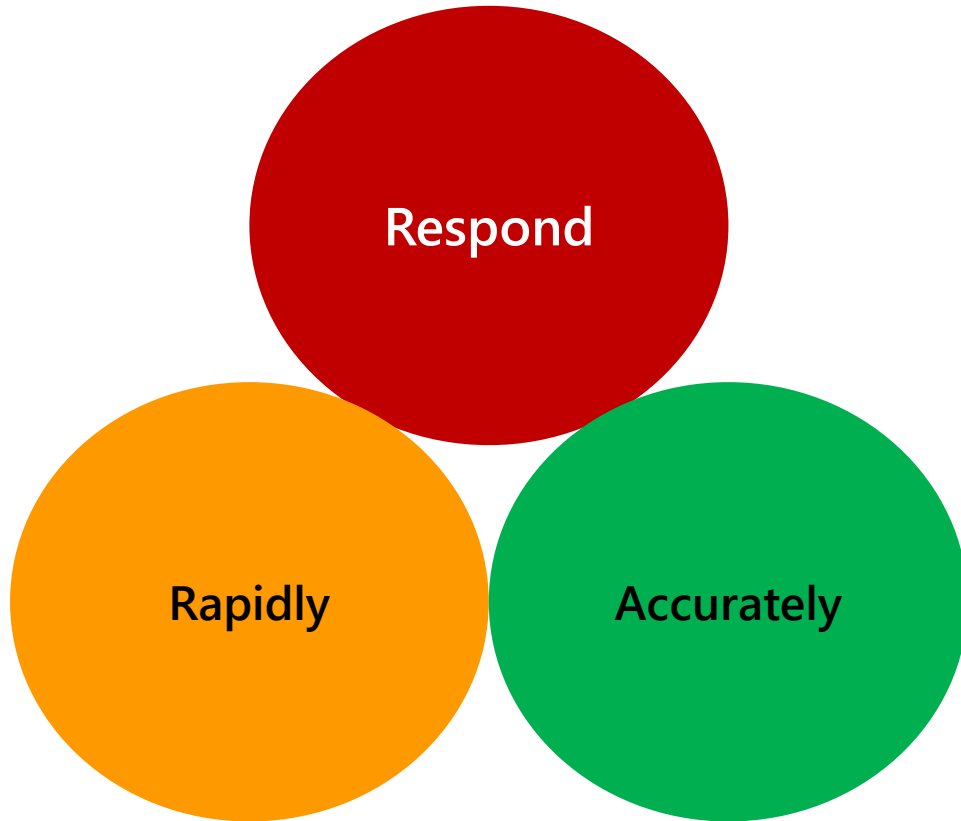
Department of
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FOOD SAFETY HELPDESK

ASK THE FOOD SAFETY SPECIALISTS

Learn how to mitigate food
safety risks and improve
your food safety systems.

Contact Dr S.P. Singh
Phone. 02 4348 1935



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Frontline team



Lukas Creek
Field Assistant



Andrew Creek
Development Officer



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Development Officer