WESTERN GROWERS
SCIENCE & TECHNOLOGY

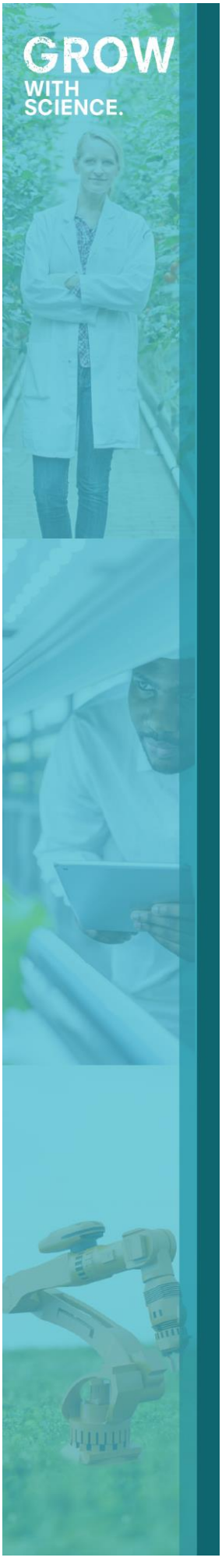
Rapid Testing Lunch and Learn Webinar
Summary / Recap
August 26, 2020

Testing in fresh produce

- Testing is a tool, and to best utilize this tool, you must ask yourself: "what are WE trying to do with our testing?"
- Testing is a means of verification in a food safety plan
    - Allows you to identify a risk, but it isn't changing the risk. Your actions following the use of the tool is what will mitigate risk.
- Key considerations: What is "fit for purpose" in testing?
    - How sensitive is your test?
    - How specific is your test?
    - Is it reliable and repeatable?
    - Is it fast enough?
    - Does your test fit the budget?
    - Does it meet your customer expectations?
- Sensitivity: the ability to correctly identify positives (low false negative rate)
- Specificity: The ability to correctly identify negatives (low false positive rate)

Rapid Testing in fresh produce

- PCR (polymerase chain reaction) is the most ubiquitous platform
    - Detects genetic information from an organism
    - Pros: Very fast, high sensitivity
    - Cons: May detect non-living cells, still requires enrichment phase
- PCR methods
    - End-point PCR (gel electrophoresis)
        - Separates DNA based on size and charge and allows you to visualize DNA
        - Less sensitive and requires human interpretation of results
    - Real-time PCR
        - Gives you individual tubes per sample, has internal controls to assure each reaction works
        - Greater resolution than end-point PCR w/ gels, less variable than gels, instrument makes result determination
- Limits to rapid testing
    - All tests currently are dependent on a growth step. We are looking for a needle in a haystack and with more time it makes the "needle" get bigger so it is easier to find.



Enrichment considerations

- How much media you add to your samples needs to account for how many other organisms are on your sample
- How long to incubate for growth?
    - Need to reach a detectable limit – bacteria can be injured, stressed, crowded by other bacteria
- PCR inhibitors can be present that will reduce PCR amplification and get you a false negative
- Validations: There's often a large amount of variability within validation methods
    - Have conversations with your lab to know how they are running your sample

DNA is a signal

- DNA exists whether the cell is living or dead
    - In food safety, we only care if the cell is living. Dead cells are not threats.
    - However, DNA from non-living cells can still provide information

PCR signal next steps

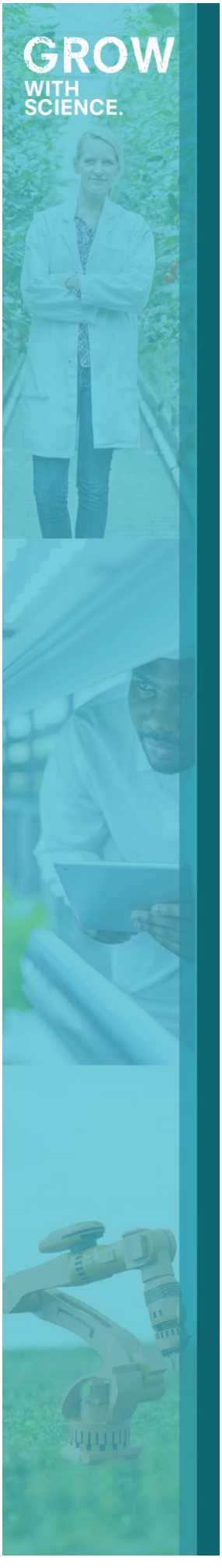
- DNAse treatment
    - Reduces DNA signals from dead cells
- Cultural confirmation
    - 3-7 days usually
    - The gold standard
- Molecular confirmation
    - Identifies additional targets
    - Can assist in rapid confirmation and further complement PCR detection

What are you trying to do with your testing?

- Sporadic events vs. contamination event
    - Finding organisms in testing is different than a contamination event
    - Are you doing sporadic testing or conducting root cause analysis?
    - You can pull many samples out of a field and still not find what you're looking for, but that doesn't mean it's not there.
- Define your goal – most likely it's not zero

Develop a plan

- Don't be afraid to change your testing program



- Define your goal: are you looking for sporadic or recurring contamination?
- More testing isn't always better – drive for value instead of activity

This document was prepared by WG staff.