



BASF

Seed health tests for pathogen viability

Background



Crop Science

Plantum

Plantum is a consortium of companies active in plant breeding, seed production, and propagation, working collectively to support market access and strengthen phytosanitary standards across the seed sector. BASF and Bayer, aligned with Plantum's mission, have joined forces to explore innovative solutions that improve seed health testing, leveraging their combined expertise in seed technology, virology, and regulatory insight. Providing healthy (vegetable) seeds to customers is a prerequisite for sustainable food production. A healthy seed is free from pathogenic organisms that could cause disease in the developing plant. Frequently used methods to determine seed health such as ELISA and PCR detect the presence of proteins or nucleic acids associated with specific plant pathogens. However, these methods cannot distinguish between viable, infectious pathogens and non-viable remnants. As a result, a positive test may indicate the presence of non-viable organisms, residual genetic material left on the seed after a disinfection treatment, or environmental contamination with genetic material, rather than an actual infection risk. Therefore, such test results may not reliably reflect the true risk posed by a seed lot when it is brought into the market. Seed companies contribute to the availability of healthy seeds by routinely testing them to prevent or control plant pests and pathogens that may affect seed quality, seed movement, and their introduction into new territories. Good management practices that prevent seeds from exposure to pests and diseases throughout all stages of seed development, production, and commercialization significantly reduce overall pest risks, and seed health testing is often a final check. A seed health test is also frequently required by National Plant Protection Organizations (NPPOs) as a condition for importing seed into their territories.

What we're looking for

We are looking for a seed health test method, whether destructive or non-destructive, that distinguishes between the presence of viable and non-viable pathogens in or on the seed. The primary focus is on testing for tobamoviruses in solanaceous crops, such as tomato, pepper, and eggplant.

This could be a new confirmation test or a completely different method that shows the viability of pathogens present in/on the seed. We are especially interested in creative and unconventional approaches beyond those listed below.

Solutions of interest include:

- Viability PCR using propidium monoazide (PMA) or ethidium monoazide (EMA)
- Seed bioassay combined with molecular marker detection
- Immunocapture with viability dye or protease treatment
- Enzyme-based viability detection

Our must-have requirements are:

- Designed for use in a laboratory environment
- Strong rationale for achieving sensitivity comparable or higher than PCR
- Test turnaround time of up to 7 days, with preliminary data or rationale supporting repeatability

Our nice-to-have's are:

- PCR-based test
- Easy adjustment of the test/method for other crops and other viruses
- Cost considerations available (e.g., estimated project costs, anticipated cost per sample)
- Scalability for routine use

What's out of scope:

- Crop-pest combinations other than tobamoviruses in solanaceous crops
- Methods requiring high-risk chemicals that may pose safety hazards to employees
- Solutions blocked by third-party intellectual property rights

Acceptable technology readiness levels (TRL): Levels 1-9

1. Basic principles observed
2. Concept development
3. Experimental proof of concept
4. Validated in lab conditions
5. Validated in relevant environment
6. Demonstrated in relevant environment
7. Regulatory approval
8. Product in production
9. Product in market

What we can offer you

Eligible partnership models:

- Sponsored research

Benefits:

Sponsored Research

Initial funding is available to support proof-of-concept studies or feasibility data collection, with the potential for follow-on funding depending on preliminary results and project scope.

Facilities and Services

Partners can send samples for analysis at our facilities.

Expertise

Partners will have access to an internal team of experts as appropriate.

Data

Partners can leverage the data set for additional insights regarding the solution.

Reviewers

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