ImmunoStrip® Validation Report

On-site Plant Pathogen Testing

Phytophthora (*Phyt*)

ISK/STX 92601

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Test Characteristics

Test Name	Phytophthora
Catalog Number	92601
Acronym	Phyt
Genus	Phytophthora
Capture Antibody	Polyclonal (Rabbit)
Detection Antibody	Monoclonal (Mouse)
Format	Lateral Flow Device
Diluents	SEB1
Sample Dilution	1:20

Summary

The Phytophthora (Phyt) ImmunoStrip is used to detect the presence of Phytophthora species in many crops including Oak, Potato, and Strawberry. ImmunoStrips are the perfect screening tool for use in the field, greenhouse, and the lab.

Diagnostic Sensitivity

True Positives	151
Correct Diagnoses	151
Percent	100%

Analytical Sensitivity

Limit of Detection: 1:5,120 dilution of infected tissue (pathogen titer unknown)

Analytical Specificity

Inclusivity:

Species Detected[1]:

Phytophthora alni	Phytophthora alticola-type
Phytophthora asparagi	Phytophthora bisheria
Phytophthora boehmeriae	Phytophthora cactorum
Phytophthora cajani	Phytophthora cambivora
Phytophthora canalensis	Phytophthora capsici
Phytophthora chlamydospora	Phytophthora cinnamomi var parvispora
Phytophthora cinnamomi var robiniae	Phytophthora citricola
Phytophthora citrophthora	Phytophthora cryptogea
Phytophthora drechsleri	Phytophthora erythroseptica
Phytophthora europaea	Phytophthora foliorum
Phytophthora fragariae	Phytophthora glovera
Phytophthora gonapodyides	Phytophthora helicoides[5]
Phytophthora heveae	Phytophthora hibernalis
Phytophthora infestans	Phytophthora kelmania[4]
Phytophthora kernoviae	Phytophthora lagoariana
Phytophthora lateralis	Phytophthora lavandula
Phytophthora meadii	Phytophthora medicaginis
Phytophthora megasperma	Phytophthora melonis
Phytophthora nemorosa	Phytophthora nicotianae

Species Detected[1]:

Phytophthora niederhauserii	Phytophthora obscura
Phytophthora palmivora	Phytophthora parasitica
Phytophthora pistaciae	Phytophthora pluvialis[3]
Phytophthora podocarpi[2]	Phytophthora porri
Phytophthora pseudosyringae	Phytophthora pseudotsuga
Phytophthora quercina	Phytophthora ramorum
Phytophthora richardiae	Phytophthora rubi
Phytophthora sansomeana	Phytophthora sinensis
Phytophthora siskiyouensis	Phytophthora sojae
Phytophthora syringae	Phytophthora taxon Agatis (PTA)
Phytophthora tropicalis	Phytophthora uliginosa
[1]The list above represents the Phytophthora species that have been shown to be detected by the Phytophthora genus ImmunoStrips test and does not represent all species that may be detected. If you have confirmed detection of a Phytophthora species not on this list, please contact us. We would like to work with you to further validate the Phytophthora genus ImmunoStrip detection capabilities.	
[2]Phytophthora podocarpi has been reported to be detected.	
[3]Phytophthora pluvialis has been reported to be detected.	
[4]Phytophthora kelmania has been reported to be detected.	
[5]Phytophthora helicoides has been reported to be detected.	

Exclusivity:

Cross-reacts With:

Phytopythium litorale	Plasmopara halstedii
Plasmopara viburni	Pythium aphanidermatum
Pythium heterothalicum	Pythium paroecandrum
Pythium sylvaticum	Pythium vanterpoolii

Does Not Cross-react With:

Pythium amazonicum	Pythium arrhenomanes
Pythium catenulatum	Pythium graminicola
Pythium hydnosporum	Pythium irregulare
Pythium myriotilum	Pythium myriotylum
Pythium olegandrom	Pythium olegandrum
Pythium paroecandrum	Pythium radicrenses
Pythium splendes	Pythium ultimum
Pythium ultimum var. ultimum	Pythium vexans type

Diagnostic Specificity

True Negatives 79
Correct Diagnoses 79
Percent 100%

Selectivity:

No Matrix Effect Observed With:			
Arctostaphylos leaves	Banana midrib	Black walnut leaves	Blackberry leaves
Bougainvillea leaves	Camellia leaves	Cantaloupe leaves	Cinnamomum leaves
Citrus leaves	Cowpea leaves	Cowpea roots	Cucumber leaves

No Matrix Effect Observed With:			
Ficus leaves	Garlic leaves	Garlic roots	Garlic stem
Grape leaves	Hops leaves	Lilac leaves	Lonicera leaves
Loropetalum leaves	Magnolia leaves	Nerium leaves	Pepper leaves
Pepper roots	Photinia leaves	Pine needles	Potato leaves
Potato tubers	Pyracantha leaves	Quercus leaves	Raspberry leaves
Rhododendron leaves	Rosa leaves	Sequoia leaves	Soybean cotyledons
Soybean leaves	Soybean roots	Squash leaves	Strawberry leaves
Syringa leaves	Tomatillo leaves	Tomato leaves	Tomato roots
Umbellularia leaves	Viburnum leaves	White Oak leaves	
The hosts on the above list have been chosen to represent those which historically cause a range of matrix effects, in addition to those expected to be screened for this pathogen. Not all plant species susceptible to this pathogen have been screened, but may still be used with this assay unless otherwise noted below. As with all diagnostic tools, Agdia recommends confirming all results with a secondary detection method before making any economic decisions (ex: discarding plants due to positive test results, etc.).			

Matrix Effect Observed With:			
None Known			

Glossary

Diagnostic sensitivity[1]: The percentage of positive samples correctly identified in an experiment with known positive controls.

Diagnostic specificity[1]: The percentage of negative samples correctly identified in an experiment with known negative controls.

Analytical sensitivity[3]: The smallest amount of target that can be detected reliably (this is sometimes referred to as the 'limit of detection')

Analytical specificity[3]: (comprises inclusivity and exclusivity)

Inclusivity[3]: The performance of a test with a range of target isolates covering genetic diversity, different geographical origin and/or hosts associated with the target organism.

Exclusivity[3]: The performance of a test with a range of non-targets (e.g. cross-reaction with closely related organisms, contaminants)

Selectivity[2]: The level of effect that matrices and relevant plant parts have on the performance of the assay.

Repeatability[2]: The agreement between test replicates of the same sample tested by the same operator.

Reproducibility[3]: The ability of a test to provide consistent results when applied to aliquots of the same sample tested under different conditions (e.g. time, users, equipment, location)

Robustness[1,3]: The extent to which varying test conditions (e.g. temperature, volume, change of buffers) affect the established test performance values. May also be referred to as planned deviation analysis.

Stability[1]: The performance of test reagents or controls over time.

References:
[1]Groth-Helms, D., Rivera, Y., Martin, F. N., Arif, M., Sharma, P., Castlebury, L. A. (in press). Terminology and Guidelines for Diagnostic Assay Development and Validation: Best Practices for Molecular Tests. PhytoFrontiers.
[2]Eads, A., Groth-Helms, D., Davenport, B., Cha, X., Li, R., Walsh, C., Schuetz, K., (in press). The Commercial Validation of Three Tomato Brown Rugose Fruit Virus Assays. PhytoFrontiers.
[3]EPPO (2018) PM 7/76 (5) Use of EPPO Diagnostic Standards, EPPO Bulletin 48, 373– 377.