Validation Report: ELISA

PSA/SRA 39300 • *Tomato spotted wilt virus* (TSWV)

Test Characteristics

Test Name	Tomato spotted wilt virus	**Capture Antibody**	Monoclonal (Mouse)
Catalog Number	39300	**Detection Antibody**	Monoclonal (Mouse)
Acronym	TSWV	**Format**	DAS-ELISA
Genus	Orthotospovirus	**Diluents**	GEB/ECI
		Sample Dilution	1:10

Summary

This ELISA test is a qualitative serological assay for the detection of Tomato spotted wilt virus (TSWV) in tomato and pepper leaves as well as other ornamental and vegetable species. TSWV is a member of the Orthotospovirus genus known for their enveloped, spherical-shaped virus particles.

Diagnostic Sensitivity

True Positives	80
Correct Diagnoses	80
Percent	100%

Analytical Sensitivity

Limit of Detection: 1:24,300 dilution of infected tissue (pathogen titer unknown)

Analytical Specificity

Inclusivity:

Isolates and Geographic Regions Detected:

TSWV-BJFC-Hb (China)[1]	TSWV-CE (South Korea)[2]
TSWV-MR-01 (CA, USA)[3]	TSWV-WGK (South Korea)[4]
TSWV-YN (China)[5]	TSWV Brazil isolate
TSWV Italy isolate	TSWV New Zealand isolate
TSWV Spain isolate	TSWV *Sw-5* resistance breaking isolate[6]
TSWV USA isolate	
[1]TSWV-BJFC-Hb has been externally reported to be detected.	
[2] TSWV-CE has been externally reported to be detected.	
[3]TSWV-MR-01 has been externally reported to be detected.	
[4]TSWV-WGK has been externally reported to be detected.	
[5]TSWV-YN has been externally reported to be detected.	
[6]TSWV *Sw-5* resistance breaking isolate has been externally reported to be detected.	

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Exclusivity:

Cross-reacts With:

Alstroemeria necrotic streak virus (ANSV)[1]	Groundnut ringspot virus (GRSV)
Tomato chlorotic spot virus (TCSV)	
[1]ANSV has been externally reported to be detected in 2017 and 2019.	

Does Not Cross-reacts With:

Melon yellow spot virus (MYSV)	

Diagnostic Specificity

True Negatives	75
Correct Diagnoses	75
Percent	100%

Selectivity:

No Matrix Effect Observed With:			
Alstroemeria leaves	Bean leaves	Beet roots	Blueberry leaves
Cucumber leaves	Cymbidium leaves	Dianthus leaves	Eggplant leaves
Hosta leaves	Impatiens leaves	Nandina leaves	Papaya leaves
Pepper leaves	Petunia leaves	Potato leaves	Soybean leaves
Strawberry leaves	Strawflower leaves	Tobacco leaves	Tomato leaves
Watermelon leaves			

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.

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