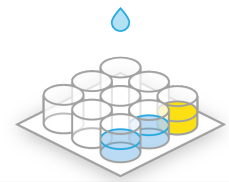


# Validation Report: ELISA

PSA/SRA 18700 • *Turnip mosaic virus* (TuMV)



## Test Characteristics

<b>Test Name</b>	Turnip mosaic virus	<b>Capture Antibody</b>	Polyclonal (Rabbit)
<b>Catalog Number</b>	18700	<b>Detection Antibody</b>	Monoclonal (Mouse)
<b>Acronym</b>	TuMV	<b>Format</b>	Compound-ELISA
<b>Genus</b>	Potyvirus	<b>Diluents</b>	GEB/ECI
		<b>Sample Dilution</b>	1:10

## Summary

This ELISA test is a qualitative serological assay for the detection of Turnip mosaic virus (TuMV) in brassica and allium leaves. TuMV is a member of the Potyvirus genus known for their non-enveloped, flexuous, filamentous virus particles.

## Diagnostic Sensitivity

<b>True Positives</b>	147
<b>Correct Diagnoses</b>	147
<b>Percent</b>	100%

## Analytical Sensitivity

**Limit of Detection:** 1:100,000 dilution of infected tissue (pathogen titer unknown)

## Analytical Specificity

### Inclusivity:

Isolates and Geographic Regions Detected:	Limit of Detection
TuMV ATCC® PV-177™ (Cabbage black ringspot strain)	1:3,600 dilution of infected tissue (pathogen titer unknown)
TuMV-CAN2	1:10,000 dilution of infected tissue (pathogen titer unknown)
TuMV-CDN1 (world-B) (Canada)	1:50,000 dilution of infected tissue (pathogen titer unknown)
TuMV-CHN1 (Asian-BR) (Taiwan)	1:5,000 dilution of infected tissue (pathogen titer unknown)
TuMV-CHN2 (world-B) (Taiwan)	1:10,000 dilution of infected tissue (pathogen titer unknown)
TuMV-CHN3 (world-B) (Taiwan)	1:50,000 dilution of infected tissue (pathogen titer unknown)
TuMV-CHN4 (world-B) (Taiwan)	1:50,000 dilution of infected tissue (pathogen titer unknown)
TuMV-CZE1 (world-B) (Czech Republic)	1:50,000 dilution of infected tissue (pathogen titer unknown)
TuMV-DNK3 (world-B) (Denmark)	1:10,000 dilution of infected tissue (pathogen titer unknown)
TuMV-GRC42 (basal-B) (Greece)	1:10,000 dilution of infected tissue (pathogen titer unknown)
TuMV-ITA7 (basal-BR) (Italy)	1:100,000 dilution of infected tissue (pathogen titer unknown)
TuMV-JPN2	1:50,000 dilution of infected tissue (pathogen titer unknown)
TuMV-Putak Creek (ATCC® PV-134™) (CA,USA)	1:100 dilution of infected tissue (pathogen titer unknown)

### Exclusivity:

#### Cross-reacts With:

Pepper mottle virus (PepMoV)	
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**Does Not Cross-react With:**

Alfalfa mosaic virus (AMV)	Alphacarmovirus dianthi (Carnation mottle virus) (CarMV)
Alstroemeria mosaic virus (AIMV)	Banana bract mosaic virus (BBrMV)
Barley yellow mosaic virus (BaYMV)	Bean common mosaic virus (BCMV)
Bean yellow mosaic virus (BYMV)	Beet necrotic yellow vein virus (BNYVV)
Beet western yellows virus (BWYV)	Clover yellow vein virus (CIYVV)
Cucumber mosaic virus (CMV)	Dasheen mosaic virus (DsMV)
Johnsongrass mosaic virus (JGMV)	Kalanchoe mosaic virus (KMV)
Leek yellow stripe virus (LYSV)	Lettuce mosaic virus (LMV)
Maize dwarf mosaic virus (MDMV)	Moroccan watermelon mosaic virus (MWMV)
Nepovirus nicotianae (Tobacco ringspot virus) (TRSV)	Onion yellow dwarf virus (OYDV)
Orthotospovirus impatiensnecromaculae (Impatiens necrotic spot virus) (INSV)	Orthotospovirus tomatomaculae (Tomato spotted wilt virus) (TSWV)
Papaya ringspot virus (PRSV)	Pea seed-borne mosaic virus (PSbMV)
Peanut mottle virus (PeMoV)	Plum pox virus (PPV)
Potato virus A (PVA)	Potato virus V (PVV)
Ribgrass mosaic virus (RMV)	Shallot yellow stripe virus (SYSV)
Soil-borne wheat mosaic virus (SBWMV)	Soybean mosaic virus (SMV)
Sweet potato feathery mottle virus (SPFMV)	Sweet potato virus 2 (SPV2)
Sweet potato virus G (SPVG)	Tobacco etch virus (TEV)
Tobacco streak virus (TSV)	Watermelon mosaic virus (WMV)
Wheat spindle streak mosaic virus (WSSMV)	Wheat streak mosaic virus (WSMV)
Xanthomonas axonopodis pv. citri (Xac)	Xanthomonas campestris pv. campestris (Xcc)
Xanthomonas campestris pv. vesicatoria (Xcv)	Zucchini yellow mosaic virus (ZYMV)

**Diagnostic Specificity**

True Negatives 154  
Correct Diagnoses 154  
Percent 100%

**Selectivity:**

No Matrix Effect Observed With:			
Anemone leaves	Anemone petioles	Artichoke leaves	Artichoke petioles
Broccoli leaves	Broccoli petioles	Brussel sprout leaves	Brussel sprout petioles
Cabbage leaves	Cabbage petioles	Calla lily leaves	Calla lily petioles
Cauliflower leaves	Cauliflower petioles	Hybiscus leaves	Hybiscus petioles
Leek leaves	Leek petioles	Lettuce leaves	Lettuce petioles
Onion leaves	Onion petioles	Petunia leaves	Petunia petioles
Radish leaves	Radish petioles	Scallion leaves	Scallion petioles
Statice leaves	Statice petioles	Turnip leaves	Turnip petioles
Watercress leaves	Watercress petioles	Zinnia leaves	Zinnia petioles



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**Repeatability**

Number of Samples 301  
 Replicates per Sample 3 - 6  
 Total Replicates 1134  
 Replicates in Agreement 1134  
 Percent Agreement 100%

**Reproducibility**

Number of Samples 58  
 Replicates per Sample 6  
 Number of Operators 3 - 4  
 Total Replicates 1218  
 Replicates in Agreement 1214  
 Percent Agreement 99.7%

**Robustness****Planned deviation analysis:**

Average OD Values				
	O.N. coating / 2 hour sample	4 hour coating / 2 hour sample	4 hour coating / O.N. sample	O.N. coating / O.N. sample
Positive Sample #1 (High)	2.613	1.849	3.851	3.829
Positive Sample #1 (Low)	0.283	0.250	0.512	0.492
Positive Sample #2 (High)	0.388	0.301	1.165	1.123
Positive Sample #2 (Low)	0.351	0.265	0.791	0.787
Positive Sample #3 (High)	0.343	0.290	0.630	0.626
Negative Sample #1	0.090	0.091	0.092	0.090
Negative Sample #2	0.104	0.094	0.090	0.087
Negative Sample #3	0.104	0.092	0.090	0.088
Buffer	0.095	0.091	0.088	0.089

**Stability:**

	1-year stability (accelerated)	1-year stability (real time)
Positive Sample (High)	Pass	Monitoring
Positive Sample (Medium)	Pass	Monitoring
Positive Sample (Low)	Pass	Monitoring
Negative Sample	Pass	Monitoring
Buffer	Pass	Monitoring
Negative Control	Pass	Monitoring



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## Glossary

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<b>Diagnostic sensitivity<sup>1</sup>:</b>	The percentage of positive samples correctly identified in an experiment with known positive controls.
<b>Diagnostic specificity<sup>1</sup>:</b>	The percentage of negative samples correctly identified in an experiment with known negative controls.
<b>Analytical sensitivity<sup>2</sup>:</b>	The smallest amount of target that can be detected reliably (this is sometimes referred to as the 'limit of detection')
<b>Analytical specificity<sup>2</sup>:</b>	(comprises inclusivity and exclusivity)
<b>Inclusivity<sup>3</sup>:</b>	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.
<b>Exclusivity<sup>2</sup>:</b>	The performance of a test with a range of non-targets (e.g. cross-reaction with closely related organisms, contaminants)
<b>Selectivity<sup>2</sup>:</b>	The level of effect that matrices and relevant plant parts have on the performance of the assay.
<b>Repeatability<sup>2</sup>:</b>	The agreement between test replicates of the same sample tested by the same operator.
<b>Reproducibility<sup>3</sup>:</b>	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)
<b>Robustness<sup>1,3</sup>:</b>	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.
<b>Stability<sup>1</sup>:</b>	The performance of test reagents or controls over time.

### References:

<sup>1</sup>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*.

<sup>2</sup>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*.

<sup>3</sup>EPPO (2018) PM 7/76 (5) Use of EPPO Diagnostic Standards, EPPO Bulletin 48, 373– 377.



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