



## SUMMARY

1. The test materials for FAPAS<sup>®</sup> proficiency test PL0102 were dispatched in January 2007. Each participant received three test materials to be analysed for *Potato spindle tuber viroid* (PSTVd). In total, 7 sets of test material were distributed to 4 countries. Of these, 7 participants, i.e. 100%, returned results within the time-scale demanded by the Scheme.
2. The proficiency test was qualitative with participants having to determine the presence or absence of PSTVd. Results were assessed based on the presence or absence of the target organism in each of the test materials issued.
3. Results for this proficiency test are summarised as follows:

organism	assigned value	number of satisfactory assessments	total number of results	satisfactory %
PSTVd	TM A absent TM B absent TM C present	5	7	71

4. Whereas this Report has been produced in good faith and in accordance with best industry practice, neither the Central Science Laboratory nor the Secretary of State for Environment, Food and Rural Affairs accepts any liability whatsoever as to the application or use of the information contained therein.

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## **1. INTRODUCTION**

### **1.1. Proficiency Testing**

There is an increasing demand for independent proof of competence both from regulatory bodies and customers. Individual laboratories need to know how well they perform against objective standards and how their laboratory results compare with others.

There are a number of quality assurance measures important in producing reliable microbiological diagnoses. These range from the use of simple quality control checks through documented and internally validated procedures to the use of externally validated methods and the participation in proficiency tests. The whole process can be brought under a formal Quality System and externally audited to attain accreditation status.

Proficiency testing is an external analytical quality assurance measure where the quality of the laboratory result is checked against criteria that are set independently of the laboratory carrying out the analyses. The analysis of an external quality check sample as part of a laboratory's routine procedures provides objective standards for individual laboratories to perform against and permits them to compare their microbiological results with those from other laboratories. Such standards and comparisons can go beyond the actual microbiological examination. For example, the ability to report results in specified units and within a given time scale are important aspects of quality. Hence, participants in FAPAS<sup>®</sup> who submit results after the closing date of a test are only included in the evaluation if there are extenuating circumstances.

### **1.2. Plant Pathogens**

The primary hosts of *Potato spindle tuber viroid* (PSTVd) are potato and tomato, but it has been found in other species. PSTVd is an infectious circular, single-strand of RNA and is capable of autonomous replication [1]. In potato, it is commonly 359 nucleotides in length [2], although strands of different lengths have also been reported in wild *Solanum* spp., tomato (*Lycopersicon esculentum*) and, in rare cases, potato.

In potato, symptoms of PSTVd are dependent upon the strain, the cultivar and/or the environment. Symptoms can vary in severity from severe, which include changes in growth pattern and reduced growth to milder and symptomless infection [1].

In the EU, the viroid is under statutory control [3] and protective measures to prevent the introduction of the viroid into the EU are in place.

## **2. TEST MATERIAL**

### **2.1. Preparation**

Test materials were prepared by a laboratory contracted to do so by FAPAS<sup>®</sup>.

The plant leaves were cut into small pieces and placed into vials and the vials sealed. The vials were then freeze-dried. The vials were then sealed under vacuum and labelled.

The identity of each test material was as follows:

Test Material A = healthy control

Test Material B = *Tomato apical stunt viroid* (TASVd)

Test Material C = *Potato spindle tuber viroid* (PSTVd)

## **2.2. Distribution**

The dispatch date was 30 January 2007. Each participant received three test material vials, together with a covering letter, instructions for electronic submission of results and methods and the results form, for participants with no internet access.

## **3. RESULTS**

Participants were required to report their data qualitatively indicating whether PSTVd was either detected or not detected, as appropriate for each test material, using any appropriate method. Results were submitted by 7 participants before the closing date for this proficiency test, 30 March 2007.

Each participant was given a laboratory number, assigned in order of receipt of results. The reported results are given in Table 1.

The methods used by each participant are summarised in APPENDIX II.

## **4. QUALITATIVE ANALYSIS OF DATA**

The object of the statistical procedure employed is to obtain a simple and transparent result, which the participant and other interested parties can readily appreciate. Further details, including worked examples, are given in the FAPAS<sup>®</sup> Protocol [4]. The procedure follows that recommended in the IUPAC/ISO/AOAC International Harmonised Protocol for the Proficiency Testing of (Chemical) Analytical Laboratories [5].

### **4.1. Individual Assessments**

Qualitative results are assessed based on the presence or absence of the target organism in the test materials issued. Participants' results for each test material and assessment are given in Table 1. Comments, as submitted by participants, are given in Table 2.

The number and percentage of participants obtaining satisfactory assessments are given in Table 3.

## 5. REFERENCES

- 1 Protocol for the Diagnosis of Quarantine Organism, *Potato spindle tuber viroid* (PSTVd), Scottish Agricultural Science Agency.
- 2 Gross, H.J., Domdey, H., Lossow, C., Jank, P., Raba, M., Albery, H., Sanger, H.L., 1978, Nucleotide sequence and secondary structure of *Potato spindle tuber viroid*, *Nature* **273**: 203-208.
- 3 Council Directive 2000/29/EC of 8 May 2000 1998 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community, *Official Journal L 169*, 10/07/2000, 0001-0112.
- 4 FAPAS<sup>®</sup>, 2002, *Protocol for the Food Analysis Assessment Scheme, Organisation and Analysis of Data*, 6th Edition.
- 5 Thompson, M., Ellison, S.L.R. and Wood, R., 2006, The International Harmonised Protocol for the Proficiency Testing of Analytical Chemistry Laboratories, *Pure Appl. Chem.*, **78**, No. 1, 145–196.

Table 1: Assessments for PSTVd

laboratory number	PSTVd			assessment
	test material A absent	test material B absent	test material C present	
001	Not Detected	Not Detected	Detected	S
002	Not Detected	Not Detected	Detected	S
003	Not Detected	Not Detected	Detected	S
004	Detected	Not Detected	Detected	<b>NS</b>
005	Not Detected	Not Detected	Detected	S
006	Not Detected	Not Detected	Detected	S
007	Not Detected	Detected	Detected	<b>NS</b>

Results are presented as reported by participants

S = Satisfactory

**NS** = Not Satisfactory

Table 2: Comments Submitted by Participants

lab no.	Comment
002	<i>Tomato apical stunt viroid (TASVd)</i> was detected in TPL0102B

comments are as submitted by participants

Table 3: Numbers and Percentages of Satisfactory Assessments

organism	number of satisfactory assessments	total number of results	satisfactory %
PSTVd	5	7	71

**APPENDIX I: Organisms Present in Test Materials**

Test Material	Organism
Test Material A	healthy control
Test Material B	<i>Tomato apical stunt viroid (TASVd)</i>
Test Material C	<i>Potato spindle tuber viroid (PSTVd)</i>

## APPENDIX II: Analytical Methods Used by Participants

Notes:

- 1) Participants' methods are tabulated according to the information supplied by electronic submission of methods entry. Some responses have been combined or edited for clarity.

### PSTVd

<b>Methodology</b>	<b>laboratory number</b>
2Step PEG extraction and probed with PSTVd labelled DIG probe plus RNeasy extract	005
EPPO Standard PM 7/33 - RT-PCR method	007
GENTRA-Kit RNA extraction, One-Step RT-PCR SuperScript, sequencing	002
Kingfisher (automated extraction machine) and TaqMan (real time PCR)	001
Reverse transcriptase real time PCR	006
R-PAGEPCR	003
RT-PCR	004

## **APPENDIX III: FAPAS<sup>®</sup> SecureWeb, Reports and Protocol**

### **1. FAPAS<sup>®</sup> SECUREWEB**

Access to the secure area of our web site is only available to participants in our proficiency tests. Please contact us if you require a UserID and Password. FAPAS<sup>®</sup> SecureWeb allows participants to:

- Obtain their laboratory numbers for the proficiency tests in which they have participated.
- View the results they submitted in past and current proficiency tests.
- Submit their results and methods for current tests.
- Review future tests they have ordered.
- Order proficiency tests and quality control materials.
- Freely download copies of reports, in Acrobat PDF format, of proficiency tests in which they have participated.

### **2. REPORTS**

The Acrobat PDF version of this report is available to all participants as a free download from FAPAS<sup>®</sup> SecureWeb.

A printed and bound version of this report is priced £35 if ordered at the same time as the proficiency test or £50 if ordered subsequently.

### **3. PROTOCOL**

The Protocol [4] sets out how FAPAS<sup>®</sup> is organised. It gives full details of the statistical procedures used and includes worked examples. Copies can be downloaded from our website.

### **4. CONTACT DETAILS**

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