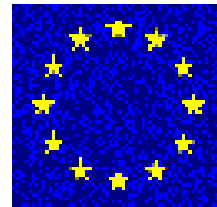


Reference Materials

Tools for Quality Assurance in Plant Health Testing



What are they?

● **Reference materials** are preserved bacterial preparations containing a defined number of viable cells. The bacteria are carried on paper discs which can be easily dispensed with sterile forceps.

Who might use them?

- Plant health and seed testing laboratories (Private/Public/Official)
- Plant Clinics
- Plant Protection Services
- Accreditation bodies
- Research institutes
- Diagnostic laboratories
- Quarantine authorities
- Statutory bodies
- Inspection services
- Seed companies
- Universities



What are they used for?

- Quality control of test procedures
- Development and evaluation of test methods/media
- Standardisation of test methods
- Laboratory accreditation
- Implementation of legislation

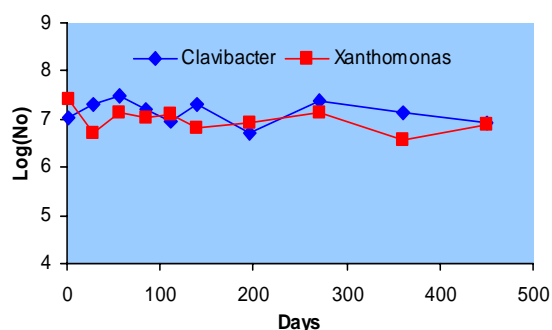
Why use them?

- Starting with healthy planting material is essential for effective management of plant diseases, especially bacterial diseases. Production and selection of healthy starting material can only be ensured by testing.
- Increased movement of seeds/planting material across the world has increased the need to standardise and validate test methods.
- **Reference Materials** provide a convenient and cost-effective means of checking that tests have been performed correctly.
- Save time and money on testing by ensuring an accurate and reliable result every time.
- Demonstrate the reliability and accuracy of test results to customers, government authorities, accreditation bodies, international bodies.
- Check for false-negatives (e.g. due to inhibition by non-target organisms).

How were they developed?

● A unique preservation technique using cryoprotectants, lyophilisation and gas storage was developed using four seed-borne bacterial pathogens with different characteristics to give **Reference Materials** which are stable for at least one year under normal storage conditions.

Stability of Reference Materials



How were they validated?

● Test batches of **Reference Materials** were sent for comparative testing in 14 laboratories. Recovery was determined using standardised methods and simulated test conditions. Analysis of results to ISO standards showed that the **Reference Materials** consistently give expected recoveries of the target organisms.

Recovery of Reference Materials in 14 laboratories			
Pathogen	Growth medium	Colony forming units	
		Mean	95% Limits
<i>Clavibacter michiganensis</i> subsp. <i>michiganensis</i>	mSCM	94	65-136
<i>Pantoea (Erwinia) stewartii</i>	GNA	187	145-241
<i>Pseudomonas syringae</i> pv. <i>phaseolicola</i>	MSP	57	40-81
<i>Xanthomonas campestris</i> pv. <i>campestris</i>	FS	48	37-62



Validation of Reference Materials was done by:

● Plant Research International, Wageningen, The Netherlands ● Horticulture Research International, Wellesbourne, UK ● Swedish University of Agricultural Sciences, Dept. of Plant Pathology, Uppsala, Sweden ● DGPC-Direcção de Serviços de Fitossanidade, Lisbon, Portugal ● Danish Plant Directorate, Dept. of Plant Pathology, Lyngby, Denmark ● Benaki Phytopathological Institute, Laboratory of Bacteriology, Kifissia (Athens), Greece ● National Institute of Agricultural Botany, Cambridge, UK ● Institut für Pflanzenschutz in Ackerbau und Grünland, Braunschweig, Germany ● Ente Nazionale delle Sementi Elette, Laboratorio Analisi Sementi, Tavazzano, Italy ● NAK-Tuinbouw, Roelofarendsveen, The Netherlands ● GEVES, Station Nationale d'Essais de Semences, Beaucaouze, France ● Istituto Sperimentale per la Patologia Vegetale, Rome, Italy ● Harris Moran Seed Company, San Juan Bautista, California, USA ● Canadian Food Inspection Agency, Nepean, Ontario, Canada ● Israel Official Seed Testing Lab, The Volcani Center, Bet Dagan, Israel.

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