Proficiency Testing in Microbiology

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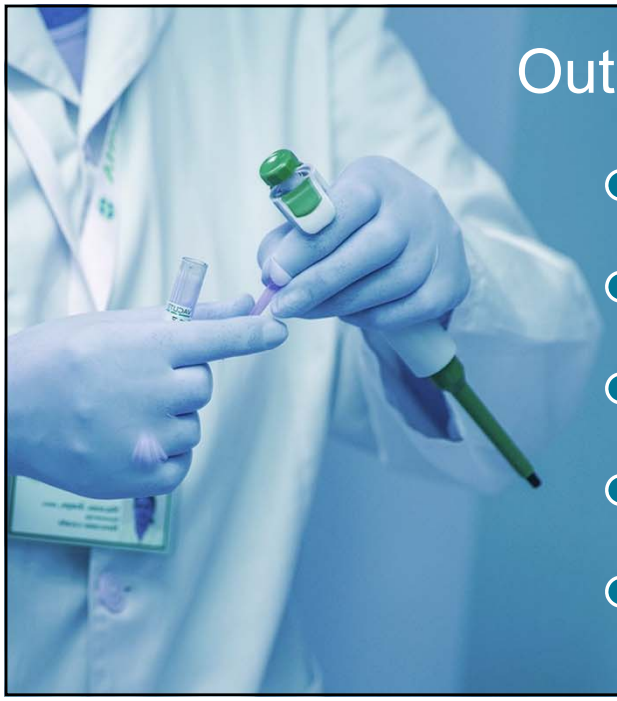


Outline of Presentation

01 Microbiology Section

02 PT in Microbiology

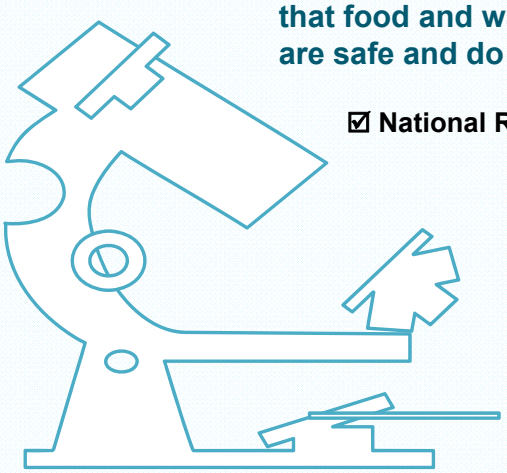
03 Bacterial Culture Collections

04 Challenges

05 Future directions

Microbiology laboratory

Protecting people's health by ensuring that food and water consumed by public are safe and do not pose a threat to health



- ☑ National Reference Laboratory
- ☑ Microbiology testing for food and water samples
- ☑ PT subcontractor for microbiology testing
- ☑ Training and consultation

Capabilities

ISO17025 Accredited Methods

Conventional microbiology

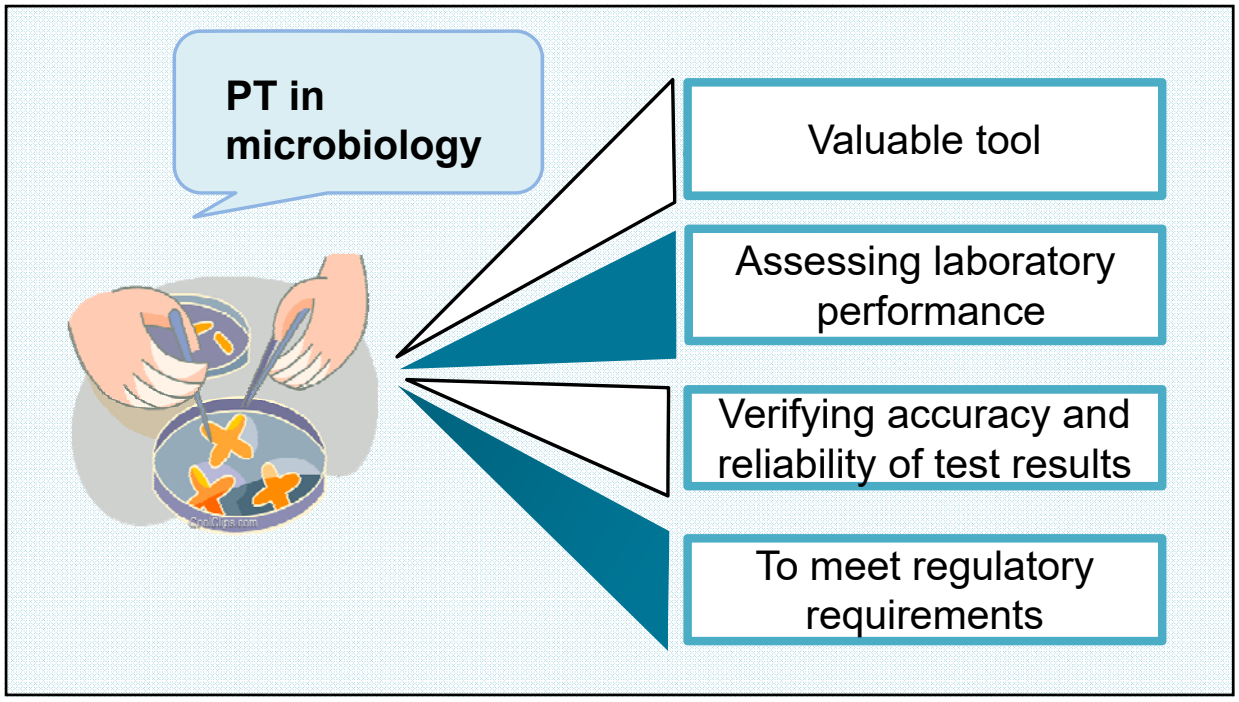
19 for water microbiology

21 for food microbiology

Molecular DNA

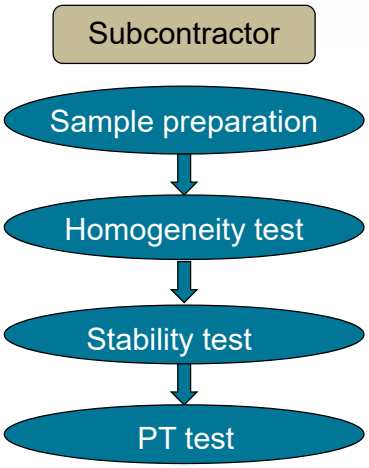
19 for food & water microbiology

- Method development for *Leptospira* spp and algae (*Cynobacteria)* in recreational and marine water
- Identification of bacteria for Ballast Water Management



Role as PT subcontractor

- Two PT schemes
  Detection of *Salmonella* spp and
  Enumeration - Aerobic Plate Count
- Matrix: black pepper, desiccated coconut, powdered milk

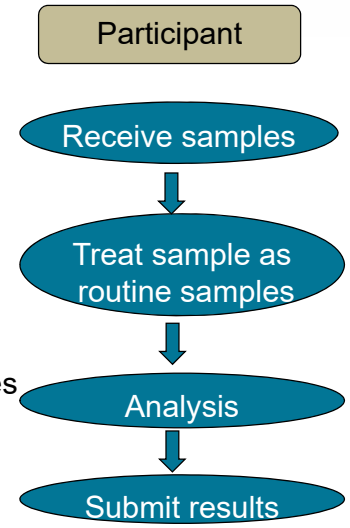


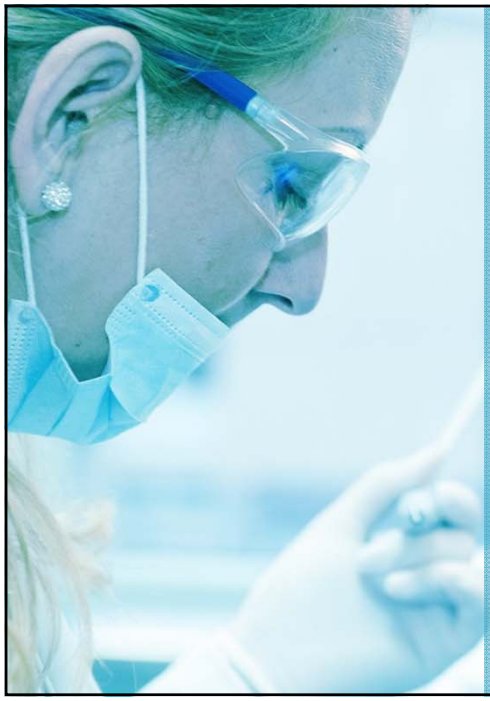
Role as PT Participant

PT provider

- ❑ FAPAS
- ❑ LEAP
- ❑ MICROTEST KIMIA MALAYSIA

  - samples are processed to the best of lab's capabilities
  - staffs trained and involved in routine testing





Bacterial cultures

- ❑ **authentic biological material for high quality research in the form of reference strains, reagents for quality control**
- ❑ **suitable for amplification by PCR**
- ❑ **act as biological control agents**

(Sharma and Shouche, 2014)

Bacterial culture collection

- ❑ 32 reference bacterial strains
- ❑ ATCC and reputable institute
- ❑ Cryobank beads, freeze-dried, glycerol stocks
- ❑ Maintenance: Working and stock cultures
- ❑ Daily cultures
- ❑ Viability and purity
- ❑ Storage: - 80˚C
- ❑ Restricted access

Preservation of bacterial strains

Cryobank beads

Freeze dried

Identification of bacterial strains

Genetic Analyzer

Biolog System

Biolog System

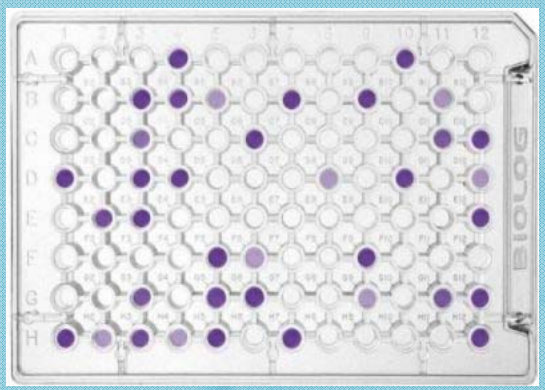
Purification of cells

Turbidity of cells

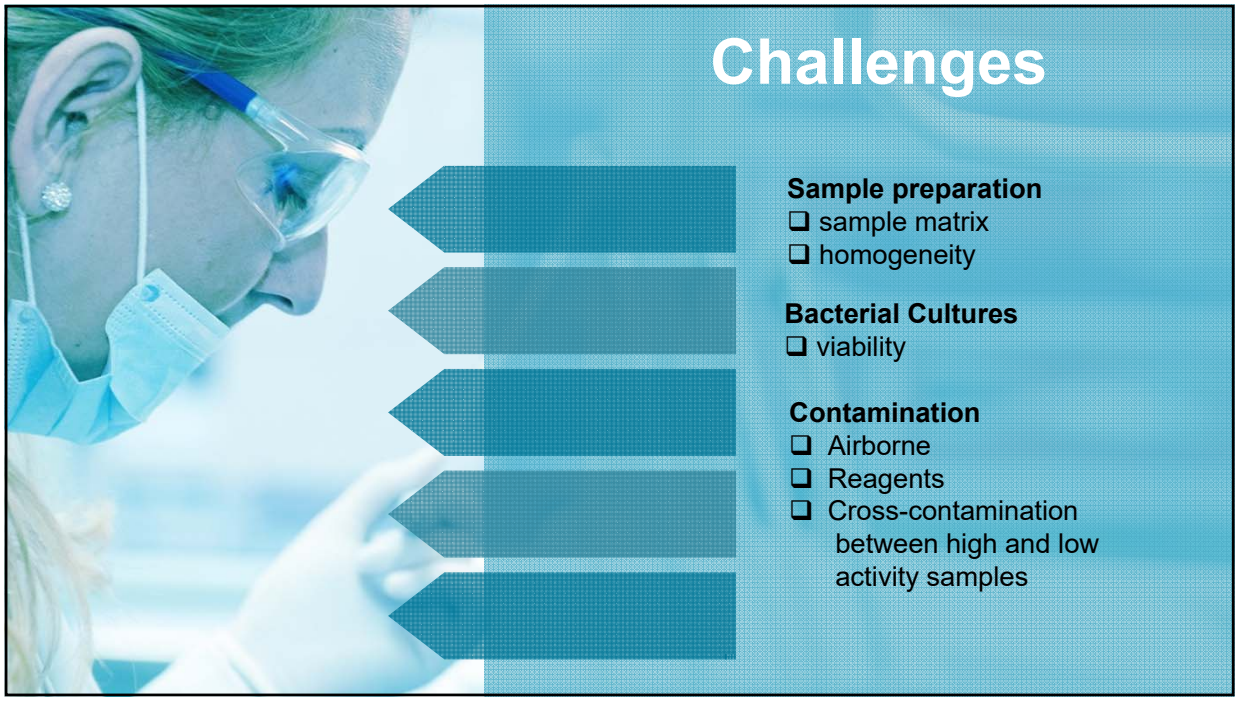
Biolog System

- ❑Transfer 100µl of inoculation fluid into GEN III microplate
- ❑ Set OMNILOG incubator at 33°C
- ❑ Incubate microplates in incubator for 36 hours

Biolog System



- ❑ Results interpreted automatically based on the utilization of chemicals and substrates in the 96 wells
- ❑Tetrazolium salt (purple) is used as an indicator to indicate the positive wells of the reactions
- ❑Bacteria can be identified up to species level.



PT outliers in microbiology

- ❑ sample handling errors
- ❑ inadequate staff training
- ❑ lack of understanding of legislation/ guidelines
- ❑ inadequate methods
- ❑ equipment and culture media failures
- ❑ calculation errors
- ❑ reporting errors

Workflow in microbiology analysis

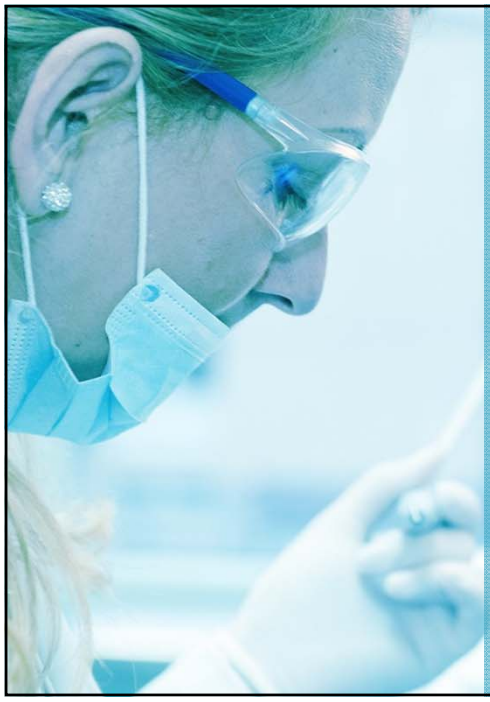






Training





Future directions

- **To develop more precise low colony-forming unit (CFU) materials for presence/absence tests**
- **Development of more trial schemes for both food and water microbiology**

References

- An approach to integrated data assessment in a proficiency test on the enumeration of *Escherichia coli*. Bremser et al., 2010. Journal of Applied Microbiology 110, 128 – 138.
- Homogeneity and stability of samples used for proficiency testing in emuration of coagulase positive staphylococci. Jacek et al., 2012. Bulletin Vet Pulaway 56, 559-562.
- Preparation of reference material for proficiency test for enumeration of coliform in cheese matrix. Brandao *et al*., 2013. Detection; 1, 7-12.
- Microbial Culture Collection (MCC) and International Depositary Authority (IDA) at National Centre for Cell Science, Pune. Indian. Sharma and Shouche, 2014. J Microbiol. 2014 Jun; 54(2):129–133.

Acknowledgement