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Soil-Microorganism Isolation and Purification - Teaching Records

Practical 7 - Biological teaching-data practical

Aim

To interpret soil-isolation, colony-purification and identification records.

Principle

A colony may originate from a viable cell or a group of cells. Colony appearance is not definitive identity, and growth on one medium represents only the organisms recoverable under that method.

Materials and Requirements

• Approved nonpathogenic teaching system or supplied anonymised dataset
• Laboratory risk assessment, controls and raw-data worksheet
• Approved method or teaching-data pack and a dated record sheet

Procedure

1. Define the preparation or dataset, study question and method version. Record identities, units and the criteria to be used before examining the outcome.
2. Use supplied environmental-isolation records or a certified nonpathogenic teaching strain; do not culture unidentified soil organisms in an open classroom exercise.
3. Trace dilution, plating, isolated-colony selection and purity checks in the record pack.
4. Compare colony images, microscopy and approved identity tests and distinguish a purified culture from a confirmed species.
5. Calculate viable-count estimates only from valid countable records and state the recovery conditions.
6. Retain the original observations and calculations. State deviations, missing information and the limits of the conclusion; do not replace measured values with expected results.

Observations and Record

Enter actual measurements or the supplied teaching data. Record the method, material identity, conditions and units.

Preparation / control	Condition / method	Raw observation	Calculated / interpreted result
Negative / vehicle control	Specify	Record	Evaluate
Positive / reference control	Specify	Record	Evaluate
Test replicates	Specify	Record	Calculate

Calculations

• CFU per gram = colony count x reciprocal dilution x suspension-volume factor / plated volume, using consistent units and the original mass basis

Worked Example

Illustrative original suspension represents 0.10 g material/mL. A 0.10 mL plate of a 10^-3 dilution has 40 colonies: original suspension = 400,000 CFU/mL, or 4,000,000 CFU/g.
The result is method-dependent and is not a count of all organisms present.

Result and Interpretation

- Produce an isolation flowchart, count worksheet and evidence-limited identity statement.
- Report biological and technical replication separately and explain control performance.

Precautions

- Use only the approved biological system, containment and decontamination procedure.
- A teaching dataset does not authorise live animal, human-tissue or unknown-organism work.
- Keep original images and observations; avoid selecting only favourable fields or bands.

Viva Questions and Answers

Why is one colony not always one cell?

Aggregates can form a single colony.

Does colony colour prove species?

Additional validated identification is needed.

Why use supplied environmental records?

Unidentified organisms require an appropriate risk assessment and containment.

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