Total and Viable Counts - Calculation Exercise

Experiment 5 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To calculate counts from instructor-supplied counting records.

Principle

A direct count measures counted objects, whereas a viable count estimates colony-forming units under the stated test conditions. Cell clumps and method limits affect interpretation.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Read the count sheet

Record method, dilution, measured volume, raw counts and replicate identifiers supplied by the instructor.

3. Direct count

Use the stated counting volume and dilution to calculate objects per unit volume; explain whether viability is established.

4. Viable count

Use only the supplied count and dilution record. Calculate CFU per unit volume and compare replicates.

5. Compare endpoints

Explain why total count and viable count can differ and avoid treating a CFU as necessarily one individual cell.

6. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

7. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Raw count / counting volume	_____
Dilution factor	_____
Calculated total count	_____
Calculated CFU per mL	_____
Replicate agreement / limitation	_____

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- CFU/mL = count × reciprocal dilution / measured volume in mL.
- Illustration only: a supplied count of 46, dilution factor 1000 and measured volume 0.1 mL gives 460,000 CFU/mL. This is a calculation from supplied results, not an experimental culture instruction.

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. What does CFU mean?

Colony-forming unit, an operational estimate that can originate from one cell or a cluster.

2. Does a direct count establish viability?

Not by itself; the method must include a validated basis for that distinction.

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