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Vitamin and Antibiotic Fermentation Process Records

Practical 15 - Biological teaching-data practical

Aim

To compare supplied vitamin and antibiotic fermentation process records.

Principle

Fermentation-product evaluation connects strain identity, process controls, product formation, downstream recovery and qualified assay. A bioactivity signal is not automatically a chemically specific product concentration.

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 vitamin and antibiotic datasets or certified nonpathogenic demonstration records; do not cultivate antibiotic-producing unknown isolates.
3. Map seed, production, sampling, recovery and purification stages with their recorded controls.
4. Review substrate, biomass, product assay and contamination records for each process.
5. Calculate titre, productivity and recovery; compare a chemically specific assay with bioactivity evidence and define identity requirements.
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

- Recovery (%) = purified measured product / product entering recovery x 100
- Productivity = product concentration / stated process duration

Worked Example

Illustrative harvest contains 200 mg measured product and purified output is 140 mg: recovery = 70%.

A 20 mg/L titre after 40 h gives average productivity 0.50 mg/L/h; this does not identify the product or define its potency.

Result and Interpretation

- Present separate vitamin and antibiotic process maps and a reconciled product-balance worksheet.
- 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 separate titre and recovery?

Production and downstream losses are different stages.

Does an inhibition zone identify an antibiotic?

Further chemical identity and selectivity evidence is needed.

Why retain strain traceability?

It supports process consistency and appropriate risk control.

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