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Establishment and Assessment of Plant Suspension Culture

Practical 6 - Approved plant-culture practical

Aim

To assess establishment and growth of a benign plant-cell suspension culture.

Principle

A plant suspension disperses cells and aggregates in a liquid medium. Mixing, aggregate size, sampling representativeness and oxygen transfer affect apparent biomass and product formation.

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 an approved benign plant culture or supplied records with source identity and contamination checks.
3. Record explant, sterilisation record, medium formulation and authorised environmental programme; do not substitute a universal hormone recipe.
4. Review initiation, contamination, appearance and serial-transfer observations and document losses.
5. Measure fresh and dry biomass by a defined method and assess a relevant marker only with a suitable assay.
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

- Growth index = (final biomass - initial biomass)/initial biomass, using a consistent fresh or dry basis

Worked Example

Illustrative initial dry biomass 0.10 g and final 0.30 g give growth index 2.0, corresponding to a threefold final-to-initial mass ratio.

Suspension-culture record

• Start from an authenticated, suitable callus under the approved protocol and record medium, vessel, fill and mixing conditions.
• Sample representatively and record cell aggregation, viability, packed-cell volume where relevant and dry biomass. Compare biomass with measured marker concentration.
• Illustrative dry biomass increases from 1 to 3 g/L while marker content decreases from 10 to 5 mg/g. Volumetric marker changes from 10 to 15 mg/L; biomass and cell-specific content tell different stories.

Result and Interpretation

• Provide a culture lineage record, contamination assessment and biomass/marker results.
• 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

Is callus an organised organ?

It is a proliferating tissue mass under the defined culture conditions.

Why keep a lineage record?

Transfers and culture history affect reproducibility.

Does biomass prove marker yield?

Marker content must be measured separately.

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