ROHINI COLLEGE OF ENGINEERING & TECHNOLOGY

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(AUTONOMOUS)

Department of Agricultural Engineering

Course Name : **Protected Cultivation**
Course Code : **AI3015**
Regulation : **R2021**
Year/Semester : **III / 06**
Faculty : **Mr. ARUNPANDIAN N (Asst. Professor)**

UNIT - II

PROTECTED CULTIVATION OF VEGETABLE CROPS

PART 3 : NURSERY MANAGEMENT – THE FOUNDATION OF SUCCESS

Mastering Propagation Science

1. Seed Technology & Treatment:

· Seed viability tests: Tetrazolium test (TZ test), germination speed index
· Advanced treatments:
  · Priming: Osmotic priming with PEG 6000 (-1.0 MPa, 7 days)
  · Coating: Polymer coating with micronutrients and bioprotectants
  · Pelletization: For precision sowing of small seeds

2. Media Science – Beyond Basic Mixes:

· Physical properties optimization:
  · Air-filled porosity: 20-30% for optimal root growth
  · Water holding capacity: 40-60% of total volume
  · Particle size distribution: 0.25-2.0 mm ideal range
· Sterilization protocols:
  · Steam sterilization: 70-80°C for 30 minutes
  · Chemical: Basamid (40g/m^3), covered for 7-10 days
  · Solarization: Double layer plastic, 45-60 days summer

3. Microclimate Control in Nursery:

Environmental Parameters by Crop:

Parameter	Tomato	Capsicum	Cucumber	Strawberry
Germination Temp	25-28°C	25-28°C	28-30°C	20-22°C
Growing Temp Day	22-25°C	23-26°C	24-28°C	18-22°C
Growing Temp Night	18-20°C	18-21°C	20-22°C	10-15°C
Light Intensity	15-25 klx	20-30 klx	20-30 klx	10-20 klx
Photoperiod	14-16 hrs	14-16 hrs	12-14 hrs	10-12 hrs
CO_2	600-800 ppm	600-800 ppm	800-1000 ppm	400-600 ppm

4. Hardening – The Transition Protocol:

· Phase 1 (3-4 days): Reduce temperature by 3-5°C
· Phase 2 (2-3 days): Reduce irrigation frequency, allow mild wilt
· Phase 3 (2-3 days): Expose to higher light (20-30% increase)
· Chemical hardening: ABA spray (10-20 ppm) or calcium nitrate (1%)

5. Quality Assessment Parameters:

Seedling Quality Index (SQI) Calculation:

SQI = (Shoot dry weight + Root dry weight) / Plant height × Stem diameter

· Excellent: SQI > 0.5
· Good: SQI 0.3-0.5
· Poor: SQI < 0.3

Critical Measurements at Transplant:

· Root ball integrity: Should hold together when lifted
· Root length density: >5 cm/cm^3
· Stem diameter: >3mm for tomatoes/peppers, >4mm for cucurbits

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