Vimala College (Autonomous), Thrissur

Department of Botany

Standard operating procedure

For

BoD Incubator

Funded by

DBT STAR College Scheme
Department of Biotechnology
Govt. of India

June 2023

Operation:

- Ensure BoD incubator was connected properly to the power supply
- Switch on the incubator by turning on / off switch to on.
- Temperature controller will show set value and process value.
- Adjust required temperature by SET key in temperature controller- press up or down key- when desired temperature is displayed on screen press ENT.
- Keep the samples inside chamber and close the door.
- Ensure the door is closed properly.
- Monitor temperature on display
- Temperature should not vary +-1°C
- If any discrepancies found, immediately inform the lab assistants.

Cleaning :

- Cleaning frequency (once in a week)
- Remove shelves/ tray
- Spray chamber inner surface with ethanol for disinfection
- Insert trays back in the incubator
- Turn on incubator after confirming no smell of disinfectant inside the chamber

Maintenance :

- Always clean the incubator after use.
- Clean temperature sensor probe every 2 months with soft cloth
- Check air circulation fan
- Check working of temperature safety thermostat

Always record usage of incubator in log book

Vimala College (Autonomous), Thrissur

Department of Botany

Standard operating procedure

For

Clevenger apparatus

Funded by

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June 2023

Operation

The Clevenger apparatus is a piece of glassware that extracts essential oils from plant samples by boiling the plant material in water and then condensing the steam:

1. **Heating**

   The sample is heated in a round-bottom flask to vaporize volatile organic compounds.

2. **Condensing**

   The vapor rises into a condenser, where it cools and condenses into a liquid.

3. Separating

   The condensed liquid falls into a burette, where the oil floats on the water. The water is gradually returned to the flask through a diagonal conduit.

4. **Collecting**

   After a few hours, the oil can be measured in the burette.

Maintenance

Maintaining a Clevenger apparatus, which is used for the extraction of essential oils via steam distillation, requires proper care to ensure its longevity and efficiency.

Cleaning after Use

Remove Residues: After each use, dismantle the apparatus carefully and rinse all parts (e.g., the receiver, condenser, and distillation flask) to remove any oil or residue.

Use Appropriate Solvent: If the essential oil is sticky or difficult to remove, use an appropriate solvent like ethanol, acetone, or mild soap solution for cleaning.

Rinse Thoroughly: Ensure to thoroughly rinse the apparatus with distilled water after cleaning with solvents to prevent contamination during the next usage.

Drying

Air Drying: Allow all components to air dry completely before storing. Moisture trapped inside can lead to contamination or damage to the glass parts.

Soft Cloth: Use a soft lint-free cloth to gently wipe parts that need quick drying.

Handling Glassware

Avoid Scratches or Breakage: Handle the glass parts with care to avoid scratches or breakage. The apparatus is made of delicate borosilicate glass, which, if mishandled, can easily crack.

Store Properly: Store the apparatus in a designated space where it won't be bumped or dropped. Use padded storage containers for added protection.

Inspect Regularly

Check for Cracks: Inspect all glass parts regularly for cracks or chips. Damaged parts can lead to leakage or compromised extraction.

Rubber Seals and Connectors: If your Clevenger apparatus has rubber seals or connectors, check these for wear and tear, and replace them when necessary to maintain airtight connections.

Calibrate for Precision

Check Measurements: Ensure that the graduations on the essential oil receiver are legible and correct. If any fading or damage to these markings occurs, recalibrate or replace the component to ensure accurate measurements during extractions.

Vimala College (Autonomous),

Thrissur

Department of Botany

Standard operating procedure

For

Seed Germinator

Funded by

DBT STAR College Scheme
Department of Biotechnology
Govt. of India

June 2023

Purpose:

To ensure proper and consistent use of the seed germinator for optimal seed germination conditions.

1. Equipment Details:

- **Name of Equipment:** Plant Seed Germinator
- **Function:** To provide controlled temperature, humidity, and light conditions for seed germination.
- **Components:**
    - Temperature Controller
    - Humidity Controller
    - Lighting System
    - Air Circulation Fans
    - Water Reservoir (if equipped)
    - Trays for Seed Placement

2. Operation Procedure:

2.1. Pre-operation Check:

1. **Inspect the Equipment:**
    - Ensure the unit is clean and free of debris.
    - Check for any visible damage or malfunctions.
    - Verify that all connections (electricity, water, etc.) are securely attached.
2. **Verify Parameters:**
    - Ensure the appropriate temperature, humidity, and light settings for the specific seeds being germinated.
    - Common settings:
        - **Temperature:** 20°C to 30°C (adjust based on seed type).
        - **Humidity:** 60% to 90%.
        - **Light Cycle:** 8-12 hours of light per day (if required by the seeds).

2.2. Loading the Germinator:

1. **Prepare Seeds:**
    - Pre-treat the seeds if required (soaking, scarification, etc.).
    - Place seeds in clean germination trays with appropriate growing medium (paper towels, soil, or other mediums).
2. **Position Trays in the Germinator:**
    - Insert the trays in the appropriate slots within the chamber.
    - Ensure even spacing to allow proper airflow and consistent temperature/humidity distribution.

2.3. Set Operational Parameters:

1. **Set the Temperature:**

    - Use the temperature control panel to set the desired temperature.
2. **Set the Humidity:**
    - Adjust the humidity settings to the required level using the control panel.
    - Fill the water reservoir if the unit has an automatic humidifier.
3. **Set the Light Cycle:**
    - Program the timer for light exposure as per the seeds' requirements.
4. **Turn On the Fans:**
    - Ensure air circulation fans are running to distribute air evenly inside the chamber.

2.4. Monitoring During Operation:

1. **Daily Checks:**
    - Check the temperature, humidity, and light settings daily to ensure they are within the desired range.
    - Monitor the water reservoir level if the unit has a humidification system.
2. **Inspect Seeds:**
    - Periodically check the germination progress to detect any potential issues (e.g., mold, seed rot, or dryness).

2.5. Post-operation:

1. **Switch Off the Germinator:**
    - After the germination period is complete, turn off the unit and remove trays carefully.
2. **Clean the Unit:**
    - Clean the interior chamber with a mild disinfectant to prevent mold and fungal growth.
    - Wipe down trays and other removable parts, then allow them to dry thoroughly before storage.

3. Maintenance Procedure:

3.1. Regular Maintenance:

1. **Weekly Cleaning:**
    - Wipe the interior and trays weekly using a non-abrasive cloth and mild disinfectant.
2. **Water Reservoir (if applicable):**
    - Clean and refill the water reservoir to prevent algae and mineral buildup.
3. **Air Filter Check (if applicable):**
    - Clean or replace the air filters monthly to ensure proper air circulation.

3.2. Calibration and Testing:

1. **Temperature Calibration:**
    - Regularly test the accuracy of the temperature controller and calibrate as necessary.
2. **Humidity Calibration:**
    - Check humidity sensors for proper functionality and recalibrate as required.

3.3. Troubleshooting:

1. **Temperature or Humidity Fluctuations:**
    - Inspect for faulty sensors or malfunctioning fans if there are temperature or humidity inconsistencies.
2. **Lighting Issues:**
    - Check for burnt-out bulbs or malfunctioning timers if the lighting system fails.
3. **Power Supply Check:**
    - Ensure the germinator is plugged into a stable power source to avoid interruptions.

4. Safety Precautions:

- **Electrical Safety:**
    - Always handle the equipment with dry hands.
    - Ensure that all electrical components are grounded properly.
- **Overheating:**
    - Never block the ventilation system, as it may lead to overheating.
- **Handling Seeds and Trays:**
    - Use gloves when handling seeds, especially if they are treated with chemicals.

5. Records and Documentation:

- Maintain a **Log Book** documenting the date, seed type, temperature, humidity, light settings, and any issues or maintenance performed.