PLANT TISSUE CULTURE AND BIOPROCESSING RESEARCH LAB

STANDARD OPERATING PROCEDURE

Name of the Lab./facility	**Plant Tissue Culture And Bioprocessing Research Lab** (DBT, Govt of India Funded)
Purpose	To conduct research in the area of plant biotechnology and bioprocess engineering through enhancing the secondary metabolite production using plant tissue culture and bioreactor.
Scope	Biotechnology has been globally accepted as one of the important tools for direct application in agriculture. It has a strong and positive influence on the agricultural sector worldwide. Agricultural biotechnology includes plant tissue culture, applied microbiology, and applied molecular biology contributing to the production of crops with improved food, feed, fiber and fuel. The technique of PTC is well translated from 'concept' to 'commercialization'. The chemical compounds produced by plants are collectively referred to as phytochemicals. Biotechnologists have special interest in plant tissue culture in association with bioreactors used for the large scale production of commercially important compounds. These include pharmaceuticals, flavours, fragrances, cosmetics, food additives, feed stocks and antimicrobials.
Responsibility	Faculty i/c of the facility, HOD/Biotechnology

STANDARD OPERATING PROCEDURE FOR WEIGING BALANCE

- Switch ON the Power button
- Keep the butter sheet or aluminum foil, Press TARE to equivalence the weight
- Add the chemicals on to the butter sheet and weigh it accurately
- Wear clean cotton gloves (supplied with reference weights) or use forceps while handling reference weights. To avoid depositing oil and dirt onto the surface of the weight, do not touch weights with bare hands.
- Store reference weights in cases provided by the manufacturer.
- For optimal performance, place balance on a stable, even, horizontal surface with minimal vibration. Avoid areas with excessive heat and moisture, direct sunlight, aggressive chemical vapors, and drafts.
- If a balance is transferred to a different location, perform the accuracy check prior to use in the new location.
- Switch OFF the power button

PRECAUTIONS TO BE FOLLOWED

- Short circuit of the battery terminals or any source terminals has to be avoided.
- Avoid spilling of chemicals
- Clean the spilled chemicals/powders immediately to avoid deposition.
- Avoid over weighing, above the limit
- As it is air sensitive, handle with care
- Perform annual calibration of weigh balances at approximately the same time each year

RECORD TO BE MAINTAINED

- Laboratory Manual containing the experiments that can be performed with the equipment

- Maintenance Record

HOD

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STANDARD OPERATING PROCEDURE FOR UV VISIBLE SPECTROPHOTOMETRE

- Check inside the UV-Vis chamber to assure that the appropriate sample holder (*i.e.*, the liquid or solid sample holder) is in place. If it is not switch it out, the correct sample holder will be in the cabinet above the equipment.

- Turn the UV-Vis on by pressing the button in the front of the unit. The unit is not operational until the blinking light on the button goes to a solid green color.

- Change the Wavelength range settings, if applicable.

- Select Zero/baseline correction

- Press OK. A pop up will come up that will tell you that the baseline is not valid, click OK.

- Once zero is finished take out the blank sample and put in your sample.

- If you are running multiple samples change your sample, change the sample name on the pop up box,

- Turn the UV-Vis ***OFF*** by pressing the button.

PRECAUTIONS TO BE FOLLOWED

- Short circuit of the battery terminals or any source terminals has to be avoided.
- Avoid spilling of chemicals
- Clean the spilled chemicals/powders immediately to avoid deposition.
- Clean the Cuvette with soft tissue paper
- Dry the Cuvettes properly and avoid scratches.

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STANDARD OPERATING PROCEDURE FOR HOT PLATE

- Plug in power cable and switch on the Hot Plate
- Keep the Glassware on the hot plate and set the temperature using knob
- Red light glow indicates the Hot plate is ON
- Once the appropriate time is over, turn the knob to zero
- Switch off the power switch, after use.

PRECAUTIONS TO BE FOLLOWED

- Short circuit of the battery terminals or any source terminals has to be avoided.
- Avoid spilling of chemicals
- Clean the spilled chemicals/powders after the usage to avoid deposition.
- As the plate is hot avoid touching with bare hands
- Always wear gloves and lab coats.

RECORD TO BE MAINTAINED

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Responsibility	Faculty i/c of the facility, HOD/Biotechnology

STANDARD OPERATING PROCEDURE FOR HOT AIR OVEN

- Plug in power cable and switch on the Hot air oven
- Keep the Glassware inside the hot air oven
- Set the desired temperature to be maintained
- After the use, set the temperature to Zero
- Switch off the power switch

PRECAUTIONS TO BE FOLLOWED

- Short circuit of the battery terminals or any source terminals has to be avoided.
- Avoid over spilling of water
- Don’t keep papers inside to dry
- Don’t keep cotton or cotton plugs
- Don’t keep plastic plates or containers
- Use only glass materials/wares to dry

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Responsibility	Faculty i/c of the facility, HOD/Biotechnology

STANDARD OPERATING PROCEDURE FOR SHAKER

- Plug in power cable and switch on the shaker
- Keep the Glassware inside the space provided and assure that it is tightly locked with the metal string
- Keep the appropriate size of conical flasks to avoid damage to the instrument
- Set the desired revolution using the knob
- Switch off the power switch after use

PRECAUTIONS TO BE FOLLOWED

- Short circuit of the battery terminals or any source terminals has to be avoided.
- Avoid over spilling of solutions
- Avoid repulsion of containers, use appropriate size glass ware to fit the socket.

RECORD TO BE MAINTAINED

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Responsibility	Faculty i/c of the facility, HOD/Biotechnology

STANDARD OPERATING PROCEDURE FOR FERMENTOR

- Inspect the fermentor to see if it is clean. If not, clean the vessel with warm soapy water. Then, rinse with tap water followed by a distilled-water rinse. If necessary, clean the underside of the head plate, impeller shaft, and paddles.
- Prepare Calibrating liquids.
- Assemble the Culture vessel
- Connect the ports and calibrate the pumps.
- Place tubing and air filters.
- Preparation of the culture vessel for sterilisation autoclaving
- Filling the water jacket.
- After the medium has cooled to the desired fermentation temperature, sparge the fermentor with either sterile air or oxygen, as required, to saturate the medium with oxygen.
- Fermentor Inoculation: Depending on the inoculum volume (~50-1,000 mL), the inoculum can be added to the fermentor using a large sterile syringe and a sterile large-bore needle.
- Check foam control and connect peristaltic pumps
- Sampling the fermentor.

PRECAUTIONS TO BE FOLLOWED

- Make sure that the wall outlet receptacle is properly wired and grounded, and matches the instrument’s power cord and plug.
- Do not touch the power cord or plug if hands or feet are wet, or if standing on a wet/damp surface, as severe electrical shock or death may result.
- Use extreme caution when handling or moving the parts during fermentor

assembly/disassembly. If available, wear shoes with steel caps when using the fermentor.

- Use extreme caution and good sterile techniques when working with these organisms.
- After use, autoclave the fermentor to kill any remaining microbes.

RECORD TO BE MAINTAINED

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Responsibility	Faculty i/c of the facility, HOD/Biotechnology

STANDARD OPERATING PROCEDURE FOR LYOPHILIZER

- Position equipment in a suitable well ventilated dry location, where it will not be moved or knocked during operation.
- Keep the Glassware inside the space provided and assure that it is tightly locked with the metal string
- The ice condenser chamber must be clean and dry before commencing.
- Ensure the media drain valve is CLOSED, before starting the pump.
- Turn on the mains switch on the unit – unit performs a self-test and initialization.
- Set values for freezing drying and the timer can be changed in the Main Menu option selected with the right Function key, and up and down arrow keys while in "Standby" mode.
- Switch on the vacuum pump to warm up the pump – ice condenser cools and vacuum pump is activated.
- At the end of drying switch the vacuum pump off and aerate the drying chamber via the media drain valve or rubber valve. Remove the Drum Manifold, remove samples. Place the unit in standby mode
- Switch off the power switch after use

PRECAUTIONS TO BE FOLLOWED

- Inadequate circulating airflow around the equipment during operation leads to overheating.
- Damage to power cord will compromise the safety of the unit.
- The chamber must not be covered drying defrosting to prevent overheating.

RECORD TO BE MAINTAINED

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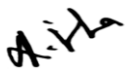

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Responsibility	Faculty i/c of the facility, HOD/Biotechnology

STANDARD OPERATING PROCEDURE FOR TISSUE CULTURE RACK

- The culture bottles or jars are kept in trays and incubated on storage racks each frame fitted with four daylight fluorescent tubes to provide light intensity of 1200 lux/m2.
- An automatic time control switch is installed to maintain desired photoperiods in growth room, which will vary with different plant species. Also dark room facilities will be required for certain species.
- The storage racks will be of either fixed type or movable type and the latter one are space shaving.
- The temperature of growth room will be measured with the help of temperature sensors connected to thermostatic control and the temperature maintained in growth rooms will be continuously monitored with the help of data loggers.
- The temperature of incubation will very between temperate and tropical plant species, which will be set with the help of thermostatic control.
- The growth rooms will be maintained at a minimum sterility level of class 100,000 and with positive pressure to prevent microbial contamination.
- The production supervisor will make observation on growth of cultures and contaminations at weekly intervals and the particulars will be recorded in a growth room register indicating accession number of clone/genotype, plant species/variety, multiplication cycle number, medium type, date of inoculation, tray number and date of observation and observation made.
- The contaminated cultures, if any, will be immediately removed for autoclaving after making entry in the register.

PRECAUTIONS TO BE FOLLOWED

- Necessary precautions should be taken to avoid the entrance of contaminants into the laboratory.
- Always keep away the hands moistened with alcohol from the spirit lamp. So dry the alcohol first.
- Work carefully and try to ensure that media and plant tissues are exposed for the plant material.
- Do not dip hot instruments in alcohol and don't use hot instrument for cutting or holding the plant material.

RECORD TO BE MAINTAINED

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HOD

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STANDARD OPERATING PROCEDURE

Name of the Lab./facility	**Plant Tissue Culture And Bioprocessing Research Lab** (DBT, Govt of India Funded)
Purpose	To describe the procedure for the operation and maintenance of the Laminar Airflow
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the Laminar Airflow in plant tissue culture and bioprocessing Research lab, Vinayaka missions' Research foundation.
Responsibility	Faculty i/c of the facility, HoD / Biotechnology

STANDARD OPERATING PROCEDURE FOR LAMINAR AIRFLOW

- Switch "ON" the mains
- Switch "OFF" U.V light
- Switch "ON" laminar air flow and light
- Check and ensure manometer reading "0" mm of water gauge before switching "ON". Check and ensure the manometer reading between 10 to 15 mm water gauge after switching "ON" the LAF and keep the record of reading
- In case the manometer reading is found out of limit, inform maintenance department for corrective action
- Clean the LAF bench with 70% IPA before use and after completion of work

PRECAUTIONS TO BE FOLLOWED

- Validate the LAF twice a year by the third party for DOP test/smoke Test for air velocity and for nonviable particle count
- Maintain U.V light burning record

HOD