DEPARTMENT OF BIOTECHNOLOGY

DOWNSTREAM PROCESSING ENGINEERING LAB

(17BTCC92)

STANDARD OPERATIONG PROCEDURE

DEPARTMENT BIOTECHNOLOGY

STANDARD OPERATING PROCEDURE

Digital Incubator

Name of the Lab./facility	Down Stream Processing Engineering Lab
Purpose	To describe the procedure for the operation and maintenance of the Digital Incubator
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the Digital Incubator in the Down Stream Processing Engineering laboratory, Vinayaka Mission's Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HoD/Biotechnology, Lab technicians

STANDARD OPERATING PROCEDURE FOR DIGITAL INCUBATOR

- Ensure that the incubator is properly connected to the power supply and Switch on the main
- Turn on the red colour power knob towards 0-1.
- To set the incubator at 22°C , set the lower temperature 21°C by pressing the 'SET POINT -1' and simultaneously adjust the temperature with the help of screw of SET and RST by screw driver.
- Set the incubator temperature to 22°C. Wait till the set temperature is reached.
- Take a calibrated thermometer and dip it in a 500 ml beaker filled to 3/4 of the volume with Glycerol AR grade.
- Keep the beaker inside, at the center of the incubator. Close the incubator door. Allow the temperature to equilibrate for 30 minutes.
- By following the same procedure as above carry out calibration by setting the incubator temperature to 37°C, 44°C and 55°C
- Record any discrepancy observed during operation or during temperature monitoring to Quality Control Executive and notify the defect to technical assistant for rectification. Affix "BREAK DOWN" label on the instrument

PRECAUTIONS TO BE FOLLOWED

- Ensure that the power supply to the incubator is switched 'OFF'.
- Dedust the incubator daily externally with a clean dry cloth.

- Once a week remove adhered dust by wet mopping using detergent solution. Afterwards wipe the surface with a clean dry cloth to remove traces of detergent.
- Once in a month clean the interior surfaces with 2.5 % savlon solution using a clean cloth

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DEPARTMENT BIOTECHNOLOGY

STANDARD OPERATING PROCEDURE

HOT AIR OVEN

Name of the Lab./facility	Down Stream Processing Engineering Lab
Purpose	To describe the procedure for the operation and maintenance of the Hot Air Oven
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the Hot Air Oven in the Microbiology & Down Stream Processing Engineering Laboratory, Vinayaka missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HoD/Biotechnology, Lab technicians

STANDARD OPERATING PROCEDURE FOR HOT AIR OVEN

- Ensure the cleanliness of the instrument
- Open the ventilation knob provided on top of the oven
- Switch "ON" the power supply
- Electronic temperature controller displays the chamber temperature
- Set the required temperature by pushing the "PUSH" switch and first potentiometer knob clockwise or anticlockwise until the temperature comes to set one
- Set the temperature with the help of second potentiometer knob
- Release the "PUSH" switch
- Indicator Bulb glows indicates that the power to the heater is "ON"
- Use rotary switch for precise control of temperature

PRECAUTIONS TO BE FOLLOWED

- Wipe the surface, walls, top, bottom and trays of the oven with dry lint free cloth on the daily basis so that there will be no dust particles in the oven
- Wipe all the parts and the outer surface of the oven with the wet lint free cloth soaked in purified water, on weekly basis

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DEPARTMENT BIOTECHNOLOGY

STANDARD OPERATING PROCEDURE

High Performance Liquid Chromatography - (HPLC)

Name of the Lab./facility	Down Stream Processing Engineering Lab
Purpose	To describe the procedure for the operation and maintenance of the High Performance Liquid Chromatography - HPLC
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the High Performance Liquid Chromatography - HPLC in the Microbiology & Down Stream Processing Engineering laboratory, Vinayaka missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HoD/Biotechnology, Lab technicians

STANDARD OPERATING PROCEDURE FOR HIGH PERFORMANCE LIQUID CHROMATOGRAPHY - HPLC

- Ensure that the instrument has been connected to power supply
- Ensure that the all communication cords between the units are connected properly
- Prepare the mobile phase as mentioned in the standard test procedure of specific product. Fill it in the reservoir bottle. Suspend the inlet tube into the reservoir bottle and ensure that the filter is below the level of the mobile phase
- Ensure that appropriate solvent mixture is pumped for seal wash
- Ensure that the outlet tube from the detector is dipped into a waste bottle
- Connect the column specified in the individual test procedure in column oven compartment in the flow direction marked on the column
- Switch on the instrument (including injector, pump, Thermostat, Column and UV lamp) by clicking the "ON" button on the extreme left middle corner of the screen and screen will be change red to green
- Open the purge valve of the instrument and purge the corresponding solvent line(s) in which mobile phase have been placed by setting the flow rate of the pump
- Ensure that no air bubbles are noticed in the solvent line

PRECAUTIONS TO BE FOLLOWED

- After completion of the analysis, wash the column with water and storage solvent and keep it

back in the relevant place

- Open the panel window. The display shows control menu. Switch off the UV lamp
- Close the panel and browser window

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STANDARD OPERATING PROCEDURE

Laminar Airflow horizontal

Name of the Lab./facility	Down Stream Processing Engineering Lab
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 the Microbiology & Down Stream Processing Engineering laboratory, Vinayaka missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HoD/Biotechnology, Lab Technicians

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

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STANDARD OPERATING PROCEDURE

UV-Vis Spectrophotometer

Name of the Lab./facility	Down Stream Processing Engineering Lab
Purpose	To describe the procedure for the operation and maintenance of the UV-Vis Spectrophotometer
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the UV-Vis Spectrophotometer in the Microbiology & Down Stream Processing Engineering laboratory, Vinayaka missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HoD/Biotechnology Lab technicians

STANDARD OPERATING PROCEDURE FOR UV-VIS SPECTROPHOTOMETER

- 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
- To take a background, fill 2 cuvettes with the same solution, place them in the reference slot (R) and sample slot (S), and click on Baseline - The program will ask for range of wavelength. Type in 700 to 200nm, then click ok
- Replace the cuvette in the sample slot with your actual sample. Be sure that the cuvette is 2/3 full.
- Click Start
- After the scan is done, select where to save the data
- To view data points, click on the icon that looks like a paper with writing on it. (to the right of the icon with an M in a circle)
- To organize data, copy and paste data onto your own excel sheet
- To save a single scan, go to file>save as

PRECAUTIONS TO BE FOLLOWED

- Click Disconnect
- Flip switch on UV-VIS off
- Always turn the system off when you do not plan to use it soon to conserve the lamp life

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STANDARD OPERATING PROCEDURE

Water bath Incubator Shaker

Name of the Lab./facility	Microbiology & Down Stream Processing Engineering Lab
Purpose	To describe the procedure for the operation and maintenance of the Water bath Incubator Shaker
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the Water bath Incubator Shaker in the Microbiology & Down Stream Processing Engineering laboratory, Vinayaka missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HoD/Biotechnology Lab technicians

STANDARD OPERATING PROCEDURE FOR WATER BATH INCUBATOR SHAKER

- Fill and check the water level, if required fill purified water to the acceptance level. The minimum water level is indicated by a black line on the water level indicator on left
- Switch "ON" the ring both by pressing "ON/OFF" switch
-
- The digital temperature controller cum indicator will indicate the actual temperature of water
- Set the desired temperature by pressing the PRESS to SET switch and adjusting the SET pot Approximately 1°C before the set temperature, the heater will start going on and off Heater action is indicated by the LED on the DTC. Allow a few minute for the temperature to stabilize

PRECAUTIONS TO BE FOLLOWED

- Do not operate without water
- Switch OFF when the instrument is not in use
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STANDARD OPERATING PROCEDURE

MAGNETIC STIRRER

Name of the Lab./facility	Downstream processing lab
Purpose	To describe the procedure for the operation and maintenance of the Magnetic Stirrer
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the Magnetic Stirrer in the Downstream processing engineering laboratory, Vinayaka missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HOD/Biotechnology Lab technicians

STANDARD OPERATING PROCEDURE FOR MAGNETIC STIRRER

- Place the magnetic stirrer on a stable well-levelled surface.
- Place the stir bar at the bottom of a glass container.
- Fill the glass container with the liquid to be stirred.
- Plug the mains cable into a suitably earthed socket.
- Check that the speed control knob is completely turned anticlockwise.
- Place the glass container on the centre of the magnetic stirrer.
- Press the On/Off switch to turn the magnetic stirrer On. The switch will light green.
- Adjust the speed control knob to a low stirring rate.
- Continue to adjust the speed control knob until the desired stirring speed is achieved.
- Wait until the liquid is properly mixed.
- Completely turn the speed control knob anticlockwise.
- Press the On/Off switch to turn the magnetic stirrer Off
- Manipulate another stir bar from the outside of the glass container to remove the immersed stir bar

PRECAUTIONS TO BE FOLLOWED

- Thoroughly wash the stir bar with distilled water after each application.
- Store stir bars in pairs to maintain their magnetic strength and increase their life span.

RECORD TO BE MAINTAINED

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

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DEPARTMENT BIOTECHNOLOGY

STANDARD OPERATING PROCEDURE

COOLING CENTRIFUGE

Name of the Lab./facility	Downstream processing lab
Purpose	To describe the procedure for the operation and maintenance of the cooling centrifuge
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the cooling centrifuge in Downstream processing lab, Vinayaka missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HOD/Biotechnology Lab technicians

STANDARD OPERATING PROCEDURE FOR COOLING CENTRIFUGE

- Open the upper lid by releasing the lock and lifting it up.
- Place the centrifuge tubes in the compartment provided for it.
- Switch on the main button.
- Set the desired time can be selected by pressing "SET TIME" by push button having range 0-60 minutes.
- Set the desired temperature can be set by adjusting knob.
- Increase the RPM of the centrifuge with the help of the adjustment knob.
- Gradually increase the rpm. Maximum 15000 rpm can be selected.
- When the desired rpm attained, now selected the time for centrifugation with the help of set time push button.
- After completion of the centrifugation time, a buzzer will beep, which indicates the completion of the cycle.
- After the beep, the motor will automatically off and rpm will come down to 0.
- Switch off the mains and remove the samples from the centrifuge.
- Clean the in wall of the centrifuge with dry lint free cloth.

PRECAUTIONS TO BE FOLLOWED

- Proper handling of the instrument.
- Ensure level and stability.

- Balance centrifuge tubes equally.
- Ensure use of rubber cushions for glass tubes.
- Bring speed knob to off and increase speed gradually.
- Do not open the lid in between the centrifugation cycle.

RECORD TO BE MAINTAINED

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

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DEPARTMENT BIOTECHNOLOGY

STANDARD OPERATING PROCEDURE

CENTRIFUGE

Name of the Lab./facility	Downstream processing lab
Purpose	To describe the procedure for the operation and maintenance of the Centrifuge
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the Centrifuge in the Downstream processing lab, Vinayaka missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HOD/Biotechnology Lab technicians

STANDARD OPERATING PROCEDURE FOR CENTRIFUGE

- Press the start/stop button and slowly increase the rpm to the desired speed using the dial
- Once a run is complete, make sure the rotor has COMPLETELY STOPPED before opening the centrifuge lid by depressing the red stop/start button.
- Remove sample vials.
- Remember to return the rpm dial back to zero after finishing.

PRECAUTIONS TO BE FOLLOWED

- Proper handling of the instrument
- Ensure level and stability
- Balance centrifuge tubes equally
- Ensure use of rubber cushion for glass tubes
- Bring speed Knob to off and increase the speed gradually.
- Do not open the lid in between the centrifugation cycle

RECORD TO BE MAINTAINED

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

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DEPARTMENT BIOTECHNOLOGY

STANDARD OPERATING PROCEDURE

ELECTRONIC WEIGH BALANCE

Name of the Lab./facility	Downstream processing lab
Purpose	To describe the procedure for the operation and maintenance of the Electronic Weigh balance
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the weigh balance in the Downstream processing lab , Vinayaka missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HOD/Biotechnology Lab technicians

STANDARD OPERATING PROCEDURE FOR ELECTRONIC WEIGH 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

DEPARTMENT BIOTECHNOLOGY

STANDARD OPERATING PROCEDURE

HEATING MANTLE

Name of the Lab./facility	Downstream processing lab
Purpose	To describe the procedure for the operation and maintenance of the Heating mantle
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the heating mantle in the Downstream processing lab, Vinayaka Missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HOD/Biotechnology Lab technicians

STANDARD OPERATING PROCEDURE FOR HEATING MANTLE

- Switch ON the Power button
- Set up flask and condenser as required.
- Connect hose to tap and turn on to give a gentle flow of water
- Switch on heating mantle and set to required temperature setting. Monitor temperature. Do not use a mercury thermometer.
- Place HOT warning sign near the heating mantle.
- Monitor system during heating procedure.
- When procedure complete, carefully remove glassware, using heat proof gloves.

Switch off heating mantle and leave HOT warning sign in place until everything is cool.

PRECAUTIONS TO BE FOLLOWED

- Know where the nearest firefighting equipment
- Know the emergency phone number 33#
- Refer to the SDS for any chemicals being used
- Place a HOT warning sign at the heating mantle
- Read and understand the procedure
- Check that the equipment is electrically compliant

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STANDARD OPERATING PROCEDURE

HOT PLATE

Name of the Lab./facility	Downstream processing lab
Purpose	To describe the procedure for the operation and maintenance of the HOT PLATE
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the heating mantle in the Downstream processing lab, Vinayaka Missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HOD/Biotechnology Lab technicians

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

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

HOD

STANDARD OPERATING PROCEDURE

TOP PAN BALANCE

Name of the Lab./facility	Downstream processing lab
Purpose	To describe the procedure for the operation and maintenance of the TOP PAN balance
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the weigh balance in the Downstream processing lab , Vinayaka missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HOD/Biotechnology,Lab Technicians

STANDARD OPERATING PROCEDURE FOR TOP PAN BALALNCE

- 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

SPEICIFIC

Frequency

Switch off/on the instrument mains. Open the sliding doors fo the balance and remove the pan inside the balance. Remove the dust or powder with a help of soft brush.

Soak the tissue paper in isopropyl alchol and clean the balance to remove the oil substance or any spot inside..Finally clean it with tissue and dry in air

Check air bubble is in the centre of the circle

Do sprit level check, pan clean and adjustment , zero error check and calibrate properly before 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 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

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DEPARTMENT BIOTECHNOLOGY

STANDARD OPERATING PROCEDURE

SONICATOR

Name of the Lab./facility	Downstream processing lab
Purpose	To describe the procedure for the operation and maintenance of the Sonicator
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the SONICATOR in the Downstream processing lab , Vinayaka missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HOD/Biotechnology Lab technicians

STANDARD OPERATING PROCEDURE FOR SONICATOR

The sonicator makes use of high-energy sound waves to cause lysis of cell cultures as well as homogenization of other solutions.

1.Close all doors that provide access to the room housing the sonicator.

2) Use Ear protection, found in labeled drawer, in addition to standard PPE.

3) Ensure that anyone in the sonicator room has ear protection, if not, ask them to get some or to leave the room.

4) To change the tip, use the special wrenches provided in the sonicator draw.

Ensure that the new tip is securely fastened to the sonicator head. Never operate the sonicator without a tip or cap - THERE SHOULD NEVER BE VISIBLE SCREW THREADS AT THE TIP

5) Place sonicator into solution. It is highly suggested that the solution be kept on ice during sonication to keep temperature low and prevent spashing.

6) Run sonication according to personal experimental protocols; then shut off instrument

7) Wipe any solution from sonicator tip and dispose of towels as chemical nature demands.

8) Wipe sonicator tip with towels dampened with clean water, followed by towels dampened by 20% EtOH. 9) Return ear protection to proper place, and reopen doors to the room.

The Primary Hazard risk is damage to the ears caused by exposure to high-frequency sound waves. Additionally, the sonicator can cause local heating of the solution, which could result in a

sudden splashing of the sonicated solution

PRECAUTIONS TO BE FOLLOWED

- Dispose of Waste CHEMICAL WASTE TO BE DISPOSED OF BY USER OUTSIDE OF FACILITY Gloves and towels free from exposure to Hazardous chemicals may be disposed of in provided trash cans.
- Personal Protective Equipment (PPE) Use of the Sonicator requires use of ear protection in addition to standard PPE. Hand protection: none required unless by the demands of a users personal experiment. Eye protection Standard Goggles. Skin and body protection Lab coat, long pants, closed-toed shoes. Hygiene measures Avoid touching instrument surfaces with gloved hands. Wipe instruments with 20% EtOH - dampened towel following use

RECORD TO BE MAINTAINED

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

HOD

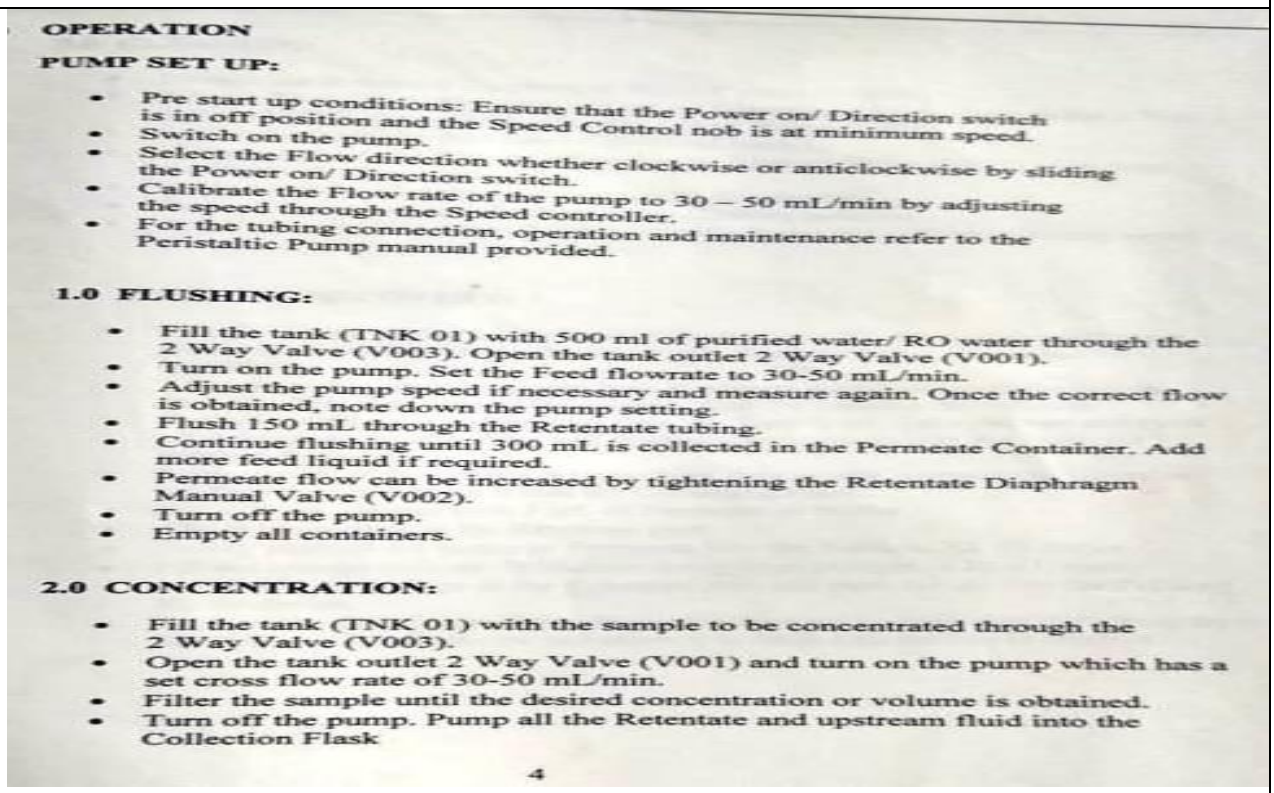
DEPARTMENT BIOTECHNOLOGY

STANDARD OPERATING PROCEDURE

ULTRAFILTRATION UNIT

Name of the Lab./facility	Downstream processing lab
Purpose	To describe the procedure for the operation and maintenance of the ULTRAFILTRATION UNIT
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the ULTRAFILTRAION UNIT in the Downstream processing lab , Vinayaka missions' Research foundation to carry out research works and experimental purpose.
Responsibility	Faculty i/c of the facility, HOD/Biotechnology Lab technicians

STANDARD OPERATING PROCEDURE FOR ULTRAFILTRAION UNIT



OPERATION

PUMP SET UP:

- Pre start up conditions: Ensure that the Power on/ Direction switch is in off position and the Speed Control nob is at minimum speed.
- Switch on the pump.
- Select the Flow direction whether clockwise or anticlockwise by sliding the Power on/ Direction switch.
- Calibrate the Flow rate of the pump to 30 – 50 mL/min by adjusting the speed through the Speed controller.
- For the tubing connection, operation and maintenance refer to the Peristaltic Pump manual provided.

1.0 FLUSHING:

- Fill the tank (TNK 01) with 500 ml of purified water/ RO water through the 2 Way Valve (V003). Open the tank outlet 2 Way Valve (V001).
- Turn on the pump. Set the Feed flowrate to 30-50 mL/min.
- Adjust the pump speed if necessary and measure again. Once the correct flow is obtained, note down the pump setting.
- Flush 150 mL through the Retentate tubing.
- Continue flushing until 300 mL is collected in the Permeate Container. Add more feed liquid if required.
- Permeate flow can be increased by tightening the Retentate Diaphragm Manual Valve (V002).
- Turn off the pump.
- Empty all containers.

2.0 CONCENTRATION:

- Fill the tank (TNK 01) with the sample to be concentrated through the 2 Way Valve (V003).
- Open the tank outlet 2 Way Valve (V001) and turn on the pump which has a set cross flow rate of 30-50 mL/min.
- Filter the sample until the desired concentration or volume is obtained.
- Turn off the pump. Pump all the Retentate and upstream fluid into the Collection Flask

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CLEANING:

- Loosen the Retentate Diaphragm Manual Valve (V002).
- Fill the Tank (TNK 01) with 500 mL of Cleaning solution through the 2 Way Valve (V003). Open the tank outlet 2 Way Valve (V001).
- Set the pump to the flowrate of 30-50 mL/min.
- Slightly tighten the Retentate Diaphragm Manual Valve (V002) to increase the Permeate flow rate.
- Recirculate the cleaning solution for 30-60 minutes.
- Turn off the pump and discharges the cleaning solution.
- Recirculate the RO water 2–3 times to discharge any residual cleaning agent.

PRODUCT RECOVERY:

- Disconnect the tubing of the Feed to the Pellicon XL 50 modules and place the Feed tubing into the Collecting Flask. Start the pump to recover the sample.
- To recover the residual sample from Retentate side disconnect the tubing from the Retentate side of the cassette, Cap the cassette immediately. Hold the tubing at a higher level than the Tank level. Take syringe and push air through the tubing. This will push residual sample into the Tank, for Product Recovery.
- For recovery of the holdup volume from the cassette, connect the tubing to the Feed port and place it into the Collecting Flask.
- Fill a 25 mL syringe with 5 mL of Permeate or buffer.
- Attach the syringe to the Retentate port.
- Slowly push all the buffer or Permeate into the Pellicon XL 50 device.
- Fill the syringe with air. Withdraw the syringe plunger to 10 mL mark.
- Reconnect the syringe to the Retentate port and push the air into the Pellicon XL 50 device.
- Recover the sample remaining in the Feed tubing by removing the tubing from the Pellicon XL 50 device and allow it to drain into the Feed container.

PRECAUTIONS TO BE FOLLOWED

CAUTION:

1) **PERISTALTIC PUMP TO BE CALIBRATED TO 30-50 mL/min FLOWRATE PRIOR TO THE OPERATION.**
   (For further reference of the operation and maintenance of the pump refer to the Peristaltic pump manual provided with the system).

2) **DO NOT RUN THE PERISTALTIC PUMP UNDER DRY CONDITIOS.**

3) **TO PREVENT MEMBRANE DAMAGE FROM REVERSE PRESSURE, DO NOT STOP THE FILTERATE/ PERMEATE FLOW.**

RECORD TO BE MAINTAINED

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

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