

Details of specifications of equipments to be purchased by FARMER under the project funded by DST vide sanction letter no. DST/SSTP/UP/285 (c) dated 14.06.2016

1. SPECIFICATION FOR ADVANCE RESEARCH DIGITAL MICROSCOPE-

- 3-way infinity corrected anti-fungal achromatic optical system.
- Advance ergonomics 25°/30deg, Seidentopf trinocular viewing head (dedicated for fluorescence) with 360° rotatable eyepiece tube, interpupillary adjustable distance: 50-75mm, fixed spectroscopic ratio R:T= 50%: 50%, Diopter +/-5 adjustable, Tube Size 26 mm and rubber eyecups.
- Mechanical 3D Stage: with special fabrication processing, anti-corrosive and anti-friction; X,Y moving hand wheel in right hand; moving range: 76x50mm, precision : 0.1mm
- Infinity plan anti-fungal coated high contrast objective for application, 4X, 10X, 20x, 40X, 100X, quintuple nosepiece
- Condenser : Universal turret condenser for phase contrast and dark field adjustment
- Integrated all-metal high-pressure die-cast body, precision transmission mechanism with pinion and rack. Coarse focusing scope: 30mm, with tightness adjustment and place limit set, fine adjustable precision: 0.002mm
- Koehler illumination High Intensity 5W LED bulbs (predetermined filament center), intensity continuously adjustable, 100V-240V_AC50/60Hz wide range voltage
- LBD color-change filter (Φ45mm), Immersion oil-8 ml, Allen Hex Keys- Φ2mm,
- Vinyl Dust Cover must be included in the quotation.
- Universal Power Supply must be included in the quotation
- Compatible High resolution Digital camera with Imaging and image analysis Software(Inbuilt), with USB 2.0 PC connection with capability for real time live image resolution: 3.2 mega pixels, Electronic shutter, Exposure Control: Manual/ Automatic, Scan Mode: line by line scan, Exposure time: 1ms-0.3s, Working Temperature: -20°C ~ 70°C
- Image Analysis Software should have various professional functions : Video broadcast; Time lapse capture; Video record; Video stream grid; Video measurement; Video calibration, Gray calibration; Video EDF; Image stitch; Video scale bar, date and etc. Image Processing and Enhancement, Control and adjust image by contrast, de-noise, all kinds of filtering algorithm and mathematical morphology algorithm; image rotate, image scale, image print; 2D Measurement, easy video or image calibration; Image Stitching to automatically combine a sequence of relevant images into a perfect larger one.
- The microscope should be upgradable to: A. LED/HBO fluorescence with 4 filter block turret mandatory at any point of time. B. Polarization, C. Motorized stage

- Compatible branded computer (at least i5 or equivalent processor, 8 GB RAM, 1TB HDD) and UPS.
- The 2 year warranty.
- Any deviation in specification will be considered with the approval of technical committee.

2. SPECIFICATIONS FOR INTERNAL LOOP AIRLIFT FERMENTER WITH CONTROL SYSTEM-

- Internal loop airlift bioreactor of 10 liters capacity for microbial and cell culture.
- Microprocessor controlled fermenter control system/module.
- Autoclavable and in-situ sterilizable fermentation borosilicate glass vessel.
- Stainless steel head plate with ports on head plate and vessels for
 - a. pH sensor,
 - b. DO sensor,
 - c. foam sensor,
 - d. temperature sensor,
 - e. air sparger inlet,
 - f. air venting exhaust,
 - g. heating/cooling finger for thermal control,
 - h. acid, base/alkali, anti-foam addition, inoculum feed
 - i. sample harvest,
 - j. blind-plugged spare ports etc.

Fitting of ports, sensors, tubing, motor etc. should be easy and convenient. All ports to have O-rings provided in pharma grade silicone.

- All ports and fittings should be designed to prevent contamination cross-over.
- Diagnostic mode to evaluate the health of the system and its various components (like probes, pumps, relays, motors, sensors, calibration, reading etc.) to enable off-site diagnosis and service-assistance.
- Should be able to maintain optimum temperature= 28 to 37°C, pH= 5.5-7.0, Oxygen saturation (pO₂) = 20 to 30%, aeration rate- 0.7vvm, Shear <1m/s (between 0.3-0.5); Osmotic strength<600 milliosmol/kg; shear <0.3 m/s.
- The 2 year warranty.

Any deviation in specification will be considered with the approval of technical committee.

3. SPECIFICATION FOR REFRIGERATED HI-SPEED CENTRIFUGE PLUS ROTORS AND ACCESSORIES

- **Table top refrigerated centrifuge for medium to high volume applications.**
- The centrifuge must have short spin key, fast cooling & stand-by cooling options, at-least 30 program memories.
- The centrifuge must be equipped with automatic rotor recognition and imbalance sensor for prevention of over speed.
- Maximum Speed for Fixed Angle Rotors Speed 14000 rpm or above, and RCF 20000 g force or above, Swing out Rotors Speed 5000 rpm or above and RCF 4500 g force or above.
- System should have inbuilt drainage facility.
- System should have Eco shut off feature which reduce the energy consumption and increase the compressor life.
- Maximum Capacity - 4 x 750-800 ml
- Timer – 30 sec. to 99 hrs. and continuous
- Temperature -5 to 40 °C
- Acceleration and deceleration -10/10 Steps
- Noise level - ≤65 dB A or low
- Power Consumption – least power consumption machine will be preferred.
- Lightweight Rotors will be preferred.
- Rotors should be made of Metallic / Carbon fiber, and must be fully autoclavable at 121 degree centigrade and more
- Should have facility to validate speed temp and time with certified device.
- Instrument must be ISO, European CE, IVD and IEC-610601 Certified. Certificates should be attached along with the Technical bid.
- Optional rotors and adaptors should be quoted as optional Accessories.
- The 1 year warranty
- Any deviation in specification will be considered with the approval of technical committee.

Required Rotor & Accessories:

- Swing out rotor of 4 x 250-300 ml with adaptors for 16- 20 x 50mL and 34-38x15ml conical tubes.
- Plate buckets for 12-16 MTP/PCR plates, at least 4 Nos. DWP for same swing out rotor (no need to change the rotor)
- Fixed angle Rotor metallic rotor with Lid 6 x 80 -100 ml with 15 ml, 50 ml conical adaptor with 12000-14000 rpm.
- Fixed angle rotor 30 x 1.5 / 2 ml. rotor (Aerosol tight / bio contaminated lid) with 13000 - 15000 rpm and 20,000 g force.

4. SPECIFICATIONS FOR UV-VISIBLE SPECTROPHOTOMETER-

- UV/VIS Spectrophotometer for measuring volumes from 1.5 μ L to 4.5 mL
- Spectrometer to perform UV/Vis spectrometric and scan applications allowing quantification of sample volumes from 1.5 μ L to 4.5 mL
- System have preprogrammed methods for rapid and reliable analysis of Nucleic acids and proteins, OD600, dye methods (parallel measurement of biomolecule and dye label), FOI (frequency of incorporation) calculation.
- Should allow measuring and recording of UV/Vis spectral wavelengths from 200 to 830 nm, with smallest increment of 1 nm
- Should allow extinction measurement for one or several wavelengths
- Recording of wavelength scans should be possible with integrated data processing
- Should have in-built methods with analysis via factor, standard or standard series
- Should allow performing Dual-wavelength method with subtraction and division analysis
- Should have data evaluation methods for concentration via standard series (Regression: linear, cubical, Quadratic) and (Interpolations: linear and Spline)
- Should have Spectra Zoom® technology to analyze and process curve sections in detail view directly on the instrument display and for peak detection
- Should have the combination of Absorption single-beam spectrophotometer with reference beam as measuring principle with Xenon flash lamp as light source and beam receiver as CMOS photodiode array
- Should allow direct operation on the device and must not require PC to operate
- Data transfer of measured data to a PC by connecting the device directly to a PC should be possible without any additional software or should be through USB stick
- Should have facility for saving > 1,000 measured results and > 100 new methods in the instrument directly
- Micro Cuvette should be quoted as optional for nano litre quantification.
- 200 Nos. of disposable cuvettes should be supplied. 230 V operation; European CE listed; should include electrical cord, suitable cuvette adapters.
- The 1 year warranty.
- System should be European CE certified.
- Any deviation in specification will be considered with the approval of technical committee.

5. SPECIFICATION FOR MECHANICAL PIPETTES

- Volume range of pipettes.
 - a) 0.1-2.5 ul
 - b) 0.5-10 ul
 - c) 2-20 ul
 - d) 10-100 ul
 - e) 20-200 ul
 - f) 100-1000 ul
- Low error and easily serviceable,
- Piston made of fortron.
- 4 Digit display
- Easy handling with lightweight ergonomic design
- Minimum operating forces
- Fully autoclavable
- Spring loaded tip cone for tight fit to the tip.
- Adjustable display for specific liquid and volume.
- Should fit all popular pipette tips
- The 3 year warranty
- Any deviation in specification will be considered with the approval of technicalcommittee.

6. SPECIFICATIONS BENCHTOP REFRIGERATED INCUBATOR SHAKER

- SPEED RANGE & INDICATOR: 25 - 400 rpm with microprocessor control.
- LCD Display of speed \pm 1rpm increments
- TEMPERATURE RANGE: 20°C below ambient to 80°C or more , min 4 Degree C
- System should have audible & visible alarm when speed deviates more than 5rpm and temperature morethan 1°C from set points.
- Programmable shaking period 1 min to 99.9 Hrs. or more
- SAFETY MACHANICAL & ELECTRONICS- Acceleration Circuit prevents sudden start and stops. Minimizing splashing and mechanical damage, sensor shut off temperature when high Temperature limit is exceeded.
- Setpoints Retention -Setpoints and operating status retained by nonvolatile memory.
- System should have multiple step programming feature.
- DRIVE: Preferably Magnetic drive on permanent magnet or Triple eccentric counterbalanced drive or equivalent.
- Drive should be warranted up to 5 years or life time warranty
- MOTOR: Solid state brush less DC motor.
- System should come one Stationary rack for Incubation purpose.
- Large, Triple pane, insulated viewing window and internal lights provide a clear view of the chamber contents.
- System should have maximum capacity to hold up to 4 liter flask.
- Temperature uniformity \pm 0.25 Degree C
- PLATFORM DIMENSION: 460 x 460 mm
- ELECTRICAL RECEPTACLE: 100watt moisture proof internal electrical outlet installed inthe chamber for optional magnetic stirrers, rocker, roller portable shaker etc.
- System should have hermetically sealed compressor uses CFC free refrigerants.
- Unit should be quoted with universal platform.
- Stainless Steel Clamps for 250ml,500ml, 1 liter flasks must be quoted as optionallyand other accessories may be quoted like UV Germicidal lamp, Phosynthetic Light Bank, test tube racks etc.
- The 2 year warranty
- System must be European CE /FDA Certified.
- Any deviation in specification will be considered with the approval of technical committee.

7. SPECIFICATIONS FOR A VERTICAL AUTOCLAVE

- 175 liters capacity vertical double wall design autoclave for research use.
- Single stainless steel chamber type for water and steam.
- Pressure range 15 Psi; temperature range- 121-125 °C.
- Lid fitted pressure gauge, safety spring loaded pressure valve and steam release valve.
- Electric operated; 200-240 V/ 15A/ 50 Hz.
- Temperature and pressure controls with digital display.
- Auto cut off at cycle completion.
- Foot lifting arrangement for the autoclave lid.
- The 2 year warranty.
- Any deviation in specification will be considered with the approval of technical committee.

8. SPECIFICATIONS FOR BENCHTOP PH METER WITH PROBES

- Benchtop pH meter with probes, must meet GLP requirements
- pH range - -2.000 to 20.000
- temperature range- -10 to 110°C, Temperature compensation automatic or manual
- Informative display with bright backlight
- High 0.001 pH resolution with ± 0.002 pH accuracy
- Temperature accuracy - $\pm 0.5^\circ\text{C}$
- USA, NIST, DIN, Custom buffer recognition
- Store and recall up to 500 sets of data or send data to a PC or printer
- Visual stability indicator to inform when measurements have stabilized
- Should include electrode stand and 100/240 VAC power adapter, probes, electrode fill solution.
- CE compliant
- The 2 year warranty.
- Any deviation in specification will be considered with the approval of technical committee.

9. SPECIFICATIONS FOR EC METER/TDS KIT-

- Easy to use automatic/ manual EC meter/TDS Kit with simple dip and read results
- Waterproof digital tester will float if dropped in water
- Up to three point calibration with auto-buffer recognition for quick calibrations. Easy push-button single point calibration—no screwdrivers required. Features self-adjusting TDS factor from 0.40 to 1.0.
- Single-junction pH electrode to protect against breakage.
- pH range 0 – 14.
- TDS range 0 – 1990
- Battery life should be > 200 hours.
- Rugged, chemical-resistant stainless steel sensor.
- Automatic temperature compensation to ensure accurate readings, a hold function to lock in a measured value, and auto shut-off to save battery life.
- Should include- tester; pH buffers 4, 7, and 10; conductivity solution 1500 uS/cm; electrode storage solution; and batteries.
- The 2 year warranty.
- Any deviation in specification will be considered with the approval of technical committee.

10. SPECIFICATIONS FOR ANALYTICAL BALANCE

- Analytical balance of capacity 220g.
- Pan Size 90 to 100 mm
- External calibration.
- High contrast LCD Display with large numbers & clear symbols to provide maximum readability regardless of lighting conditions
- Smart Operation- intuitive user interface through tactile mechanical buttons
- Quick access to all built-in applications & the adjustment menu.
- “ESC” functionality and exit button
- The 2 year warranty.
- Any deviation in specification will be considered with the approval of technical committee.

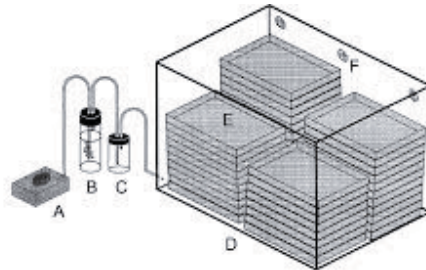
11. SPECIFICATIONS FOR A DESKTOP COMPUTER WITH PRINTER

- A desktop computer with printer.
- Minimum 5th Generation Intel Core i5 processor
- Preloaded genuine Windows 10 operating system.
- 4 to 8 GB RAM+>1GB Graphics Card
- 1TB Hard Disk Drive
- Preloaded genuine Microsoft Office 2013 or later version.
- The CPU must have-
 - a. Power button,
 - b. 5-in-1 Multi-Card Reader
 - c. Audio combo jack
 - d. 2 USB 3.0 ports
 - e. Optical drive
 - f. Air vent
 - g. Line-in port
 - h. Line-out port
 - i. Microphone port
 - j. VGA port
 - k. HDMI port
 - l. USB 2.0 ports
 - m. Power-adaptor port
 - n. Security-cable slot
 - o. Network port
 - p. Padlock rings
- 18 inch or larger TFT monitor with or without built in speakers.
- A multi -function colour Laser printer with scanning, photocopying and printing functions should be included in the quotation.
- The 2 year warranty.
- Any deviation in specification will be considered with the approval of technical committee.

12. SPECIFICATIONS OF UPRIGHT SOLID DOOR -20⁰ C DEEP FREEZER

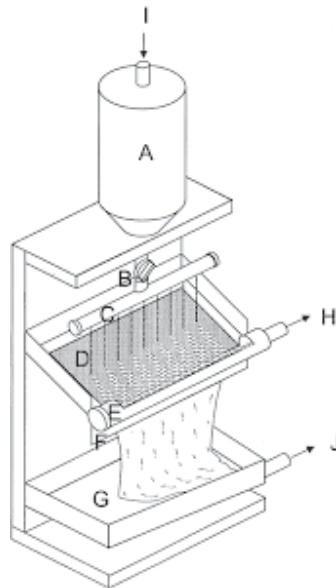
- Capacity 300-400 lts
- CFC/HCFC free
- Temp range: -17⁰ C to -24⁰ C
- Dimension: Width 23.4” X Depth 23.4” X Height 72.8”
- Defrost: Manual
- Wheels should be present
- Lock should be present
- Number of baskets / shelves: 6 – 8
- Number of doors: Single or double
- Rated load – wattage: 140
- Suitable temperature display system for exhibiting inside temperature for monitoring
- Type of insulation: Puff with cyclopentene
- The 2 year warranty.
- Any deviation in specification will be considered with the approval of technical committee.

13. CONDITIONING APPARATUS FOR INCUBATING TRAYS



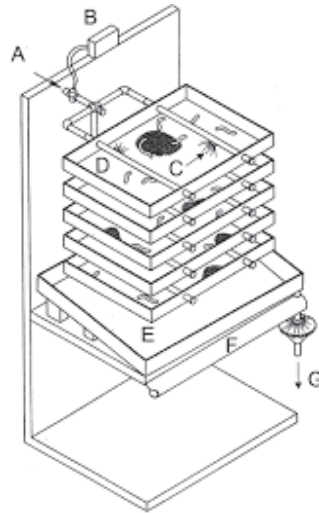
- Conditioning apparatus must be of suitable thickness tempered Glass/ acrylic 1000 mm x 600 mm x 800 mm with one side open able and on one side vents for the air out flow.
- The conditioning apparatus must have humidity Control (working humidity range 90-98. Necessary humidifier Unit must be a part of the system.
- 50 trays. The tray Measures 300 mm x 250 mm X 50 mm , with edges of 7/ 8 mm. Trays are fabricated by folding single sheets of perforated 20/18 gauge aluminum / SS 304 (30% open area) to form walls. Perforations are sized (1.6 mm diameter) and suitable holes for mist pipes
- The 2 year warranty.
- Any deviation in specification will be considered with the approval of technical committee.

14. CONTINUOUS DEFLECTION SEPARATOR APPARATUS



- All parts of Continuous deflection separator apparatus should be of SS 304 except as specified
- The bottom base size is suggested to be of 600 mm x 500 mm of MS 12 mm covered by SS 304 of 1 mm from all sides so as to take weight of apparatus.
- The back side should 600 mm x 800 mm made of suitable 12 mm heavy gauge pipe to support the weight of holding vessel and filter mesh etc, and covered by ss 304 of 1 mm from all sides
- The top side should 500 mm x 400 mm made of suitable 12 mm heavy gauge pipe to support the weight of holding vessel and filter mesh etc, and covered by ss 304 of 1 mm from all sides
- Conical bottomed 5 lts. reservoir tank made of SS 304 (acts as a buffer to maintain a constant even flow) and are gravity-fed to a distribution system made of 15/20 mm SS 304 pipes dividing in 4 small streams (each stream averages 700 ml/min)
- SS 304 framed 40/ 50 mm edges stainless steel screen (1 um openings) oriented at a 38 deg. angle
- A collection gutter 150 mm above collection pan made of SS 304 (2 deg. angle for drainage).
- Collection Pan 150 mm above base plate measuring 500 mm x 400 mm (30 Deg and 2 angle for drainage) with drainage pipe of 15 mm, all made of SS 304. oriented at a 38 and 2 deg. Angle.
- The 2 year warranty.
- Any deviation in specification will be considered with the approval of technical committee.

15. HARVESTER APPARATUS FOR COLLECTING INFECTIVE JUVENILE NEMATODES.



- All parts of Harvester apparatus should be of SS 304 except as specified
- A suitable controller for spray time (seconds selection to minute's intervals)
- The bottom base size is suggested to be of 500 mm x 400 mm of MS 20 mm covered by SS 304 of 1 mm from all sides so as to take weight of apparatus.
- The back side should 500 mm x 1200 mm made of suitable 12 mm heavy gauge pipe to support the weight of pipes and trays and covered by SS 304 of 1 mm from all sides
- The holding tray Measures 300 mm x 250 mm X 50 mm , with edges of 7/ 8 mm. Trays are fabricated by folding single sheets of perforated 20/18 gauge aluminum / SS 304 (30% open area) to form walls. Perforations are sized (1.6 mm diameter) and suitable holes for mist pipes (10/12 mm, SS 304 and mist sprayer) as shown in Drawing
- Suitable pipe of SS 304 of 12 mm to hold the trays. Each pipe is equipped with 2 mist nozzle, delivering water at the rate of 37 ml/min. The two nozzles (oriented 10_ below horizontal) attending to each tray are staggered, so that the inner tray surface could be entirely covered by a canopy of mist. The pipe length to be 400 mm, the vertical and horizontal gap between pipes to be 150 mm to hold the trays.
- Collection Pan measuring 450 mm x 350 mm (30 Deg and 10 angle for drainage) with drainage pipe of 15 mm, all made of SS 304.
- The 2 year warranty.
- Any deviation in specification will be considered with the approval of technical committee.