

Continue



Polarimeter sop pdf

Polarimeter standard solution. What is sop ppt. Polarimetry instrumentation. What is polarimeter and its application. Standard operating procedure of polarimeter. Polarimeter calibration standards. Procedure of polarimeter. Procedure for Polarimeter Operation and Calibration Objective: To establish a standard operating procedure (SOP) for operating and calibrating a polarimeter to determine optical rotation of raw materials in quality control. Scope: This SOP applies to the operation and calibration of the polarimeter in quality control. Procedure: 1. Ensure equipment and tubes are clean, check the calibration due date, and set up the instrument on the bench. 2. Turn on the sodium vapor lamp by pressing the transformer switch down, allowing it to fully illuminate for five minutes. 3. Adjust the lower and upper eye pieces to focus the instrument, and view the scale graduation and reference line through the upper eye piece. 4. Rinse the tube with the solvent used, fill it with the solvent, and place it in the cabinet to ensure no air bubbles form. 5. Compare the color shades on both sides of the instrument by rotating the knob, take a reading through the upper eye piece, and adjust the micrometer drum knob if necessary. 6. Rinse the tube with the solution, fill it with the liquid or prescribed solution, and take a reading following the above procedure. 7. Calculate the specific optical rotation by deducting the solvent reading from the liquid/sample reading. 8. After completion of work, open the cabinet, remove the tube, clean it thoroughly, switch off the sodium vapor lamp, and enter details in the instrument log. of rotation, similarly prepare solutions with concentrations of 40g/100ml, 30g/100ml, 20g/100ml, and 10g/100ml by diluting stock solution A. Measure the angle of rotation at 25°C following SOP steps and record observations in Annexure I. Take average readings for each concentration. Enter details in Annexure I. Calibrate the Polarimeter every 6 months ± 3 days. Fill tubes without air bubbles, ensuring a temperature of 25°C ± 1°C. Record five readings per operation. Report any deviations to the service engineer. Refer to instruction manual for more information. Annexure I: Calibration Record of Polarimeter Format: * Make: * Eq. No.: * Model No.: * Calibration Frequency: 6 Months ± 3 days * Calibration Due on: [insert date] * Batch No. of Sucrose: [insert batch number] * Stock Solution A: Dissolve [insert weight] g sucrose in 100.0 ml (or [insert volume] ml) water (Milli Q) * Length of Polarimeter Tube: 1 dm * Light Source: Sodium Light (589.3 nm) * Volume Taken (ml): [insert volume] * Diluted to Volume (ml): [insert volume] * Concentration (%): [insert concentration] * Angle of Rotation at 25°C: [insert angle] ± 0.5 * Acceptance criteria (*): [insert acceptance criteria] * Observed Average: [insert observed average] Remarks: The observed values comply/do not comply with the acceptance criteria, and the equipment can be/cannot be used for routine analysis. Next calibration due date: [insert date] Reference(s) - Polarimeter SOP **Polarimeter Calibration Template 4.0** **Responsibilities:** 1. Operate the instrument according to the Standard Operating Procedure (SOP). 2. Calibrate the instrument according to SOP. 3. Maintain calibration records. 4. Train all relevant personnel before implementing SOP. 5. Ensure that instrument operation and calibration are performed as per SOP. 6. Execute Out of Calibration (OOC) procedures in case of failure or breakdown, and notify the Quality Head. 7. Arrange repairs or alternative arrangements during maintenance status. 8. Maintain proper documentation according to SOP. 9. Implement the system according to SOP. 10. Review and approve SOP. **Definition of Terms & Abbreviations:** 1. SOP: Standard Operating Procedure 2. SOR: Specific Optical Rotation 3. NIST: National Institute of Standards and Technology 4. PMT: Photomultiplier tubes **Optical Rotation Definition:** The optical rotation of a substance or liquid refers to the angle through which the plane of polarization is rotated when polarized light passes through it, measured at 25°C (unless otherwise specified). **Specific Optical Rotation:** A specific optical rotation is defined as the angle of rotation of the plane of polarization at the wavelength of the D line of Sodium ($\lambda=589.3$ nm) measured at 25°C (unless otherwise specified), calculated with reference to a 1-dm thick layer of a solution containing 1g of a substance per ml. **Procedure for Handling and Calibration:** 1. Follow SOP on "Instrument/equipment usage logbook" for instrument entry. 2. Maintain internal and third-party calibration schedules according to SOP. 3. Handle Out of Calibration (OOC) results by following SOP. 4. Allow sufficient time to warm up the lamp before use. 5. Determine optical rotation within 30 minutes of preparation, unless otherwise specified. 6. Maintain required temperature during optical rotation analysis. 7. Ensure that instrument and polarimeter tube are clean and free of spills or residues before starting analysis. Please note: The above content is a paraphrased version of the original text, and it has been rewritten to maintain the same language and tone as the original text. To ensure proper polarimeter operation, begin by filling the sample tube with the required solution, taking care to remove any air bubbles that may interfere with readings. Cleanliness is crucial; avoid over-tightening end caps and maintain a spotless glass tube. Position the bubble at the center of curvature for optimal alignment. After analysis, keep the temperature probe clean to prevent contamination affecting results. Before switching samples, thoroughly rinse the sample cell 2-3 times to remove any residual material. Hold the cell in the same position and orientation as previous measurements, as altering this may compromise data reproducibility. Ensure the sample chamber is empty before shutting down the instrument. Turn off the power switch on the rear panel when finished using the polarimeter. Clean and air-dry the sample cell for storage. Allow sufficient time to warm up the lamp prior to use. Maintain a consistent temperature during blank and sample solution optical rotation measurements. Liquids and solutions must be clear. Before each use, clean the Polarimeter and surrounding area with a dry cloth. If spills occur, immediately wipe them away with a dry cloth or, if necessary, use approved detergent (1% Hemtop) followed by purified water and a dry cloth. For lens cleaning, use lint-free tissue paper. Following analysis, clean the glass tube and temperature probe using the same solvent used to prepare the test solution, then rinse with purified water and methanol. Check the polarimeter calibration status and enter user credentials to log in. Initialize the system by clicking on the standard measurement option. Set measurement parameters, including repeat time, interval time, and cell length (default 100 mm). Enter a sample name, comment, and save settings. To zero-set the instrument, open the sample compartment, verify its emptiness, and close it. Select "zero clear" from the measurement menu to take the blank reading. Open the instrument cover and fill the blank (diluent) with the required solution. To use the polarimeter, first place the cell tube into the sample chamber by opening the lid. Ensure that the temperature of the sample or blank is within the specified range and select the "Optical rotation" mode for the blank in the parameters. Click on the "Blank" button and choose "measure". For measuring the sample, select the required mode from the parameters and save it. Enter the sample name and comment if any, then click "Sample" and select "measure" after the measurement is complete. Save the data once the measurement is finished. To print the data, go to the "Spectra Manager CFR" window and select "Polarimeter Analysis". Double-click on the sample file and choose "print". For switching between wavelengths, open the lid of the filter unit located next to the sample chamber. Remove the 589nm filter and replace it with the 436nm filter. Alternatively, you can use the Mercury lamp as per your product's requirements. To change the light source, select the "light source" button on the standard measurement window. Deactivate the currently selected lamp by clicking on it, then choose the desired lamp. The calibration procedure for the polarimeter is either performed using sucrose/fructose calibration solutions or quartz plates. The temperature sensor should be calibrated annually with an accuracy of ± 0.5°C. Calibration should be carried out after each maintenance and relocation. It's recommended to use certified standards like sucrose and fructose, or a polarization reference standard available from Rudolph Research Analytical or Rudolph Instrument. To perform calibration using quartz plates, mount the plate perpendicular to the light path in a holder. Record your observations and ensure that the calibration meets the manufacturer's value for the applicable wavelength. Calibrate both the 589nm and 436nm filters annually, with an accuracy of ± 0.5°C. **Calibration Report** The instrument has been calibrated for use, with the next calibration scheduled on [TABLE A] and [TABLE B]. The actual values and observed values are provided below. **Quartz Rotatory Plate (Dextro-rotatory range)** | Temperature | Wavelength | Actual Value | Observed Value | Acceptance Range | |---|---|---|---|---|---| | 589 nm | 436 nm | [Actual value] | [Observed value] | ± 0.5% | **Quartz Rotatory Plate (Levo-rotatory range)** | Temperature | Wavelength | Actual Value | Observed Value | Acceptance Range | |---|---|---|---|---|---| | 589 nm | 436 nm | [Actual value] | [Observed value] | ± 0.5% | **Note:** The limits are as per the calibration certificate provided by the manufacturer. **Instrument Details** * Calibration type: Scheduled * Calibrated by: [Name] * Checked by: [Name] * Date: [Date] **Mercury Lamp and Sucrose Solution Preparation** * Mercury lamp used: [Lamp name] * Filter wavelength set: 436 nm * Analytical balance code no.: [Code number] * Valid up to: [Date] * Vacuum oven code no.: [Code number] * Valid up to: [Date] * Chemicals batch no.: [Batch number] * Calibration standard number: [Calibration standard number] * Make/grade: [Make/grade] * Use before: [Date] **Sucrose Solution Preparation** 1. Prepare a series of solutions having concentrations of 10.0%, 20.0%, 30.0%, 40.0%, and 50.0% w/w using purified water. 2. Weigh accurately the required quantity of previously dried sucrose and transfer it to a clean and dry volumetric flask. 3. Dissolve the sucrose in 25ml of purified water and dilute up to the volume with purified water. Dry a 50 ml volumetric flask. Dissolve the anhydrous sucrose in 25ml of purified water and dilute up to the volume with purified water. Condition the sucrose solutions and the blank solution (diluent) at 20°C±0.5°C. Take the reading of purified water as a blank, making it auto zero. Take readings for all samples within 30 minutes of sample preparation. For sucrose solution calibration: 1. Lamp used: Sodium (Na) Filter; wavelength set: 589 nm. 2. Analytical Balance Code No.: ; Valid up to: . 3. Vacuum Oven Code No.: ; Valid up to: . 4. Chemicals Batch No., Cal. Std. No., Make/Grade, and Use Before: Sucrose anhydrous. For sucrose solution preparation: 1. Prepare a series of solutions having concentrations of 10.0%, 20.0%, 30.0%, 40.0%, and 50.0% w/v in purified water. 2. For each concentration, accurately weigh the required quantity of previously dried sucrose (e.g., 5.000gm for a 10% solution). 3. Transfer the sucrose to a clean and dry 50 ml volumetric flask. 4. Dissolve the sucrose in 25ml of purified water and dilute up to the volume with purified water. Condition the sucrose solutions and the blank solution at 20°C±0.5°C. Take readings for all samples within 30 minutes of sample preparation. !! Measure five sucrose solutions with specified concentrations. Use a 1-dm Polarimeter tube to measure the specific optical rotation of each solution, taking five readings per solution. The readings should meet the acceptance criteria as indicated in the observation table. Tabulate the results and plot a linearity curve for component concentration vs corresponding optical rotation. The coefficient of correlation must be at least 0.992. **Calibration Requirements for Fructose Solution** To prepare a fructose solution: 1. Dry 5.000 gm of previously dried fructose in a vacuum oven at 70°C for 4 hours. 2. Transfer the dried fructose to a clean and dry 50 ml volumetric flask, then dissolve it in 25ml of purified water and dilute to volume with purified water. 3. Condition the solution and blank (diluent) at 25°C±0.5°C. Measure the specific optical rotation using a polarimeter tube: 1. Take five readings of the sample solution at the specified concentration of fructose. 2. Record the results in an observation table, including the concentration of sucrose (in %), specific optical rotation at 25°C±0.5°C, and mean SOR (in %) at 25°C. Note: The limits shall be as per the COA provided by the manufacturer. **Calibration Status** * Instrument calibrated: yes/no * Calibration type: scheduled/not scheduled * Reason for calibration: _____ * Last calibrated date: _____ * Next scheduled calibration date: _____