Technical Note 110

Microvolume Sample Surface Cleaning

Introduction

The DeNovix® DS-11 Series instruments use a hydrophobic sapphire window along with a stainless steel and quartz optical fiber as sampling surfaces. Wiping the sample from both the upper and lower sampling surfaces with a dry lab wipe after a measurement is generally sufficient to completely remove any trace of the previous sample. However, if a sample is not adequately wiped away and dries down onto the surfaces, problems with subsequent measurements will occur.

Blanking an instrument with a dirty sampling surface (either top, bottom or both) will result in measurements of erroneous absorbance values, such as a negative spectrum or sample concentrations being calculated as lower than the actual values. Updated versions of the DS-11 software detect significantly negative spectra and trigger an error message to appear and advise cleaning.

A dirty sampling surface can also cause issues with the surface tension of a sample on the measurement surface. If a protein or bacterial cell culture sample has been left on the sampling surfaces of the DS-11, samples may start to lie flat on the surface instead of beading up, as shown in the Figures 1A and 1B. This behavior may also arise when measuring samples in a buffer containing an alcohol. In these cases, a thorough cleaning of the sample surfaces is recommended.

Figure 1: A) 1 µL of dH2O lays flat on a dirty surface with a dried down protein sample. B) 1 µL of dH2O will bead up when the surface is properly cleaned.

Sample Surface Cleaning Procedure

If an error message warning about negative spectra appears after a measurement, or if sample concentrations are lower than expected, follow the cleaning procedure below:

1. Pipette 2 µL of purified dH_2O onto the lower sampling surface and lower the arm.
2. Allow the dH2O to sit between the sampling surfaces for approximately 15 seconds.
3. Lift the arm. Using a clean, dry laboratory wipe, polish both the upper and lower sampling surfaces, going back and forth at least five times on each with a moderate amount of force. For stubborn samples, rub the surfaces back and forth up to 50 times.
4. Blank with the blanking solution (water or buffer).
5. Measure a fresh aliquot of the blanking solution and confirm that there is no significant absorbance across the spectrum.

Using dH_2O should be sufficient to clean the sample surfaces. In some cases, it may be necessary to repeat the above steps multiple times.

Note: Using 0.5 M HCl in the procedure above will make it easier to remove dried samples but is not absolutely necessary.

- If using HCl: after wiping away the HCl, repeat the procedure above with dH2O to ensure no residual acid is left on the microvolume sample surfaces.
- Do not use alcohols or bases to clean the DS-11 microvolume sample surfaces.

Note: The sampling surface is located near the front of the instrument. The optical surface at the back near the arm hinge base should be cleaned as described above if someone inadvertently pipettes samples onto this surface.

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DeNovix Inc.
3411 Silverside Road
Wilmington, DE 19810, USA

Phone: +1.302-442-6911
Email: info@denovix.com
www.denovix.com