

MOLECULAR SEROLOGY PROCEDURES MANUAL

Body Fluid Identification by Proteomic Mass Spectrometry -Quantitation		
Status: Published		Document ID: 77456
DATE EFFECTIVE 07/27/2023	APPROVED BY Molecular Serology Technical Leader	PAGE 1 OF 5

Body Fluid Identification by Proteomic Mass Spectrometry - Quantitation

1 Purpose

- 1.1 To quantify extracted proteins in order to identify specific body fluids on evidence samples using liquid chromatography and mass spectrometry.

2 Protein Quantitation Procedure

- 2.1 Retrieve the reagents for protein quantitation and record the lot and identification numbers in LIMS.

1% SDC at 4°C
Bovine Serum Albumin (BSA), 2 mg/mL at 4°C
Deionized Water
Pierce™ BCA Reagent A
Pierce™ BCA Reagent B

- 2.2 Turn on Mini-Shaker and set to 37°C.
- 2.3 Prepare the BSA standards in 1.5 mL microcentrifuge tubes as described below. Vortex and short spin tubes on benchtop centrifuge before making subsequent dilutions.

Tube Label	BSA Concentration	BSA	Diluent (Deionized Water)
A	2000 µg/ml	183 µl from BSA stock	0 µl
B	1500 µg/ml	66 µl from tube A	22 µl
C	1000 µg/ml	57 µl from tube A	57 µl
D	750 µg/ml	30 µl from tube B	30 µl
E	500 µg/ml	54 µl from tube C	54 µl
F	250 µg/ml	48 µl from tube E	48 µl
G	125 µg/ml	36 µl from tube F	36 µl
H	0 µg/ml	0 µl	60 µl

- 2.4 Retrieve positive control extracts from -80°C freezer
- 2.4.1 Keep all positive control extracts on ice or on a frozen tube rack.
- 2.4.2 Write your initials on all positive control extract tubes, as you will continue to use the same tube for the remainder of the procedure. **DO NOT THROW OUT.**
- 2.5 Prepare positive control dilutions in 1.5 mL microcentrifuge tubes as described below.

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DATE EFFECTIVE 07/27/2023	APPROVED BY Molecular Serology Technical Leader	PAGE 2 OF 5

Positive Control	Extract	Diluent (1% SDC)
Saliva 1X	30 µl	0 µl
Semen 5X	6 µl	24 µl
Blood 20X	2 µl	38 µl

- **NOTE:** Each microplate will only hold a total of **nineteen** unknown samples.

2.6 Retrieve Quant aliquot tubes from -20°C freezer.

2.7 Prepare sample dilutions in separate 1.5 ml microcentrifuge tubes, labeled 5X, 10X and 20X as described in the table below. Vortex and short spin tubes on benchtop centrifuge before making subsequent dilutions.

Tube Label	Dilution	Extract	Diluent (1% SDC)
Transfer (1X)	1X	41 µl	0 µl
5X	5X	11 µl of 1X	44 µl
10X	10X	23 µl of 5X	23 µl
20X	20X	15 µl of 10X	15 µl

2.8 **WITNESS:** Confirm the sample names by reading the tube top labels and LIMS INPUT sample ID. Tube top labels should be re-witnessed at the load plate screen.

2.9 Pipette 25 µl of Standards in duplicate into the 96-well microplate beginning at wells A1 through H2. Pipette 25 µl Neg and Pos Controls beginning at wells A3 through D3. See example layout below.

2.9.1 Vortex and short spin tubes on benchtop centrifuge before pipetting into microplate.

2.10 Pipette 25 µl of all sample dilutions (1X through 20X) into the 96-well microplate beginning at wells E3 through H12. Continue pipetting in this order until all sample dilutions are loaded. See example layout below.

2.10.1 Vortex and short spin tubes on benchtop centrifuge before pipetting into microplate.

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DATE EFFECTIVE 07/27/2023	APPROVED BY Molecular Serology Technical Leader	PAGE 3 OF 5

	1	2	3	4	5	6	7	8	9	10	11	12
A	H [0 µg/ml]	D [750 µg/ml]	Eneg	Sample 2 Tube 1X	Sample 4 Tube 1X	Sample 6 Tube 1X						
B	H [0 µg/ml]	D [750 µg/ml]	Saliva Positive Ctrl	Sample 2 Tube 5X	Sample 4 Tube 5X	Sample 6 Tube 5X						
C	G [125 µg/ml]	C [1000 µg/ml]	Semen Positive Ctrl	Sample 2 Tube 10X	Sample 4 Tube 10X	Sample 6 Tube 10X						
D	G [125 µg/ml]	C [1000 µg/ml]	Blood Positive Ctrl	Sample 2 Tube 20X	Sample 4 Tube 20X	Sample 6 Tube 20X						
E	F [250 µg/ml]	B [1500 µg/ml]	Sample 1 Tube 1X	Sample 3 Tube 1X	Sample 5 Tube 1X							
F	F [250 µg/ml]	B [1500 µg/ml]	Sample 1 Tube 5X	Sample 3 Tube 5X	Sample 5 Tube 5X							
G	E [500 µg/ml]	A [2000 µg/ml]	Sample 1 Tube 10X	Sample 3 Tube 10X	Sample 5 Tube 10X							
H	E [500 µg/ml]	A [2000 µg/ml]	Sample 1 Tube 20X	Sample 3 Tube 20X	Sample 5 Tube 20X							

- 2.11 Dispose of Quant Aliquot tubes. Place positive controls extracts into previous Quant Aliquot tube slots in -20°C storage box.
- 2.12 Determine the volume of working solution you will need. In LIMS, select BCA Kit Reagent A and BCA Kit Reagent B and click “calculate amount”.
- 2.13 Vortex working solution and pour into reagent reservoir.
- 2.14 Use a multichannel pipette to add 200 µl of working solution to each well.
- 2.15 Incubate for 30 minutes on the Mini-Shaker at 37°C while shaking at 200 RPM. Record instrument and temperature in LIMS.

3 Read Plate on Spectrophotometer

Note: Ensure that there are no other windows of Gen5 or Excel open before you begin.

- 3.1 Click on Gen5.3 10 software  on desktop.
- 3.2 Select “**BCA Casework**” as experiment protocol and click OK.
- 3.3 Click “Plate Layout” icon .
- 3.4 Ensure layout is correct, add samples if needed.

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Status: Published		Document ID: 77456
DATE EFFECTIVE 07/27/2023	APPROVED BY Molecular Serology Technical Leader	PAGE 4 OF 5

Select a Well ID in the list on the left, then assign to the matrix.

	1	2	3	4	5	6	7	8	9	10	11	12
A	BLK	STD4 750	NC	SPL2:1	SPL4:1	SPL6:1	SPL8:1	SPL10:1	SPL12:1	SPL14:1	SPL16:1	SPL18:1
B	BLK	STD4 750	Pos1	SPL2:2	SPL4:2	SPL6:2	SPL8:2	SPL10:2	SPL12:2	SPL14:2	SPL16:2	SPL18:2
C	STD1 125	STD5 1000	Pos2	SPL2:3	SPL4:3	SPL6:3	SPL8:3	SPL10:3	SPL12:3	SPL14:3	SPL16:3	SPL18:3
D	STD1 125	STD5 1000	Pos3	SPL2:4	SPL4:4	SPL6:4	SPL8:4	SPL10:4	SPL12:4	SPL14:4	SPL16:4	SPL18:4
E	STD2 250	STD6 1500	SPL1:1	SPL3:1	SPL5:1	SPL7:1	SPL9:1	SPL11:1	SPL13:1	SPL15:1	SPL17:1	SPL19:1
F	STD2 250	STD6 1500	SPL1:2	SPL3:2	SPL5:2	SPL7:2	SPL9:2	SPL11:2	SPL13:2	SPL15:2	SPL17:2	SPL19:2
G	STD3 500	STD7 2000	SPL1:3	SPL3:3	SPL5:3	SPL7:3	SPL9:3	SPL11:3	SPL13:3	SPL15:3	SPL17:3	SPL19:3
H	STD3 500	STD7 2000	SPL1:4	SPL3:4	SPL5:4	SPL7:4	SPL9:4	SPL11:4	SPL13:4	SPL15:4	SPL17:4	SPL19:4

Serial Assignment
 Replicates: 1
 Next Dil.
 Auto Select Next ID

3.5 Click “Create Experiment and Read Now”

3.6 Input information as prompted and click OK.


Prompts	
Case ID*	Test Batch Description Name
Kit Lot*	Lot Number for Reagent A and Reagent B
User*	Analyst Initials
Prompt 4	
Prompt 5	
Prompt 6	

3.7 Insert plate in correct alignment when prompted and click OK.

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DATE EFFECTIVE 07/27/2023	APPROVED BY Molecular Serology Technical Leader	PAGE 5 OF 5

- 3.8 Once plate read is complete, click “Export” 
- 3.9 Copy and paste results into “**BCA Quant Concentration Template**” excel worksheet into the “**Instrument Output**” tab.
- 3.10 Input R square value into LIMS
- 3.11 R square value must be equal to or above 0.95 to continue with batch.
- 3.12 Copy and paste Dilution, Concentration, and Concentration Avg columns from “Result” tab into LIMS.
- 3.13 Ensure data was properly copy and pasted onto LIMS
- 3.14 Identify the LOW QUANT (low concentration, i.e., samples with <math><0.2 \mu\text{g}/\mu\text{l}</math>) samples in the interpretation column.

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