Instructions for Use

Serazym® Bovine Serum Albumin (BSA) sensitive

Enzyme immunoassay for the quantitative determination of bovine serum albumin in biological fluids

REF E-108 96

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Manufacturer	Date of manufacture	Use by date
LOT Batch number	REF Article number	SN Serial number
Keep away from sunlight	Temperature limits	Biological risks
Do not reuse	Consult instructions for use	Caution
	Sufficient for <n> tests	

Intended Use

Serazym® Bovine Serum Albumin (BSA) sensitive is an enzyme immunoassay for the quantitative determination of bovine serum albumin in biological fluids like cell culture supernatants or vaccines by a laboratory professional user.
The test must not be used for human or veterinary diagnostics and by lay persons.

Principle of the Test

Serazym® Bovine Serum Albumin (BSA) sensitive is an enzyme immunoassay based on polyclonal antibodies against bovine serum albumin. Samples, ready to use standards and control are dispensed simultaneously with peroxidase (HRP)-labeled polyclonal anti-BSA antibodies into the wells of the microtiter plate coated with polyclonal anti-BSA antibodies. After a 60-minute incubation at room temperature (RT, 20...25 °C) unbound components are removed by a wash step. HRP converts the colorless substrate solution into a blue reaction product in the following 15-minute enzymatic reaction step. The reaction is stopped by the addition of stop solution, resulting in a color change from blue to yellow.
The optical density (OD) of the reaction product measured at 450 nm measuring filter and ≥ 620 nm reference filter is directly proportional to the concentration of specifically bound BSA. Using the measured absorbances of the standards and their corresponding BSA concentrations, a reference curve is generated from which the concentrations of a sample can be read.

Test Components (Delivery Scope)

			For 96 wells
1	**WELLS**	**Microtiter Plate** coated with polyclonal anti-BSA antibodies (rabbit) Contains material of animal origin.	12 single breakable 8-well strips, colorless, vacuum-sealed with desiccant
2	**WASHBUF (10x)**	**Wash Buffer (10x)** Seramun® Wash buffer B TRIS-based buffer	50 mL concentrate for 500 mL solution, colorless, white cap
3	**DILUENT**	**Sample Diluent** Seramun® Sample diluent J TRIS-based buffer Contains material of animal origin.	70 mL, ready to use, colored red, black cap
4	**STD** **1 - 7**	**Standards 1 - 7** **STD 1 = 50 ng/mL** **STD 2 = 40 ng/mL** **STD 3 = 30 ng/mL** **STD 4 = 20 ng/mL** **STD 5 = 10 ng/mL** **STD 6 = 5.0 ng/mL** **STD 7 = 2.5 ng/mL** Diluted BSA	1.0 mL each, ready to use, colored red, colorless cap
5	**CONTROL**	**Control** Diluted BSA; concentration, see Certificate of Analysis	1.0 mL, ready to use, colored red, green cap
6	**CONJ HRP**	**HRP Conjugate** HRP-labeled polyclonal anti-BSA antibodies (rabbit)	15 mL, ready to use, colored red, brown cap
7	**SUBSTR**	**Substrate** < 0.1 % 3,3',5,5'-tetramethylbenzidine; < 0.05 % hydrogen peroxide	15 mL, ready to use, colorless, blue cap

8	**STOP**	**Stop Solution** 0.25 M sulphuric acid	15 mL, ready to use, colorless, yellow cap
9	**COVER**	**Covering Film**	2 pieces
10	**RESERVOIR**	**Disposable Reagent Container**	3 pieces
11		**Certificate of Analysis**	1 piece
12		**Instructions for Use**	1 piece

Additional Materials and Aids Required for the Test Procedure

Adjustable single-channel micropipette • 8-channel micropipette or multi-channel micropipette with pipette tips • reagent container for multi-channel micropipettes • 8-channel wash comb with vacuum pump and waste bottle or microplate washer • microplate reader with 450 nm measuring filter and ≥ 620 nm reference filter • deionized water • measuring cylinder • tubes for sample preparation

Important Information

This product is for *in vitro* use only and the kit may be used by laboratory professionals only. Follow the instructions carefully.
The shelf life specified must be observed. Do not use reagents from damaged packages or bottles. Do not mix components with reagents from other manufacturers.
Mixing of test kit components of different lots is only allowed for wash buffer (10x), sample diluent, substrate and stop solution.

Information on Assay Procedure
All reagents should be stored at 2…8 °C. The stop solution can also be stored at room temperature. Bring all test components to room temperature before use. Reagents that appear contaminated should not be used.

Each well of a microtiter plate can only be used once. For larger sample series, pipetting reagents from liquid reservoirs using a multi-channel micropipette is recommended to avoid time delays and contaminations. Each sample and control should be pipetted with a new pipette tip.

Follow the pipetting scheme and time schedules of the protocol.

Attention: Serazym® Bovine Serum Albumin (BSA) sensitive is a very sensitive test, thus it is recommended to use disposable reagent containers when pipetting reagents. Any contamination of the work materials with BSA must be strictly avoided. Glassware used to prepare wash buffer and equipment used for test processing must be BSA-free.

The aspiration and washing steps may be performed manually or with the help of a microplate washer or waterjet pump. When using a microplate washer, ensure that the wells are completely filled (at least 300 µL/well) and completely drained in each wash cycle. Avoid foaming and air bubbles in the wells when washing manually. Wash solution should be allowed a minimum reaction time of 5 s in the wells per wash cycle. Remove wash buffer residues by thoroughly aspirating or tapping out the wells.

Protect substrate from light!

Safety Instructions
Do not swallow reagents and avoid contact with skin and mucous membranes.
Some reagents may contain biocides as preservative.

Control, standards, samples and waste should be considered potentially infectious and handled with caution. Used wash buffer, other test kit components, and all materials that have come into contact with samples and reagents should be collected in appropriate containers and disposed of according to local and national regulations.
Additional safety-relevant information may be taken from the Safety Data Sheet.

Limitations of the Procedure
False results may be caused by contamination of reagents or equipment with BSA. Cross-reactions of reagents or specimens, bacterial or fungal contamination of reagents or specimens, incorrect washing, and incorrect incubation times can also cause false results.

Due to the high-dose hook effect occurring in one-step assays, samples with BSA concentrations ≥ 8 µg/mL may be determined too low.

Sample Treatment

Sample Collection
Collect samples in suitable sampling container.

Preparation of Diluted Samples
Before testing appropriate dilutions of samples have to be prepared to generate measured values within the range of the reference curve.
Exemplary dilutions of samples range from 1 : 6 to 1 : 21.
Pipette 1,000 µL of sample diluent into a reaction tube. For a 1 : 6 dilution add 200 µL sample to the sample diluent, for a 1 : 21 dilution add 50 µL sample to the sample diluent and mix thoroughly.
Other dilution protocols have to be established individually by the user.

Shelf Life and Storage of Diluted Samples
Samples that have already been diluted in sample diluent may be stored at 2...8 °C and examined within 48 h. Alternatively, diluted samples may be stored at -20 °C. Repeated (> 3x) freezing and thawing of diluted samples should be avoided. Allow stored diluted samples to reach room temperature and mix thoroughly before testing.
Alternative storage conditions of diluted and undiluted samples may be determined individually by the user.

Reagent Treatment

Reagent Shelf Life and Storage
The complete test kit with sealed reagent bottles and 8-well strips can be stored at 2...8 °C until the printed expiry date. All opened test kit components are stable for up to 2 months when stored properly at 2...8 °C. The diluted wash buffer can be stored at 2...8 °C for up to 1 month.

Reagent Preparation
All reagents must have reached room temperature before being used in the assay. The microtiter plate with breakable 8-well strips is vacuum sealed with desiccant. Allow the sealed plate to reach room temperature before opening. Unused wells should be stored at 2…8 °C and protected from moisture in the original cover carefully resealed.

The sample diluent is ready to use. If stored at 2...8 °C, precipitates may occur which dissolve again after reaching room temperature. Do not use the sample diluent until it has reached room temperature.

Dilute wash buffer (10x) 1 : 10 with deionized water before use.

Example: 10 mL wash buffer (10x) + 90 mL deionized water

Assay Procedure

One test kit (1x 96 wells) allows the quantitative determination of BSA in up to 40 samples when samples, standards and control are run in duplicates.

1. Allow test reagents and required number of wells to reach room temperature (RT).
   Shake reagents gently before use. Avoid foaming.
2. Pipette 100 µL **CONJ HRP** HRP conjugate per well.
3. Add 100 µL **diluted sample**
   100 µL **STD** **1 - 7** standards 1 - 7
   100 µL **CONTROL** control each and mix gently.
4. Cover plate and incubate for 60 min at RT.
5. Decant, then wash each well 5x with 300 µL diluted wash buffer.
   Tap dry onto absorbent paper if necessary.
7. Add 100 µL **SUBSTR** substrate per well.
8. Incubate for 15 min at RT **protected from light**.
9. Add 100 µL **STOP** stop solution per well, mix gently.
10. Read OD at 450 nm measuring filter and ≥ 620 nm reference filter with a microplate reader within 30 min following reaction stop.

Evaluation of Results

A reference curve is created by plotting the measured absorbances of the standards STD 1 - 7 (y-axis) against the corresponding BSA concentrations (x-axis). Alternatively, sample diluent can be integrated into the reference curve as standard 8. In this case, a fictitious concentration of 0.1 ng/mL must be used for standard 8 to enable the mathematical creation of an extended reference curve.

The 4-parameter regression model is recommended to create the reference curve.

The absorbance of an unknown sample is converted to a BSA concentration [ng/mL] by extrapolating from the reference curve. Samples with higher BSA concentrations than standard STD 1 (50 ng/mL) should be retested after further dilution. In case of a pre-dilution of the samples, multiply the obtained concentration by the dilution factor.

Highly concentrated samples alternatively may be tested in Serazym® Bovine Serum Albumin (order no. E-048) with a measuring range of 15 ng/mL - 500 ng/mL.

Interpretation of Results

Test Validation
The test run is valid, if:

- mean absorbance $OD_{450/620nm}$ of standard STD 1 (50 ng/mL) ≥ 1.5,
- mean absorbance $OD_{450/620nm}$ of standard STD 7 (2.5 ng/mL) ≤ 0.5 and
- control is determined between 20 and 30 ng/mL.

If one of the above-mentioned quality criteria is not met, test should be repeated strictly following the test procedure (sample and wash buffer dilution, incubation times and temperatures, careful washing, etc.). In case of repeated failure of the quality criteria contact the manufacturer.

Performance Characteristics

Precision
For the determination of the intra-assay coefficient of variation (CV) samples were measured in an 8-fold determination in one test run.

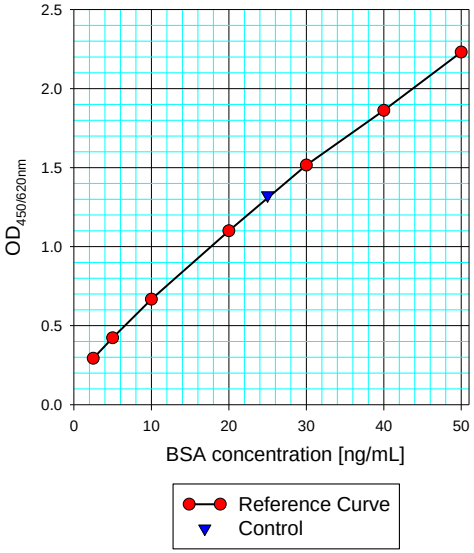
Sample	Intra-assay coefficient of variation			
	$\bar{x}$ OD	CV [%]	Concentration [ng/mL]	CV [%]
1	2.437	1.4	50.1	2.0
2	2.060	1.8	39.8	2.4
3	1.670	3.2	30.0	4.3
4	1.243	4.4	20.2	5.9
5	0.737	4.2	9.9	6.1
6	0.473	2.9	5.0	4.7
7	0.322	0.5	2.5	1.1
8	1.494	2.6	25.9	3.5

The inter-assay coefficient of variation in Serazym® Bovine Serum Albumin (BSA) sensitive was defined by a 3-fold determination of 4 samples in 8 different test runs:

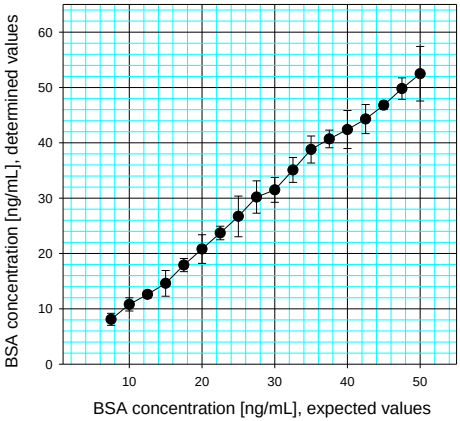
Sample	Inter-assay coefficient of variation			
	$\bar{x}$ OD	CV [%]	Concentration [ng/mL]	CV [%]
1	2.087	5.1	50.9	3.6
2	1.205	5.9	24.2	3.3
3	0.715	5.5	12.0	2.6
4	0.466	6.7	6.3	5.1

Cross-reactivity
Human serum albumin and ovalbumin (3.0 ng/mL - 200 ng/mL respectively) were tested in Serazym® Bovine Serum Albumin (BSA) sensitive. No cross-reactivities were detected.

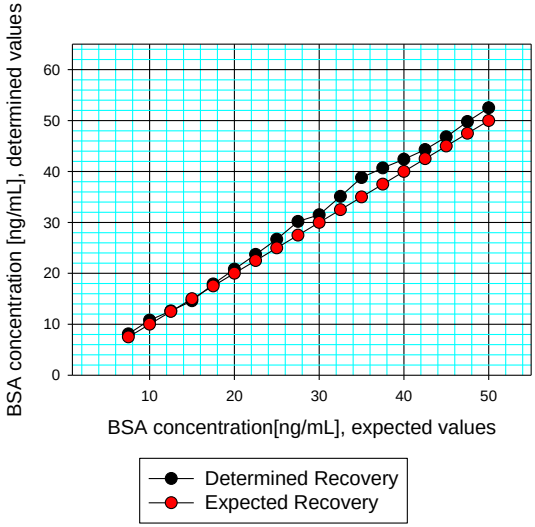
Reference Curve
A typical reference curve of Serazym® Bovine Serum Albumin (BSA) sensitive is shown below:



Linearity of Dilution and Analytical Sensitivity
To determine the analytical sensitivity, a defined BSA solution was arithmetically diluted from a concentration of 50 ng/mL to 7.5 ng/mL in 2.5 ng/mL steps and tested in Serazym® Bovine Serum Albumin (BSA) sensitive. The concentrations determined and the standard deviation (±3SD) are shown below. The analytical sensitivity refers to the concentration that can be reliably differentiated and has been determined at 5.0 ng/mL.



Linearity of Dilution and Recovery
To determine the recovery, a defined BSA solution was arithmetically diluted from a concentration of 50 ng/mL to 7.5 ng/mL in 2.5 ng/mL steps and tested 5-fold in Serazym® Bovine Serum Albumin (BSA) sensitive.



Expected BSA concentration [ng/mL]	Determined BSA concentration [ng/mL]	Recovery [%]
50.0	52.5	105.0
47.5	49.8	104.8
45.0	46.8	104.0
42.5	44.3	104.2
40.0	42.4	106.0
37.5	40.7	108.5
35.0	38.8	110.9
32.5	35.1	108.0
30.0	31.5	105.0
27.5	30.2	109.8
25.0	26.7	106.8
22.5	23.7	105.3
20.0	20.8	104.0
17.5	17.9	102.3
15.0	14.6	97.3
12.5	12.6	100.8
10.0	10.8	108.0
7.5	8.1	108.0

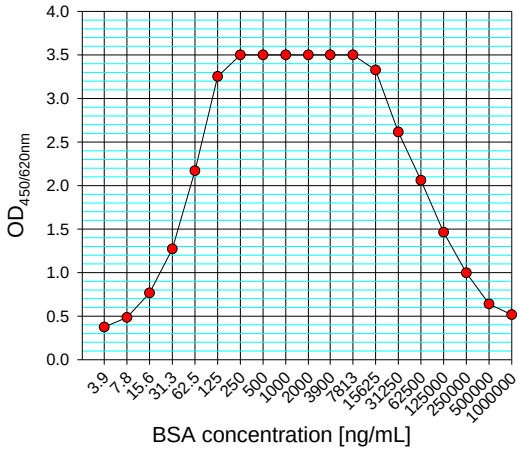
The recovery has been determined within the range of 80-120 %.

High-dose hook effect

To determine the high-dose hook effect occurring in one-step assays (simultaneous incubation of sample and conjugate), BSA concentrations ranging from 3.9 ng/mL (0.0039 µg/mL) to 1,000,000 ng/mL (1,000 µg/mL) were investigated.

The level of signal intensity as a function of the BSA concentration shows a high-dose hook effect starting at a concentration of 8.0 µg/mL BSA.

Samples with BSA concentrations ≥ 8.0 µg/mL may be determined too low due to the high-dose hook effect.



Change History

Version	Section	Modifications
2024-07 (v01)	Entire document	Update of Intended Use Update of Performance Characteristics Revision of section structure Layout and editorial changes