

CHANGE NOTIFICATION

Date: August 18, 2021
From: Henry Turlington, Vice President, Quality Assurance & Regulatory Affairs
Subject: Shelf-Life Extension for Lyophilized Bovine Serum Albumin

Dear Valued Customer:

In our ongoing effort toward continuous quality improvement, Proliant Biologicals is pleased to announce the following process improvement. We are excited the share that, based on the stability studies completed over the past several years, we are increasing the shelf-life for the following products from 36 months to 60 months from the date of manufacture:

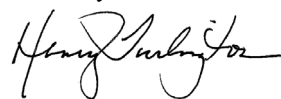
Product Name	SKU
Bovine Serum Albumin Standard Grade pH 7.0 Lyophilized Powder	68100
Bovine Serum Albumin Cohn Analog Culture Grade Lyophilized Powder	68300
Bovine Serum Albumin Standard Grade pH 5.2 Lyophilized Powder	68500
Bovine Serum Albumin Reagent Grade Fatty Acid Free Lyophilized Powder	68700

Data supports the extension of shelf life if the product is stored unopened under ambient conditions. This change will be effective February 14, 2022 (180 days from the notification date). For supporting information on extending the shelf-life, please see attached Appendix A.

We trust you will see these efforts as part of our long-term commitment to quality and reliability as the world's premier BSA manufacturer. Proliant Biologicals, LLC manufacturing is completely integrated, controlling the entire process from plasma collection through drying and packaging resulting in unprecedented and unmatched control over the quality and consistency of our Bovine Serum Albumin.

Please direct any questions to your Proliant Biologicals sales representative or Customer Service.

Sincerely,



Henry Turlington
Vice President, Quality Assurance & Regulatory Affairs

APPENDIX A

Bovine Serum Albumin (BSA) Stability Evaluation

Overview: The stability of BSA for 5 years has been evaluated. The current expiration date assigned to BSA produced in Boone, IA is three (3) years from the date of manufacture. The date may be re-assigned to four (4) and up to five (5) years upon retesting if the product was stored, unopened under ambient conditions. If the product meets the original predetermined final product specification, the date is extended accordingly and it is re-released. The BSA produced by our New Zealand facility has an expiration date of five (5) years. Both locations maintain supporting data for expiration periods. While the Boone plant established a shorter shelf-life, testing results support a longer period. Because the processes are identical at the two plants, it is recommended that the expiration date be harmonized to five (5) years for both sites.

Background: Proliant Bovine Serum Albumin (BSA) is a high purity, lyophilized “Fraction V” powder derived from the plasma of USDA-inspected healthy animals from abattoirs located in the USA. The albumin is isolated from other plasma protein products and lipids by a proprietary non-solvent procedure. The separation process includes a modified Cohn/heat-shock procedure designed to inactivate proteases and other potentially interfering enzymes. Further processing such as extensive membrane dialysis and filtration, minimizes analytes that can cause background interference in sensitive in vitro diagnostic (IVD) assays as well as inhibition in sensitive cell and microbial culture systems.

Program Design: To demonstrate the five (5) year expiration dating of the Boone, IA product, ten (10) samples of five (5) year old retain samples were selected for re-evaluation. Samples were stored at ambient temperature since manufacture. Samples were tested for protein, moisture, Ash, Aerobic Plate Count, Purity, Solubility, and pH. The release specifications for each parameter are provided below in Table 1.

Results: Initial and final (60 months) testing results for ten different lots of bovine serum albumin (BSA) are shown in Table 2.

The following were the key observations:

- Moisture content of the product increased, however, this is expected as the finished product is a dry, hygroscopic powder. The moisture content was still below the $\leq 5.0\%$ specification threshold.
- There were minimal or no changes in protein, ash, APC, purity, solubility, and pH after 5 years from manufacturing for samples stored under dry, ambient temperatures.
- APC levels were below detectable limits of $< 10/g$ after 60 months.

TABLE 1. SPECIFICATIONS FOR BOVINE SERUM ALBUMIN (BSA)	
Item	Specification
Protein	$\geq 98.0\%$
Moisture	$\leq 5.0\%$
Ash	$\leq 2.0\%$
APC	< 1000 cfu/g
Purity	$\geq 98.0\%$
Solubility	Clear to Slightly Hazy
pH	6.5-7.5

Based on the data provided, BSA maintains a shelf-life for at least 60 months (5 years) when stored in dry, ambient conditions.

TABLE 2. INITIAL AND FINAL (60 MONTHS) TESTING RESULTS FOR BOVINE SERUM ALBUMIN (BSA)

Lot Number	Protein, % (Dry Basis)		Moisture, %		Ash, %		pH		Purity, %		APC		Solubility*	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final
BB52860101	101.5	101.8	2.0	3.8	1.3	1.3	6.8	6.8	100	100	< 10/g	< 10/g	Complies	Complies
BB52930101	100.8	99.6	0.8	4.3	1.4	1.2	6.9	6.8	100	100	< 10/g	< 10/g	Complies	Complies
BB53110101	100.4	99.6	0.8	4.1	1.1	1.3	6.9	6.8	100	100	< 10/g	< 10/g	Complies	Complies
BB53160101	99.4	99.8	0.5	4.0	1.4	1.0	6.8	6.8	100	100	20/g	< 10/g	Complies	Complies
BB53190101	100.4	99.7	0.3	4.0	1.2	0.9	6.8	6.8	100	100	10/g	< 10/g	Complies	Complies
BB53250101	99.3	99.4	0.6	4.3	1.0	1.5	6.7	6.8	100	100	< 10/g	< 10/g	Complies	Complies
BB53280101	99.5	99.8	0.8	4.1	1.6	1.3	6.9	6.8	100	100	< 10/g	< 10/g	Complies	Complies
BB53350101	100.0	99.6	0.8	4.0	1.8	1.3	7.0	6.9	100	100	10/g	< 10/g	Complies	Complies
BB53420101	100.2	99.8	0.5	4.3	1.4	1.2	6.8	6.7	100	100	< 10/g	< 10/g	Complies	Complies
BB53470101	100.0	98.8	0.5	4.2	1.4	1.2	6.9	6.8	100	100	< 10/g	< 10/g	Complies	Complies
Average	100.2	99.8	0.8	4.1	1.3	1.2	6.9	6.8	100	100				
St. Dev.	0.7	0.8	0.5	0.2	0.2	0.2	0.1	0.1	-	-				

*Compliance recorded as "Clear to Slightly Hazy" (subjective assessment).