

Welcome to our Education Series



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Bovine Serum Albumin

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Read about [Collection Process](#)

See our [Product Application Guideline](#)



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Introduction

Albumin is one of the most extensively used proteins in biological research today. It acts as a powerful antioxidant in cell culture. It binds, sequesters and stabilizes a variety of molecular species which are often unstable. This acidic, soluble protein has both high affinity and secondary binding sites, optimizing the roles that fatty acids, metals, disulfides, and other molecules play in cellular metabolism.

Role in Mammalian Cell Culture

Fetal bovine serum has been an important part of culturing mammalian cells for decades. Its composition of proteins, nutrients, growth factors, etc. provides cells with a complete cocktail from which to grow. However, with the desire to move toward serum-free media came the need to find alternative supplements to provide cells support in culture. Since the major protein in serum is albumin and it plays many roles in the human body, it was an obvious choice in lieu of serum. It has since become a popular media supplement from both human and bovine sources.



Happy Cows in New Zealand



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BSA is a single polypeptide chain consisting of about 583 amino acid residues and no carbohydrates. At pH 5-7 it contains 17 intrachain disulfide bridges and 1 sulfhydryl group.



Why Is It Used

Bovine Serum Albumin (BSA) is commonly used in cell culture protocols, particularly where protein supplementation is necessary and the other serum components are unwanted. In cell culture, it can act as a small molecule carrier.

Because of its negative charge, Bovine Serum Albumin:

- Binds water, salts, fatty acids, vitamins and hormones and carries these bound components between tissues and cells.
- Its binding capacity also makes Bovine Serum Albumin an effective scavenger removing toxic substances, including pyrogens, from the medium.
- It is readily soluble in water and can only be precipitated by high concentrations of neutral salts such as ammonium sulfate.
- The solution stability of Bovine Serum Albumin is excellent especially if the solutions are stored as frozen aliquots.
- Albumin is used to solubilize lipids, and it is also used as a blocking agent in Western Blot or ELISA applications.
- Albumins are frequently used as stabilizers for other solubilized proteins (e.g., labile enzymes).

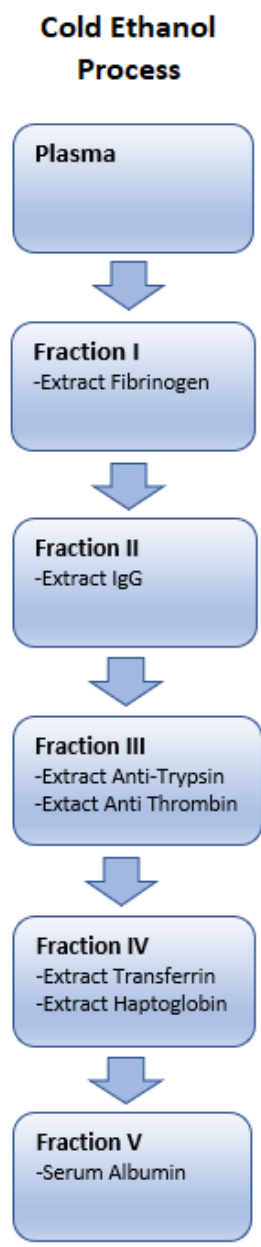


How is it processed

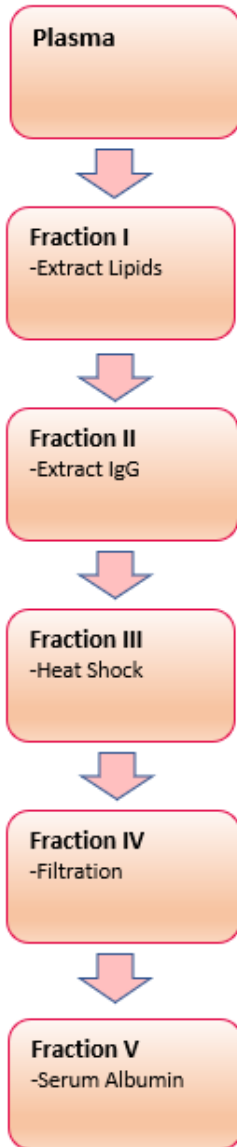
BSA is separated from whole blood using a multi-step fractionation process. Dr. Edwin J. Cohn, a researcher at Harvard University, developed the original process in the 1940's. Dr. Cohn found that the blood proteins could be separated from each other by manipulating the temperature and varying concentrations of an organic solvent. His process used these two variables to separate human blood plasma into five fractions, of which the fifth contains mostly albumin. This is why it was called "Fraction V".

Today there are two major processes used to extract albumin from plasma; they are Cohn's cold-ethanol process and a heat shock process.

Cold-ethanol fractionation involves adding the solvent to bold plasma at different low temperatures until the albumin is precipitated out. This process can leave behind impurities and organic compounds that are less than ideal in BSA.



Heat Shock Process



How is it processed, continued.

Most modern fractionation processes for BSA use heat, rather than organic solvents at several key steps. Ethanolic processes are somewhat dangerous, potentially harmful to the environment and use explosive, highly controlled organic solvents.

Heat-Shocked fractionation involves manipulation of temperature and filtration to separate the albumin from the other plasma components. This generally is a simpler process and yields a product of higher purity.

All of Phoenix Scientific BSA offerings are produced by the Heat-Shock process.

Phoenix Scientific BSA Products

Our HS-100 Standard Grade BSA is low endotoxin, high purity, virus tested for BVD, PI3 and IBR and is consistent from batch to batch.

Our HS-200 Tissue Culture Grade BSA offers all the same qualities of our Standard Grade plus is low IgG, fatty acid free and protease free.

Our BSA grades are designed to work in different applications. Our sales rep will be able to direct you to the appropriate BSA grade needed our use our handy reference chart.

Phoenix Scientific is a Life Sciences Company dedicated to offering the best products for all your cell culture applications. Our customers trust our consistency, reliability and quality and so can you.

Application	Standard Grade BA-100	Tissue Culture Grade BA-200
Blood Bank Reagent/Diluent	•	•
Carrier Protein (binding and transport)	•	•
Immunology Application	•	•
Protein Control	•	•
Protein Stabilier	•	•
Serology Diluent	•	•
Blocking Agent (includes Elisa applications)		•
Cell Culture		•
EIA/RIA Diluent		•
Molecular Biology		•



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