Media Solutions

For Microbial and Molecular Genetics Research Applications

BD

Helping all people
live healthy lives

Microbiology – It's What We Do

BD offers a one-stop resource for all of your microbiology research needs. As one of the largest and oldest manufacturers of dehydrated culture media in the world, BD has a wide breadth of line and over 170 years of combined Difco™ and BBL™ experience in developing culture media. With products from the venerated Bacto™, Difco and BBL lines, BD offers peptones/hydrolysates and ingredients manufactured from meat, animal tissue, collagen, gelatin, casein and from animal-free materials. These materials have been used by generations of researchers in laboratories throughout the world. The combined experience in manufacturing Difco, Bacto and BBL brands, along with state-of-the-art controlled and validated raw material sourcing policies and procedures, allows us to offer reproducibility and consistency in culture media. This means that you don't have to worry about media as a source of variation in experimental parameters. When you're ready to move to production volumes, BD is at your side, ready to support the transfer, with the same, highly consistent media that you used for your research and development. Whether you choose an animal-based formulation or one of our animal-free peptones or hydrolysates, BD stands out as the best choice for media and ingredients for microbial and molecular genetics research applications.

Animal-Based Culture Media, Ingredients and Peptones

Animal-Based Culture Media, Ingredients and Peptones are used in microbiological and cell cultures as nutritional supplements for microorganisms. BD Animal-Based Culture Media, Ingredients and Peptones are highly nutritious supplements usable in almost any microbiological or cell culture. All animal tissues used are sourced in a controlled and validated way as to reduce risk of contamination or exposure to any diseases, especially Bovine Spongiform Encephalopathy (BSE).

- **BBL™ Acidicase™ Peptone**: A hydrochloric acid hydrolysate of casein. The manufacturing process produces a casein hydrolysate that has a high salt content of approximately 37% and nitrogen content of approximately 8%. It is intended for use as a nutritional supplement in microbial fermentation where the high salt content will not interfere.

- **Bacto™ Brain Heart Infusion**: A nutritious, buffered culture medium that contains infusions of brain and heart tissue and peptones to supply protein and other nutrients necessary to support the growth of fastidious and nonfastidious microorganisms.

- **Bacto™ Brain Heart Infusion, Porcine**: Developed as an alternative to the Brain Heart Infusion (BHI) formula, with porcine brains and heart replacing the beef brains and heart. The porcine formulation was developed for pharmaceutical and vaccine production, and can replace the traditional BHI depending on organism and production application. BHI, Porcine is formulated with no bovine components to minimize BSE risk.

- **Bacto™ Beef Extract Dessicated**
  Bacto™ Beef Extract Powder:
  Derived from infusion of beef and provide an undefined source of nutrients. These Beef Extract products are not exposed to the harsh treatment used for protein hydrolysis, so they can complement the nutritive properties of peptone by contributing minerals, phosphates, energy sources and those essential factors missing from peptone.

- **Bacto™ Casamino Acids**
  Bacto™ Casamino Acids, Technical
  BBL™ Casamino Acids, Vitamin Assay:
  Acid hydrolysate of casein. This material makes an excellent supplement for many media formulations where nitrogen requirements are minimal. Bacto Casamino Acids provide nitrogen, vitamins, carbon and amino acids in microbiological culture media. Bacto Casamino Acids, Technical is recommended for use in culture media where amino acid mixtures are required for a nitrogen source, but the sodium chloride and iron content have not been decreased to the same extent as with Bacto Casamino Acids. Casamino Acids, Vitamin Assay is specially treated to markedly reduce or eliminate certain vitamins. It is recommended for use in microbiological assay media and in growth promotion studies.

- **Bacto™ Casein Digest**: An enzymatic digest of casein similar to NZ Amine A. This material was developed for use in cultivating recombinant strains of *Escherichia coli*, and is digested under conditions different from other enzymatic digests of casein, including Tryptone and Casitone. Casein Digest provides amino acids, nucleotide precursors, vitamins and other metabolites that these cells would otherwise have to synthesize.

- **Bacto™ Casitone**: A pancreatic digest of casein that can be used as a component in microbiological media or in fermentation applications. The manufacturing procedure for this product does not break down the casein into its constituent components as completely as does an acid hydrolysis. In many cases, this makes for a more nutritious hydrolysate, especially for organisms that prefer peptides to amino acids.

- **Bacto™ Neopeptone**: An enzymatic digest of protein. Bacto Neopeptone contains a wide variety of peptide sizes in combination with vitamins, nucleotides and minerals. It is recommended for use in media for detection of fungi, and has also been reported to provide nutrients for support of spirochetes and protozoa.
- **Bacto™ Peptone**: An enzymatic digest of animal protein. Bacto Peptone contains nitrogen in a form that is readily available for bacterial growth. Bacto Peptone has a high peptone and amino acid content, with only a negligible quantity of proteoses and more complex nitrogenous constituents.
- **Bacto™ Proteose Peptone**
  Bacto™ Proteose Peptone #2
  Bacto™ Proteose Peptone #3:
  Enzymatic digests of protein that provide nitrogen in a form that is readily available for bacterial growth. All Proteose Peptone products are used in preparing microbiological culture media and in producing bacterial toxins. It has been reported that Proteose Peptone as supplementation to defined medium resulted in significant increases in cell number and specific monoclonal antibody production in batch culture systems. Bacto Proteose Peptone #3 provides superior nutrition for fastidious organisms.
- **Difco™ SOB Medium**: Used for cultivating recombinant strains of *Escherichia coli*. The peptone and yeast extract provide sources of nitrogen and growth factors that allow the bacteria to recover from the stress of transformation and grow well.
- **Difco™ Skim Milk**: Skim Milk is used for preparing microbiological culture media. Skim Milk Medium may be used for the maintenance and propagation of lactic acid bacteria.
- **Bacto™ TC Lactalbumin Hydrolysate**: The enzymatically hydrolyzed protein portion of milk whey, which is recognized as a complete protein source. Bacto TC Lactalbumin Hydrolysate is intended as a nutritional supplement for bacterial, insect and mammalian cell culture.
- **Difco™ Terrific Broth**: Terrific Broth is a highly enriched medium developed by Tartoff and Hobbs to improve yield in plasmid-bearing *Escherichia coli*. Recombinant strains have an extended growth phase in the medium. The addition of extra peptone and yeast extract in the medium allows higher plasmid yield per volume.
- **Bacto™ Tryptic Soy Broth**
  BBL™ Trypticase™ Soy Broth:
  A nutritious medium that will support the growth of a wide variety of microorganisms, including common aerobic, facultative and anaerobic bacteria and fungi.
- **Bacto™ Tryptone**
  Bacto™ Trypticase™ Peptone:
  A pancreatic digest of casein that meets *USP* specifications. Bacto Tryptone is notable for the absence of detectable levels of carbohydrates, and has been used in conjunction with casamino acids in nutritional studies to determine amino acids vs. peptide utilization. Trypticase Peptone is the primary nitrogen source in Trypticase Broth and Agar.
- **Bacto™ Tryptose**: A mixed enzymatic hydrolysate with distinctive nutritional properties. The digestive process of Bacto Tryptose results in assorted peptides of higher molecular weight suitable for long chain amino acid requirements. Bacto Tryptose provides nitrogen, amino acids and vitamins in microbiological culture media.

Animal-Free Peptones and Hydrolysates

BD Animal-Free Peptones and Hydrolysates include peptones, yeast extracts and yeastolates, all of which serve as nutritional supplements in microbiological culture media. Proteins, derived from animal-free sources such as soybean, yeast and grains, are broken down into amino acids and peptides by using strong acids or proteolytic enzymes such as pepsin, papain or pancreatin. These protein hydrolysates are called Peptones. Using BD Animal-Free Peptones and Hydrolysates reduces the risk of exposure to Bovine Spongiform Encephalopathy (BSE) and other animal-borne diseases.

- **Bacto™ Malt Extract**: The water-soluble portion of malted barley. This product is very high in carbohydrate content and is suitable for the growth of yeasts and molds because of the high concentration of reduced sugars, especially the maltoses.
- **BBL™ Phytone™ Peptone**
  Difco™ Phytone™ Peptone, Ultra Filtered
  Bacto™ Soytone*
  Difco™ Select Soytone:
  Animal-free soy peptones. Phytone Peptone formulations retain the high vitamin and high carbohydrate content of the soy plant tissue. The Ultra Filtered product was developed specifically for the tissue culture market. Its nitrogen content combined with the naturally occurring vitamins has demonstrated remarkable growth support with monoclonal antibodies and protein expression. Difco Select Soytone demonstrates excellent growth support for *Escherichia coli* and is also used in molecular genetics media such as Difco Select APS™ Super Broth.
- **Yeast Extracts**: Concentrates of the water-soluble portion of *Saccharomyces cerevisiae* cells that have been autolyzed. The autolysis is carefully controlled to preserve the naturally occurring B-complex vitamins. Yeast extract is considered a non-animal product and is used extensively for many non-animal formulations for bacterial, fungal, mammalian and insect cell culture. Bacto Yeast Extract is one of the most complete and versatile fermentation bionutrients available. Bacto Yeast Extract, UF is ultra-filtered and specifically designed for tissue culture applications. With its low endotoxin level and high content of naturally occurring B vitamins, it is an ideal substitute for fetal bovine serum. Yeastolates are mixtures of peptides, amino acids, carbohydrates, simple and complex, as well as vitamins. Both Bacto TC Yeastolate and Bacto Yeastolate, Ultra Filtered are used as nutritional supplements for bacterial, insect and mammalian cell cultures.

*Note: Bacto™ Soytone utilizes an animal based enzyme in the digestion of the soy flour.

Molecular Genetics Media Formulations

BD Molecular Genetics Media Formulations are specifically designed for growing cell cultures for molecular genetic studies. They are made to be especially rich and nutritious in order to offer excellent growth support for the fastidious organisms used in molecular genetic studies.

- **Difco™ 2xYT Medium**: A nutritionally rich growth medium designed for growth of recombinant strains of *Escherichia coli*. Also used for propagation of M13 bacteriophage for sequencing and phage display research. The components of Difco 2xYT Medium provide nitrogen and growth factors that allow bacteriophage to reproduce in large quantities without exhausting the host.

- **Difco™ LB Agar, Lennox**
  Difco™ LB Broth, Lennox
  Difco™ LB Agar, Miller
  Difco™ LB Broth, Miller
  Difco™ Luria Agar Base, Miller
  Difco™ Luria Broth Base, Miller:
  Nutritionally rich media used for maintaining and cultivating recombinant strains of *Escherichia coli* in molecular microbiology procedures. The Lennox and Miller formulae are designed for growth of pure cultures of recombinant strains. The media provide all of the nutritional requirements of organisms that have been derived from *Escherichia coli* K12, which are deficient in B vitamin production. *Escherichia coli* grows more rapidly than in conventional media, because these media provide the cells with amino acids, nucleotide precursors, vitamins and other metabolites that the microorganism would otherwise have to synthesize. The Difco Luria Agar Base, Miller and Difco Luria Broth Base, Miller media are based on the Luria agar and broth formulae described by Miller. Difco Luria Agar Base, Miller and Difco Luria Broth Base, Miller contain one-tenth and one-twentieth, respectively, the sodium chloride level of the Difco LB Agar, Lennox and Difco LB Agar, Miller formulations. This allows the researcher to select the optimal salt concentration for a specific strain. The Difco Luria Base, Miller media may be aseptically supplemented with glucose, if desired.

- **Difco™ M9 Minimal Salts, 5X**: Used to prepare M9 Minimal Medium, which is used for cultivating recombinant strains of *Escherichia coli*. Difco M9 Minimal Salts, 5X is a minimal chemically defined dehydrated culture media comprised only of ingredients with known chemical structures. Difco M9 Minimal Salts, 5X is a 5X concentrate that is diluted to a 1X concentration and supplemented with an appropriate carbon and energy source, such as dextrose, to provide a minimal medium.

- **Difco™ Minimal Agar Davis**: Used for isolating and characterizing nutritional mutants of *Escherichia coli*. Difco Minimal Broth Davis without Dextrose is used with added dextrose in isolating and characterizing nutritional mutants of *Escherichia coli* and *Bacillus subtilis*.

- **Difco™ NZCYM Broth**
  Difco™ NZYM Broth
  Difco™ NZY Broth with Thymine:
  Used for cultivating recombinant strains of *Escherichia coli*. NZCYM Broth was developed by Blattner et al. as an enriched medium for cultivating recombinant strains of *Escherichia coli* and propagating λ bacteriophage. *Escherichia coli* grows rapidly in rich media, such as the NZ media, which provide amino acids, vitamins and other metabolites the cell would otherwise have to synthesize. The two variations of NZ media allow the user to select a formulation appropriate to the need.

- **Difco™ YPD Agar**
  Difco™ YPD Broth:
  Used for maintaining and propagating yeasts in molecular microbiology procedures. These are minimal media, with added protein and yeast cell extract hydrolysates that allow faster growth so that during exponential or log-phase growth, the cells divide every 90 minutes.

Select Alternative Protein Source (APS) Media

Animal-Free APS™ (Alternative Protein Source) Bacteriological and Molecular Genetics Media consists of media formulated for the use of growing cell cultures for bacteriological and molecular genetics studies, utilizing animal-free ingredients. These APS media are nutrient-rich formulations designed to out-perform classical animal-based molecular genetics media formulations. Select APS media are manufactured from animal-free ingredients in order to minimize the risk of Bovine Spongiform Encephalopathy (BSE) in culture media containing animal, especially bovine materials.

- **BBL™ Select APS™ LB Broth Base**: An excellent all-purpose growth medium based on the LB Broth Lennox formulation with 5.0 g/L sodium chloride, which was developed by Lennox for the growth and maintenance of recombinant strains of *Escherichia coli*.
- **Difco™ Select APS™ Super Broth**: A molecular genetic medium based on the Terrific Broth formulation designed by Tartof and Hobbs to improve yield of plasmid-bearing *Escherichia coli* strains over that of LB Broth. The lack of glucose in the formulation prevents acetate build-up in the fermentation of the organism. The buffering system, 1.14% dipotassium phosphate and 0.17% monopotassium phosphate, is altered from that of classical Terrific Broth, and prevents cell death caused by pH drop.

Agars

Agar is a phycocolloid extracted from a group of red-purple marine algae (Class Rhodophyceae) including *Gelidium*, *Pterocladia* and *Gracilaria*. *Gelidium* is the preferred source for agars that are used for bacterial growth. Impurities, debris, minerals and pigment are reduced to specified levels during manufacturing. Agar that is used for microbiological purposes must have good clarity, controlled solidifying and melting temperatures, good diffusion characteristics, absence of toxic bacterial inhibitors and relative absence of metabolically useful minerals and compounds.

The *Gelidium* marine algae from world sources is selected. Through a variety of processes, the agar is extracted from the *Gelidium*, resulting in a liquid agar that is purified. The liquid agar is first gelled, causing the soluble and suspended contaminants to be trapped, then washed from the agar, eliminating the contaminants. BD manufactures several different types of agars that are suitable for different applications:

- **Bacto™ Agar**: Optimized for beneficial calcium and magnesium content, and reduction of detrimental ions such as copper and iron. Bacto Agar is recommended for clinical applications, auxotrophic studies, bacterial and yeast transformation studies and bacterial molecular genetics applications.
- **BBL™ Agarose**: The low sulfate, neutral gelling fraction of agar. During the fractionation of agar, the agarose portion is separated from the highly charged polysaccharides (high sulfate, nongelling portion), purified and dried. Because of its method of preparation, Agarose is considerably purer than the special kinds of agar, with respect to ionic groups, rendering it more valuable for gel electrophoresis. In addition to high chemical purity, Agarose must exhibit certain physical properties, e.g. high gel strength and high gel clarity.
- **Difco™ Noble Agar**: Extensively washed and bleached. This agar should be used for applications where extreme clarity and high purity are required. Noble Agar is suitable for immunodiffusion, some electrophoretic applications and as a substrate for mammalian or plant tissue culture.
- **Difco™ Granulated Agar**: Qualified for culturing recombinant strains of *Escherichia coli* (HB101) and *Saccharomyces cerevisiae*. Granulated Agar may be used for general bacteriological purposes where clarity is not a strict requirement.
- **BBL™ Agar, Grade A**: Select grade of agar containing essential minerals for bacterial growth. When utilized as an ingredient, most media formulations demonstrate improved growth and test reactions.
- **Difco™ Technical Agar**: Suitable for many bacteriological applications. This agar is not highly processed, has broader technical specifications than other agars and is not recommended for growth of fastidious organisms.
- **BBL™ Agar, Select**: This agar is tested as NZC Bottom Agar and NZC Top Agar, and tested for satisfactory propagation of bacteriophage lamda Charon 30 utilizing *Escherichia coli* ATCC 33526 (K802).
- **Difco™ Gelatin**: This medium of Gelatin is a high grade gelatin in granular form which may be used as a solidifying agent or may be incorporated into culture media for various uses. Gelatin is also used as a source of nitrogen and amino acids.

Animal-Based Culture Media, Ingredients and Peptones

211843	BBL™ Acidicase Peptone	500g
237500	Bacto™ Brain Heart Infusion	500g
256120	Bacto™ Brain Heart Infusion, Porcine	500g
212610	Bacto™ Beef Extract (Paste)	500g
211520	Bacto™ Beef Extract Desiccated	500g
212303	Bacto™ Beef Extract Powder	500g
223050	Bacto™ Casamino Acids	500g
223120	Bacto™ Casamino Acids, Technical	500g
228830	BBL™ Casamino Acids, Vitamin Assay	500g
211610	Bacto™ Casein Digest	500g
225930	Bacto™ Casitone	500g
211681	Bacto™ Neopeptone	500g
211677	Bacto™ Peptone	500g
211684	Bacto™ Proteose Peptone	500g
212120	Bacto™ Proteose Peptone No. 2	500g
211693	Bacto™ Proteose Peptone No. 3	500g
244310	Difco™ SOB Medium	500g
232100	Difco™ Skim Milk	500g
259962	Bacto™ TC Lactalbumin Hydrolysate	500g
243820	Difco™ Terrific Broth	500g
211825	Bacto™ Tryptic Soy Broth	500g
211768	BBL™ Trypticase Soy Broth	500g
211705	Bacto™ Tryptone	500g
211921	Bacto™ Trypticase Peptone	454g
211713	Bacto™ Tryptose	500g

Animal-Free Peptones and Hydrolysates

218630	Difco™ Malt Extract	500g
211906	BBL™ Phytone™ Peptone	454g
210931	BBL™ Select Phytone™ UF	500g
243620	Bacto™ Soytone*	500g
212488	Difco™ Select Soytone	500g
212750	Bacto™ Yeast Extract	500g
210933	Bacto™ Yeast Extract, Low Dusting	500g
288620	Bacto™ Yeast Extract, Technical	500g
210929	Bacto™ Yeast Extract, Ultra Filtered	500g
255772	Bacto™ TC Yeastolate	100g
292804	Bacto™ TC Yeastolate, Ultra Filtered	500g

*Note: Bacto™ Soytone utilizes an animal based enzyme in the digestion of the soy flour.

Molecular Genetics Media Formulations

244020	Difco™ 2xYT Medium	500g
240110	Difco™ LB Agar, Lennox	500g
244520	Difco™ LB Agar, Miller	500g
240230	Difco™ LB Broth, Lennox	500g
244620	Difco™ LB Broth, Miller	500g
241320	Difco™ Luria Agar Base, Miller	500g
241420	Difco™ Luria Broth Base, Miller	500g
248510	Difco™ M9 Minimal Salts 5X	500g
254410	Difco™ Minimal Agar Davis	500g
275610	Difco™ Minimal Broth Davis without Dextrose	500g
240410	Difco™ NZCYM Broth	500g
241510	Difco™ NZYM Broth	500g
299313	Difco™ NZY Broth with Thymine	500g
242720	Difco™ YPD Agar	500g
242820	Difco™ YPD Broth	500g

Select Alternative Protein Source (APS) Media

292438	BBL™ Select APS™ LB Broth Base	500g
212485	Difco™ Select APS™ Super Broth	500g

Agars

214050	Bacto™ Agar	100g
214010	Bacto™ Agar	454g
212272	Difco™ Agarose	500g
214220	Difco™ Noble Agar	100g
214230	Difco™ Noble Agar	500g
214530	Difco™ Granulated Agar	500g
212304	Difco™ Agar, Grade A	454g
281230	Difco™ Technical Agar	500g
299340	BBL™ Agar, Select	500g
214340	Difco™ Gelatin	500g

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Find out what we can do for you.

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Ordering Information

BD Media Solutions for Sterility Testing, Microbiological Examination of Non-Sterile Product Testing and Environmental Monitoring

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