## User Quality Control

### *Identity Specifications*

**BBL™ Polypeptone™ Peptone**

| | |
|---|---|
| Dehydrated Appearance: | Light to dark, yellow to tan, fine, homogeneous, free of extraneous material. |
| Solution: | 2.0% solution, soluble in purified water. Solution is light to medium, yellow to tan, clear to slightly hazy. |
| Reaction of 2.0% Solution at 25°C: | pH 6.8-7.5 |

### *Cultural Response*

**BBL™ Polypeptone™ Peptone**

Prepare a sterile solution of peptone agar without (plain) and with 5% sheep blood (SB) using 10 g of **Polypeptone** Peptone, 2.5 g of sodium chloride and 6.5 g of agar in 500 mL of purified water. Adjust final pH to 7.2-7.4. Inoculate and incubate plates at 35 ± 2°C for 2-3 days (incubate streptococci with 3-5% $CO_2$).

| ORGANISM | ATCC™ | INOCULUM CFU | RECOVERY PLAIN | RECOVERY WITH SB |
|---|---|---|---|---|
| *Salmonella enterica* subsp. *enterica* serotype Typhi | 19430 | $10^3$-$10^4$ | Good | N/A |
| *Staphylococcus aureus* | 6538P | $10^3$-$10^4$ | Good | N/A |
| *Streptococcus pneumoniae* | 6305 | $10^3$-$10^4$ | N/A | Good, alpha hemolysis |
| *Streptococcus pyogenes* | 49117 | $10^4$-$10^5$ | Good | Good, beta hemolysis |

## Expected Results

Refer to appropriate references and procedures for results.

## References

1. Tsuchiya and Kimura. 1978. Appl. Environ. Microbiol. *35*:631.
2. Son, Heo, Kim and Lee. 2001. Biotechnol. Appl. Biochem. *33(Pt 1)*:1.
3. Lee, Lee, Kwon, Lee and Chang. 2000. Appl. Microbiol. Biotechnol. *54*:23.
4. Yang, Takeyama, Tanaka and Matsunaga. 2001. Enzyme Microbiol. Technol. *29*:13.
5. Taniyama, Yoshida and Furuta. 1988. J. Immunol. *141*:4061.
6. Horowitz (ed.). 2007. Official methods of analysis of AOAC International, 18th ed., online. AOAC International, Gaithersburg, Md.
7. U.S. Food and Drug Administration. 2001. Bacteriological analytical manual, online. AOAC International, Gaithersburg, Md.
8. Downes and Ito (ed.). 2001. Compendium of methods for the microbiological examination of foods, 4th ed. American Public Health Association, Washington, D.C.
9. United States Pharmacopeial Convention, Inc. 2008. The United States pharmacopeia 31/The national formulary 26, Supp. 1, 8-1-08, online. United States Pharmacopeial Convention, Inc., Rockville, Md.
10. Eaton, Rice and Baird (ed.). 2005. Standard methods for the examination of water and wastewater, 21st ed., online. American Public Health Association, Washington, D.C.
11. U.S. Department of Agriculture. Microbiology laboratory guidebook, online. Food Safety and Inspection Service, USDA, Washington, D.C.

## Availability

**BBL™ Polypeptone™ Peptone**

AOAC BAM COMPF SMWW USDA USP

Cat. No. 211910 Dehydrated – 454 g
297108 Dehydrated – 10 kg

# Potato Dextrose Agar • Potato Dextrose Broth

## Intended Use

Potato Dextrose Agar is used for the cultivation and enumeration of yeasts and molds.

Potato Dextrose Broth is used for cultivating yeasts and molds.

**Potato Dextrose Agar meets *United States Pharmacopeia (USP)*, *European Pharmacopoeia (EP)* and *Japanese Pharmacopoeia (JP)*[1-3] performance specifications, where applicable.**

## Summary and Explanation

Potato Dextrose Agar is a general purpose medium for yeasts and molds that can be supplemented with acid or antibiotics to inhibit bacterial growth. It is used in plate count methods when testing food,[4-6] dairy products[7] and cosmetics.[5,6] The *USP* lists Potato Dextrose Agar as one of the recommended media for use in the Microbial Enumeration Tests when testing nonsterile pharmaceutical products.[1]

Potato Dextrose Agar can be used to grow clinically significant yeasts and molds.[8,9] In addition, this medium is used to stimulate sporulation (slide preparations), maintain stock cultures of certain dermatophytes and differentiate atypical varieties of dermatophytes by pigment production.[10]

Potato Dextrose Broth is a general-purpose broth medium for yeasts and molds (Potato Dextrose Agar without the agar).

## Principles of the Procedure

Potato starch, potato infusion and dextrose support luxuriant growth of fungi. Lowering the pH of the medium to approximately 3.5 with sterile tartaric acid achieves the inhibition of bacterial growth. It is important, however, to avoid heating the medium after it has been acidified because this action results in the hydrolysis of the agar and impairs its ability to solidify.

## Formulae

**Difco™ Potato Dextrose Agar**

| Approximate Formula* Per Liter | | |
|---|---|---|
| Potato Starch (from infusion)** | 4.0 | g |
| Dextrose | 20.0 | g |
| Agar | 15.0 | g |

**Adjusted and/or supplemented as required to meet performance criteria.*
***Approximates 200 g of infusion from potatoes.*

**Difco™ Potato Dextrose Broth**

Consists of the same ingredients without the agar.

## User Quality Control

NOTE: Differences in the Identity Specifications and Cultural Response testing for media offered as both **Difco**™ and **BBL**™ brands may reflect differences in the development and testing of media for industrial and clinical applications, per the referenced publications.

### *Identity Specifications*

#### Difco™ Potato Dextrose Agar

| | |
|---|---|
| Dehydrated Appearance: | Light beige, free-flowing, homogeneous (may contain small dark particles). |
| Solution: | 3.9% solution, soluble in purified water upon boiling. Solution is light amber, slightly opalescent. |
| Prepared Appearance: | Light amber, slightly opalescent. |
| Reaction of 3.9% Solution at 25°C: | pH 5.6 ± 0.2 |

#### Difco™ Potato Dextrose Broth

| | |
|---|---|
| Dehydrated Appearance: | Light beige, free-flowing, homogeneous. |
| Solution: | 2.4% solution, soluble in purified water upon boiling. Solution is very, very light amber, clear to very slightly opalescent. |
| Prepared Appearance: | Very, very light amber, clear to very slightly opalescent. |
| Reaction of 2.4% Solution at 25°C: | pH 5.1 ± 0.2 |

### *Cultural Response*

#### Difco™ Potato Dextrose Agar

Prepare the medium per label directions. Inoculate and incubate at 25-30°C for 18-48 hours (up to 7 days for *T. mentagrophytes*). For *Aspergillus brasiliensis*, incubate at 20-25°C for 5 days.

| ORGANISM | ATCC™ | INOCULUM CFU | RECOVERY |
|---|---|---|---|
| *Candida albicans* | 10231 | $10^3$-$10^4$ | Good |
| *Saccharomyces cerevisiae* | 9763 | $10^3$-$10^4$ | Good |
| *Trichophyton mentagrophytes* | 9533 | Undiluted | Good |
| *Aspergillus brasiliensis (niger)* | 16404 | <100 | Growth |

#### Difco™ Potato Dextrose Broth

Prepare the medium per label directions. Inoculate and incubate at 25 ± 2°C for 40-48 hours.

| ORGANISM | ATCC™ | INOCULUM CFU | RECOVERY |
|---|---|---|---|
| *Aspergillus brasiliensis (niger)* | 16404 | 30-300 | Good |
| *Candida albicans* | 10231 | 30-300 | Good |
| *Lactobacillus casei* | 7469 | 30-300 | Fair to good |
| *Saccharomyces cerevisiae* | 9763 | 30-300 | Good |

### *Identity Specifications*

#### BBL™ Potato Dextrose Agar (prepared)

| | |
|---|---|
| Appearance: | Light to medium tan cream and trace hazy. |
| Reaction at 25°C: | pH 5.6 ± 0.2 |

### *Cultural Response*

#### BBL™ Potato Dextrose Agar (prepared)

Inoculate and incubate at 20-25°C for up to 7 days (up to 3 days for *C. albicans*) under appropriate atmospheric conditions.

| ORGANISM | ATCC™ | INOCULUM CFU | RECOVERY |
|---|---|---|---|
| *Candida albicans* | 10231 | 10-100 | Good |
| *Candida albicans* | 60193 | 10-100 | Good |
| *Saccharomyces cerevisiae* | 9763 | $10^3$-$10^4$ | Good |
| *Trichophyton mentagrophytes* | 9533 | Undiluted | Good |
| *Aspergillus brasiliensis (niger)* | 16404 | <100 | Growth |

## Directions for Preparation from Dehydrated Product

1. Suspend the powder in 1 L of purified water:
   **Difco™ Potato Dextrose Agar** – 39 g;
   **Difco™ Potato Dextrose Broth** – 24 g.
   Mix thoroughly.
2. Heat with frequent agitation and boil for 1 minute to completely dissolve the powder.
3. Autoclave at 121°C for 15 minutes.
4. To alter the reaction of the agar medium to pH 3.5, cool the base to 45-50°C and aseptically add an appropriate amount of sterile 10% tartaric acid to each liter of medium. Mix well. Do not reheat the medium.
5. Test samples of the finished product for performance using stable, typical control cultures.

## Sample Collection and Handling

For clinical specimens, refer to laboratory procedures for details on specimen collection and handling.[8,9]

For food, dairy and cosmetic samples, follow appropriate standard methods for details on sample collection and preparation according to sample type and geographic location.[4-7]

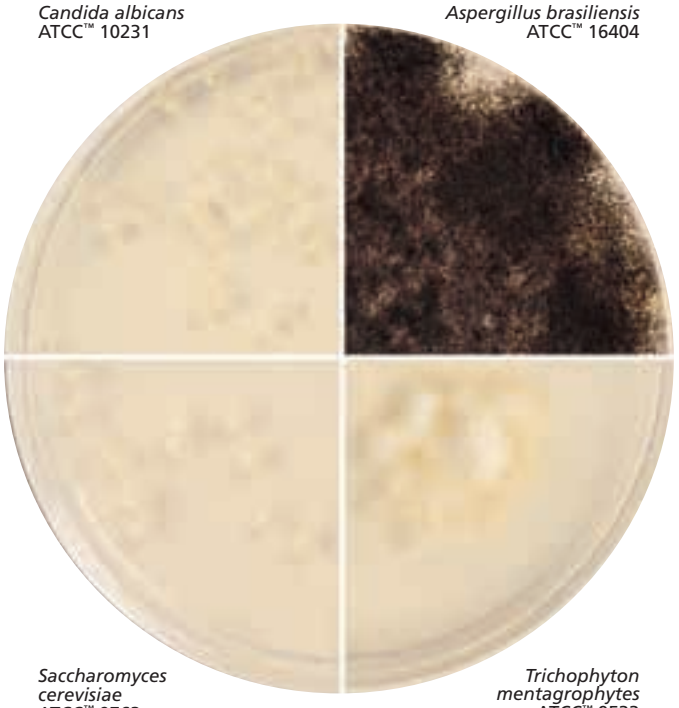
For pharmaceutical samples, refer to the *USP* for details on sample collection and preparation for testing of nonsterile products.[1]

## Procedure

For clinical specimens, refer to appropriate standard references for details on testing protocol to obtain isolated colonies from specimens using Potato Dextrose Agar.[8,9]

For food, dairy and cosmetic samples, refer to appropriate standard references for details on test methods using Potato Dextrose Agar.[4-7]

For pharmaceutical samples, refer to *USP* General Chapter <61> for details on the examination of nonsterile products and Microbial Enumeration Tests using Potato Dextrose Agar.[1]




Liquefy the medium in pour tubes by heating in boiling water. Cool to 45-50°C and pour into sterile Petri dishes. Allow to solidify for a minimum of 30 minutes.

Streak the specimen onto prepared media with a sterile inoculating loop to obtain isolated colonies. When used for determining yeast and mold counts, the medium should be adjusted to a pH of approximately 3.5 with sterile tartaric acid and used in the standard pour plate technique. Incubate the plates at 25-30°C with increased humidity for up to 7 days.

Tubed slants are used primarily for the cultivation and maintenance of pure cultures. They should be inoculated with an inoculating loop and incubated under the same conditions as the plated medium.

For isolation of fungi from potentially contaminated specimens, a selective medium should be inoculated along with the nonselective medium. For isolation of fungi causing systemic mycoses, two sets of media should be inoculated, with one set incubated at 25-30°C and a duplicate set at 35 ± 2°C. All cultures should be examined at least weekly for fungal growth and should be held for 4-6 weeks before being reported as negative.

Inoculation of Potato Dextrose Broth with pure cultures of yeasts can assist in their identification.

## Expected Results

After sufficient incubation, the plates which were streak inoculated should show isolated colonies in streaked areas and confluent growth in areas of heavy inoculation. The colonies in pour plates should be counted and the results expressed as yeast and mold counts per gram or milliliter of material, taking into account the applicable dilution factor.

Growth from tubes inoculated with pure cultures may be used for biochemical and/or serological testing.

For broth, observe cultures for surface growth and pellicle formation.

## Limitations of the Procedure

1. Heating Potato Dextrose Agar after acidifying hydrolyzes the agar and may destroy the solidifying properties.
2. Potato Dextrose Agar is not a differential medium. Perform microscopic examination and biochemical tests to identify isolates to genus and species if necessary.

## References

1. United States Pharmacopeial Convention, Inc. 2008. The United States pharmacopeia 31/The national formulary 26, Supp. 1, 8-1-08, online. United States Pharmacopeial Convention, Inc., Rockville, Md.
2. European Directorate for the Quality of Medicines and Healthcare. 2008. The European pharmacopoeia, 6th ed., Supp. 1, 4-1-2008, online. European Directorate for the Quality of Medicines and Healthcare, Council of Europe, 226 Avenue de Colmar BP907-, F-67029 Strasbourg Cedex 1, France.
3. Japanese Ministry of Health, Labour and Welfare. 2006. The Japanese pharmacopoeia, 15th ed., online. Japanese Ministry of Health, Labour and Welfare.
4. Downes and Ito (ed.). 2001. Compendium of methods for the microbiological examination of foods, 4th ed. American Public Health Association, Washington, D.C.
5. Horwitz (ed.). 2007. Official methods of analysis of AOAC International, 18th ed., online. AOAC International, Gaithersburg, Md.
6. U.S. Food and Drug Administration. Bacteriological analytical manual, online. AOAC International, Gaithersburg, Md.
7. Wehr and Frank (ed.). 2004. Standard methods for the examination of dairy products, 17th ed. American Public Health Association, Washington, D.C.
8. Murray, Baron, Jorgensen, Landry and Pfaller (ed.). 2007. Manual of clinical microbiology, 9th ed. American Society for Microbiology, Washington, D.C.
9. Isenberg and Garcia (ed.). 2004 (update, 2007). Clinical microbiology procedures handbook, 2nd ed. American Society for Microbiology, Washington, D.C.
10. MacFaddin. 1985. Media for isolation-cultivation-identification-maintenance of medical bacteria, vol. 1. Williams & Wilkins, Baltimore, Md.

## Availability

### Difco™ Potato Dextrose Agar

AOAC BAM BS12 CCAM CMPH2 COMPF EP JP MCM9 SMD USP

| | | |
|---|---|---|
| Cat. No. | 213300 | Dehydrated – 100 g† |
| | 213400 | Dehydrated – 500 g† |
| | 213200 | Dehydrated – 2 kg† |

### BBL™ Potato Dextrose Agar

AOAC BAM BS12 CCAM CMPH2 COMPF EP JP MCM9 SMD USP

| | | |
|---|---|---|
| Cat. No. | 221002 | Prepared Pour Tubes, 20 mL – Pkg. of 10 |
| | 297241 | Prepared Slants – Pkg. of 10 |
| | 299906 | Prepared Bottles,500 mL (septum screw cap) – Pkg. of 10† |

*United States and Canada*

| | | |
|---|---|---|
| Cat. No. | 296272 | Prepared Plates (Deep Fill) – Pkg. of 20* |
| | 297945 | Prepared Plates (Deep Fill) – Ctn. of 100* |

*Japan*

| | | |
|---|---|---|
| Cat. No. | 251545 | Prepared Plates – Ctn. of 100* |
| | 251821 | Prepared Plates (Deep Fill) – Ctn. of 100* |
| | 251544 | Prepared Plates (150 × 15 mm-style) – Pkg. of 24* |

*Mexico*

| | | |
|---|---|---|
| Cat. No. | 252632 | Prepared Bottles, 140 mL – Pkg. of 12 |

NOTE: None of the prepared media contain tartaric acid.

### Difco™ Potato Dextrose Broth

| | | |
|---|---|---|
| Cat. No. | 254920 | Dehydrated – 500 g |

** Store at 2-8°C.*
*† QC testing performed according to USP/EP/JP performance specifications.*