

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 products⁷ 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.

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

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
<i>Candida albicans</i>	10231	10 ³ -10 ⁴	Good
<i>Saccharomyces cerevisiae</i>	9763	10 ³ -10 ⁴	Good
<i>Trichophyton mentagrophytes</i>	9533	Undiluted	Good
<i>Aspergillus brasiliensis (niger)</i>	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
<i>Aspergillus brasiliensis (niger)</i>	16404	30-300	Good
<i>Candida albicans</i>	10231	30-300	Good
<i>Lactobacillus casei</i>	7469	30-300	Fair to good
<i>Saccharomyces cerevisiae</i>	9763	30-300	Good

Identity Specifications

BBL™ Potato Dextrose Agar (prepared)

Appearance: Light to medium tan cream and trace hazy.

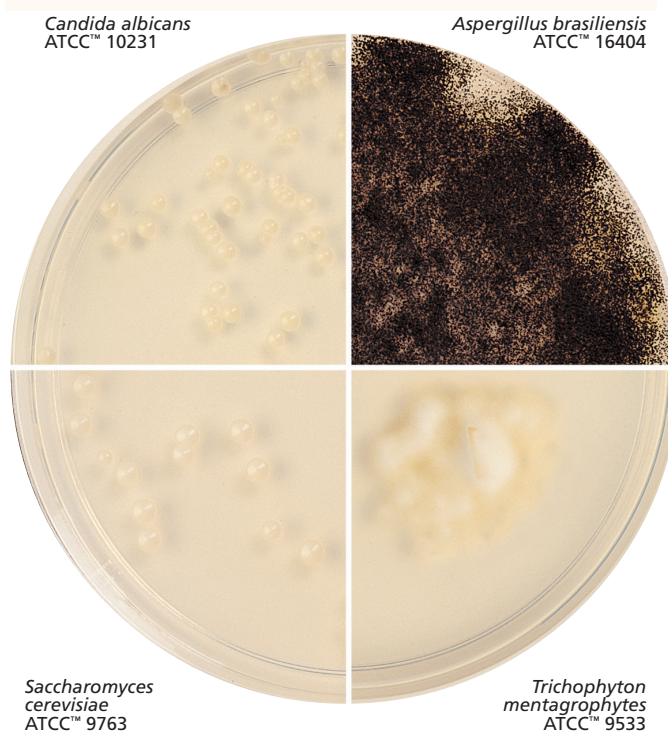
Reaction at 25°C: pH 5.6 ± 0.2

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
<i>Candida albicans</i>	10231	10-100	Good
<i>Candida albicans</i>	60193	10-100	Good
<i>Saccharomyces cerevisiae</i>	9763	10 ³ -10 ⁴	Good
<i>Trichophyton mentagrophytes</i>	9533	Undiluted	Good
<i>Aspergillus brasiliensis (niger)</i>	16404	<100	Growth



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
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NOTE: None of the prepared media contain tartaric acid.

Difco™ Potato Dextrose Broth

Cat. No.	254920	Dehydrated – 500 g
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* Store at 2-8°C.

† QC testing performed according to USP/EP/JIP performance specifications.