

Czapek-Dox Broth • Czapek Solution Agar

Intended Use

Czapek-Dox Broth and Czapek Solution Agar are used for cultivating fungi and bacteria capable of using inorganic nitrogen.

Summary and Explanation

Czapek-Dox Broth is a modification of the Czapek¹ and Dox² formula prepared according to Thom and Raper.³ Czapek Solution Agar is prepared according to the formula given by Thom and Church.⁴ The media are prepared with only inorganic sources of nitrogen and chemically defined sources of carbon. Czapek-Dox media are useful in a variety of microbiological procedures, including soil microbiology and fungi and mildew resistance tests. Thom and Raper³ reported Czapek-Dox Broth and Czapek Solution Agar produce moderately vigorous growth of most saprophytic aspergilli and yield characteristic mycelia and conidia.

Czapek Solution Agar is recommended in *Standard Methods for the Examination of Water and Wastewater*⁵ for the isolation of *Aspergillus*, *Penicillium*, *Paecilomyces* and related fungi.

Principles of the Procedure

Saccharose is the sole carbon source, and sodium nitrate is the sole nitrogen source in Czapek-Dox Broth and Czapek Solution Agar. Dipotassium phosphate is the buffering agent, and potassium chloride contains essential ions. Magnesium sulfate and ferrous sulfate are sources of cations. Agar is the solidifying agent in Czapek Solution Agar.

Formulae

Difco™ Czapek-Dox Broth

Approximate Formula* Per Liter	
Saccharose	30.0 g
Sodium Nitrate	3.0 g
Dipotassium Phosphate	1.0 g
Magnesium Sulfate	0.5 g
Potassium Chloride	0.5 g
Ferrous Sulfate	0.01 g

Difco™ Czapek Solution Agar

Approximate Formula* Per Liter	
Saccharose	30.0 g
Sodium Nitrate	2.0 g
Dipotassium Phosphate	1.0 g
Magnesium Sulfate	0.5 g
Potassium Chloride	0.5 g
Ferrous Sulfate	0.01 g
Agar	15.0 g

*Adjusted and/or supplemented as required to meet performance criteria.

Directions for Preparation from Dehydrated Product

Difco™ Czapek-Dox Broth

1. Dissolve 35 g of the powder in 1 L of purified water.
2. Autoclave at 121°C for 15 minutes.
3. Test samples of the finished product for performance using stable, typical control cultures.

Difco™ Czapek Solution Agar

1. Suspend 49 g of the powder in 1 L of purified water. 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. Test samples of the finished product for performance using stable, typical control cultures.

User Quality Control

Identity Specifications

Difco™ Czapek-Dox Broth

Dehydrated Appearance: White, free-flowing, homogeneous.

Solution: 3.5% solution, soluble in purified water. Solution is colorless, clear to very slightly opalescent and may have a slight precipitate.

Prepared Appearance: Colorless, clear to very slightly opalescent, may have a slight precipitate.

Reaction of 3.5%
Solution at 25°C: pH 7.3 ± 0.2

Difco™ Czapek Solution Agar

Dehydrated Appearance: Very light beige, free-flowing, homogeneous.

Solution: 4.9% solution, soluble in purified water upon boiling. Solution is light amber, opalescent with a uniform flocculent precipitate.

Prepared Appearance: Light amber, slightly opalescent, may have a slight precipitate.

Reaction of 4.9%
Solution at 25°C: pH 7.3 ± 0.2

Cultural Response

Difco™ Czapek-Dox Broth

Prepare the medium per label directions. Inoculate and incubate at 30 ± 2°C for 48-72 hours.

ORGANISM	ATCC™	INOCULUM CFU	RECOVERY
<i>Aspergillus niger</i>	9642	10 ² -10 ³	Good
<i>Candida albicans</i>	10231	10 ² -10 ³	Good
<i>Candida tropicalis</i>	750	10 ² -10 ³	Good
<i>Saccharomyces cerevisiae</i>	9763	10 ² -10 ³	Good

Difco™ Czapek Solution Agar

Prepare the medium per label directions. Inoculate and incubate at 30 ± 2°C for 18-48 hours (up to 72 hours if necessary).

ORGANISM	ATCC™	INOCULUM CFU	RECOVERY
<i>Aspergillus niger</i>	9642	10 ² -10 ³	Good
<i>Candida albicans</i>	10231	10 ² -10 ³	Good
<i>Penicillium rubrum</i>	10520	10 ² -10 ³	Good
<i>Streptococcus albus</i>	3004	10 ² -10 ³	Good

Procedure

Refer to appropriate references for specific procedures for the cultivation of fungi and bacteria capable of utilizing inorganic nitrogen.

Expected Results

Refer to appropriate references and procedures for results.

References

1. Czapek. 1902-1903. Beitr. Chem. Physiol. Pathol. 1:540.
2. Dox. 1910. U.S. Dept. Agr. Bur. Anim. Ind. Bull. 120:70.
3. Thom and Raper. 1945. Manual of the aspergilli. Williams & Wilkins Co., Baltimore, Md.
4. Thom and Church. 1926. The aspergilli. Williams & Wilkins Co., Baltimore, Md.
5. 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.

Availability

Difco™ Czapek-Dox Broth

Cat. No. 233810 Dehydrated – 500 g

Difco™ Czapek Solution Agar

SMWW

Cat. No. 233910 Dehydrated – 500 g