



Christensen Urea Agar Urea Agar Base (Christensen)

Medium for differentiation of urea-degrading microorganisms.

INTENDED PURPOSE

Differential medium used for determining urease activity and for identification of organisms from clinical specimens and other samples. The medium complies with the requirements of the standards ISO 6579-1, ISO 10273, ISO 19250, ISO 21567 and ISO 11133. This medium is intended as an aid in the diagnosis, requiring further tests to complete the diagnostic results.

DESCRIPTION

Christensen Urea Agar is a differential medium for detecting urease activity in microorganisms, including *Proteus*, enterococci, and urease-positive yeasts such as *Cryptococcus*. *Proteus* species typically give a positive reaction within 6 hours on the slant and up to 24 hours in the full medium, while other urease-positive bacteria may react more slowly.

TYPICAL FORMULA*

	(g/litre)
<u>Base medium</u>	
Peptone	1.0
Glucose	1.0
Sodium Chloride	5.0
Monopotassium Phosphate	2.0
Phenol Red	0.012
Agar	15.0
Final pH 6.8 ± 0.2	

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

Prepared medium

Base

Urea Agar Base (Christensen)

+

Supplement

Urea 40 % Supplement

METHOD PRINCIPLE

Peptone provides nitrogen, carbon, and amino acids required for microbial growth. Glucose serves as an energy source. Sodium chloride maintains the osmotic balance of the medium. Monopotassium phosphate acts as a buffer. Phenol red is the pH indicator, and agar is the solidifying agent. Urea is included as a substrate for the urease enzyme. Microorganisms producing urease hydrolyze urea into ammonia and carbon dioxide. The release of ammonia increases the pH of the medium, shifting it toward alkaline conditions. This change is detected by the phenol red indicator, which turns from yellow/orange to pink/red.

PREPARATION

Dehydrated medium

Suspend 24.0 g of the powder in 1 liter of distilled or deionized water. Mix well. Heat until completely dissolved. Sterilize in autoclave at 121°C for 15 minutes. Cool to 45-50°C. Aseptically add 50 ml of Urea 40% supplement. Mix well and pour into sterile final containers.

Medium in bottles

Melt the content of the bottle in a water bath at 100°C (with the cap partially removed) until completely dissolved. Then screw the cap and check the homogeneity of the dissolved medium, if it is the case turning the bottle upside down. Cool at 45-50°C. Aseptically add 10 ml of Urea 40% supplement. Mix well avoiding foam formation and aseptically distribute into final tubes.

Allow medium to solidify in a slanted position.

MATERIALS REQUIRED BUT NOT PROVIDED

Standard microbiological supplies and equipment such as: autoclave, sterile Petri plates, test tubes, inoculating loops, swabs, incubator, quality control organisms.

SPECIMENS

Clinical specimens should be sampled at the acute stage, before antimicrobial therapy (where possible) and examined as soon as possible after collection. Good laboratory practices for collection, transport and storage of the clinical specimens should be applied. Refer to specific guidelines for more information about specimen collection and preparation.

TEST PROCEDURE

Use a heavy inoculum from a pure 18–24-hour culture. Inoculate by streaking over the slant surface. Incubate at $37 \pm 1^\circ\text{C}$ for up to 24 hours under aerobic atmosphere (slightly loosen caps). Observe reactions after 6 and 24 hours. Longer periods of incubation may be necessary.

INTERPRETING RESULTS

At the end of the incubation period observe the color of the medium.

A pink color indicates a positive reaction (urease activity), while no color change, with the medium remaining yellow to orange, indicates a negative reaction.

Proteus spp. usually complete the reaction in 4-5 hours and therefore can be easily differentiated from weaker urease-producing organisms such as *Klebsiella* and *Enterobacter* spp. Typical *Salmonella* cultures do not hydrolyze urea so that the color of the medium will remain unchanged. Some pathogenic *Y. enterocolitica* strains can need up to 7 days for positive reaction to develop.

For the definitive identification of urea-degrading microorganisms, additional biochemical test must be performed.

STORAGE

The powder is very hygroscopic: store the powder at 10-30°C, in a dry environment, in its original container tightly closed and use it before the expiry date on the label or until signs of deterioration or contamination are evident. Store slant tubes, bottles and supplements at 2-8°C.

SHELF LIFE

Medium in tubes: 1 year

Medium in bottles: 2 years

Dehydrated medium: 4 years

Supplements: 2 years

QUALITY CONTROL

Appearance of Supplement: Limpid solution

Appearance of Dehydrated Medium: Free-flowing, homogeneous, orange-reddish.

Appearance of Prepared Medium: Trace to slightly hazy, orange.

Expected Cultural Response:

Control strain	Inoculum	Incubation	Specification
<i>Proteus mirabilis</i> WDCM 00023 (ATCC® 29906; NCTC 11938)	Direct inoculation	18-24 h / $37 \pm 1^\circ\text{C}$	Color change to pink (positive urease reaction)
<i>Klebsiella pneumoniae</i> WDCM 00097 (ATCC® 13883; NCTC 9633)			
<i>Escherichia coli</i> WDCM 00013 (ATCC® 25922; NCTC 12241)			No change of color (negative urease reaction)
<i>Salmonella</i> Typhimurium WDCM 00031 (ATCC® 14028; NCTC 12023)			
<i>Salmonella</i> Enteritidis WDCM 00030 (ATCC® 13076; NCTC 12694)			
<i>Shigella sonnei</i> WDCM 00127 (ATCC®29930; NCTC 12984)			
<i>Shigella flexneri</i> WDCM 00125 (ATCC® 29903; NCTC 13631)			

Please refer to the actual batch related Certificate of Analysis (CoA).

PERFORMANCE CHARACTERISTICS

Performance testing of Christensen Urea Agar was carried out using the QC strains listed above. The results obtained met the established criteria.

LIMITATIONS

Invalid results can be caused by poor specimen quality, improper sample collection, improper transportation, improper laboratory processing, or a limitation of the testing technology. The operator should understand the principles of the procedures, including its performance limitations, in advance of operation to avoid potential mistakes.

Due to nutritional variation, some strains may result in poor growth or fail to grow on this medium.

WARNING AND PRECAUTIONS

- 1) **For *in vitro* diagnostic use (IVD).**
- 2) **For laboratory professional use only.**
- 3) Operators must be trained and have certain experience. Please read the instructions carefully before using the product. Reliability of assay results cannot be guaranteed if there are any deviations from the instructions in this document.
- 4) Consult the Safety Data Sheet (SDS) for information regarding hazards and safe handling practices.
- 5) Do not use if the product or packaging appears to be damaged.
- 6) Follow standard precautions. All patient specimens should be considered potentially infectious and handled accordingly.
- 7) Handle all specimens as if infectious using safe laboratory procedures. Dispose of hazardous or biologically contaminated materials according to the practices of your institution.
- 8) Avoid cross-contamination of samples by using disposable tips and changing them after each sample.
- 9) Do not mix reagents of different batches. Please use the product within the validity period.
- 10) Do not eat, drink, smoke, apply cosmetics or handle contact lenses in areas where reagents and human specimens are handled.
- 11) Results should be interpreted by a trained professional in conjunction with the patient's history and clinical signs and symptoms, and epidemiological risk factors.
- 12) Ensure laboratory equipment is calibrated and maintained in accordance with the laboratory's procedure.
- 13) When test results are transmitted from the laboratory to an informatics centre, attention has to be done to avoid erroneous data transfer.

DISPOSAL OF WASTE

Disposal of waste must be carried out according to national and local regulations in force.

BIBLIOGRAPHY

See the references at the end of this document.

TABLE OF SYMBOLS

See the table of symbols at the end of this document.

ORDER INFORMATION

Product	Format	Packaging	Ref.
Christensen Urea Agar	Slant tube	10 x 7 mL	30081
	Bottle + Supplement	5 x 200 mL + 1 x 50 mL	412100
Urea Agar Base (Christensen)	Dehydrated media	500 g	610107
		100 g	620107
		5 kg	6101075
Urea 40 % Supplement	Bottle	6 x 100 mL	80110
		10 x 5 mL	80292

There may be additional product ref. numbers as well. For an updated listing of available products, visit liofilchem.com

Revision History

Revision	Release Date	Change Summary
0	2026-03-27	Updated layout and content in compliance with IVDR 2017/746, version reset to revision 0

In case of malfunctions or defects, contact immediately Liofilchem (*) or the local representative.

In case of incident associated with the device, notify immediately Liofilchem (*) or its local representative and the National Competent Authority.

*Please login to <https://www.liofilchemstore.it/login.php> (user ID and password required) and click on Complaint.

This IFU document and the SDS are available from the online Support Center:

[liofilchem.com/ifu-sds](https://www.liofilchem.com/ifu-sds)