

# XLD (XYLOSE-LYSINE-DESOXYCHOLATE) AGAR

## INTENDED USE

Remel XLD (Xylose-Lysine-Desoxycholate) Agar is a solid medium recommended for use in qualitative procedures for selective and differential isolation of enteric gram-negative bacilli.

## SUMMARY AND EXPLANATION

This medium was developed by Taylor for selective isolation and differentiation of enteric pathogens, especially *Shigella*.<sup>1</sup> XLD Agar has since been found to be a satisfactory medium for the recovery of *Salmonella* spp. from clinical specimens.<sup>2,3</sup>

## PRINCIPLE

Xylose is rapidly fermented by most enteric gram-negative bacilli other than *Shigella* spp., producing red colonies. Lysine provides for differentiation of *Salmonella* spp. from nonpathogenic enteric gram-negative bacilli. *Salmonella* produces lysine decarboxylase which causes the pH to revert to alkaline after xylose is fermented, producing red colonies. Lactose and sucrose are added in excess to prevent lysine-positive coliforms from reverting to alkaline conditions. Sodium thiosulfate, a sulfur source, and ferric ammonium citrate, an indicator, are added to enable organisms which form hydrogen sulfide (H<sub>2</sub>S) to produce black-centered colonies under alkaline conditions. Such organisms include *Salmonella* spp. Organisms which ferment xylose, lactose, or sucrose and are lysine-negative cause an acid pH and produce yellow colonies. Desoxycholate is a selective agent which inhibits gram-positive organisms.

## REAGENTS (CLASSICAL FORMULA)\*

Lactose.....	7.5 g	Yeast Extract.....	3.0 g
Sucrose.....	7.5 g	Sodium Desoxycholate.....	2.5 g
Sodium Thiosulfate.....	6.8 g	Ferric Ammonium Citrate.....	0.8 g
L-Lysine.....	5.0 g	Phenol Red.....	0.08 g
Sodium Chloride.....	5.0 g	Agar.....	13.5 g
Xylose.....	3.5 g	Deminerlized Water.....	1000.0 ml

pH 7.4 ± 0.2 @ 25°C

\*Adjusted as required to meet performance standards.

## PROCEDURE

1. An enrichment broth, such as GN Broth (REF R060992), may be used in conjunction with XLD Agar and a nonselective medium to increase the potential for recovering enteric pathogens.
2. Inoculate and streak the specimen as soon as possible after it is received in the laboratory.
3. If material is being cultured directly from a swab, roll the swab over a small area of the agar surface and streak for isolation.
4. Incubate plate aerobically at 33-37°C for 18-48 hours. Colonies on XLD Agar may require 48 hours incubation for full color development.
5. Examine plate for typical colony morphology. *Salmonella* produces red colonies with or without black centers (H<sub>2</sub>S); colonies of *Shigella* are transparent but appear red due to background color of medium.

## QUALITY CONTROL

All lot numbers of XLD (Xylose-Lysine-Desoxycholate) Agar have been tested using the following quality control organisms and have been found to be acceptable. This quality control testing meets or exceeds CLSI standards.<sup>4</sup> Testing of control organisms should be performed in accordance with established laboratory quality control procedures. If aberrant quality control results are noted, patient results should not be reported.

## CONTROL

\**Salmonella enterica* serovar Typhimurium ATCC® 14028

\**Shigella flexneri* ATCC® 12022

\**Enterococcus faecalis* ATCC® 29212

*Escherichia coli* ATCC® 8739

\**Escherichia coli* ATCC® 25922

\*CLSI recommended organism

## INCUBATION

Aerobic, 18-24 h @ 33-37°C

Aerobic, 18-24 h @ 33-37°C

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Aerobic, 18-24 h @ 33-37°C

## RESULTS

Growth, red colonies w/ black centers

Growth, red colonies

Inhibition (partial to complete)

Inhibition (partial; yellow to yellow-red colonies)

Inhibition (partial; yellow to yellow-red colonies)

## LIMITATIONS

1. Colonies that resemble *Salmonella* or *Shigella* (e.g., *Pseudomonas* spp., *Proteus* spp.) may grow on XLD Agar; further biochemical and/or serological testing is required for definitive identification of enteric pathogens.<sup>5</sup>
2. Selective and nonselective media should be inoculated to increase the chance of recovering enteric pathogens when the population is low and to provide isolation of other organisms present in the specimen.<sup>3</sup>
3. Some strains of *Proteus* may develop black centers on XLD Agar. Additional testing may be required for definitive identification.<sup>5</sup>

## BIBLIOGRAPHY

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2. Isenberg, H.D., S. Kominos, and M. Siegel. 1969. *Appl. Microbiol.* 18:656-659.
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4. Clinical and Laboratory Standards Institute (CLSI). 2004. *Quality Control for Commercially Prepared Microbiological Culture Media; Approved Standard*, 3<sup>rd</sup> ed. CLSI, Wayne, PA.
5. MacFaddin, J.F. 1985. *Media for Isolation-Cultivation-Identification-Maintenance of Medical Bacteria*. Vol. 1. Williams & Wilkins, Baltimore, MD.

Refer to the front of Remel *Technical Manual of Microbiological Media* for **General Information** regarding precautions, product storage and deterioration, specimen collection, storage and transportation, materials required, quality control, and limitations.

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