Xylose Lysine Deoxycholate (XLD) Agar CE (NCM2015)

Intended Use
Xylose Lysine Deoxycholate (XLD) Agar is a selective agar for the detection of Salmonella spp.

Description
Originally formulated by Taylor to differentiate enteric pathogens, the agar is widely used as the preferred differential medium for Salmonella spp. The medium is void of peptones but instead uses yeast extract as a carbon, nitrogen and vitamin source and xylose, lactose and sucrose are fermentable carbohydrates. *Salmonella* are able to ferment xylose to produce acid but not lactose or sucrose. When the xylose is exhausted *Salmonella* will decarboxylate lysine shifting the pH back to neutral. At near neutral pH, *Salmonella* can reduce sodium thiosulfate producing hydrogen sulfide which creates a complex with ferric ammonium citrate to produce black or black centered colonies. Other organisms are able decarboxylate lysine but acid production from the fermentation of lactose and sucrose keeps the pH too acidic for H_2S production. Selectivity is achieved through the incorporation of sodium deoxycholate and phenol red acts as a pH indicator.

Typical Formulation

Yeast Extract	3.0 g/L
Sodium Chloride	5.0 g/L
Xylose	3.75 g/L
Lactose	7.5 g/L
Sucrose	7.5 g/L
L-Lysine Hydrochloride	5.0 g/L
Sodium Thiosulfate	6.8 g/L
Ferric Ammonium Citrate	0.8 g/L
Phenol Red	0.08 g/L
Sodium Deoxycholate	1.0 g/L
Agar	13.0 g/L

pH: 7.4 ± 0.2 at 25°C
Formula may be adjusted and/or supplemented as required to meet performance specifications.

Precaution
Refer to SDS

Preparation
1. Suspend 53.5 grams of the medium in one liter of purified water.
2. Bring rapidly to the boil with frequent stirring, and immediately transfer to a 45-50°C water bath. DO NOT OVERHEAT.
3. Pour into plates as soon as the medium has cooled.
4. Protracted boiling or prolonged holding at elevated temperature induces precipitation.

Test Procedure
Suitable standard methods should be followed, such as the UK Standards for Microbiology Investigations (NHS). Common method involve direct plating from faecal material, or streaking following enrichment in selenite broth.

Quality Control Specifications
Dehydrated Appearance: Powder is homogeneous, free flowing, and light beige to pinkish beige.

Prepared Appearance: Prepared medium is bright red to red-orange, trace to slightly hazy.

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Expected Cultural Response: Cultural response at 37 ± 1°C after 24 ± 3 hours incubation.

Microorganism	Approx. Inoculum (CFU)	Expected Results	
		Recovery	Reaction
Enterococcus faecalis ATCC® 19433	>10^4	Complete inhibition	N/A
Enterococcus faecalis ATCC® 29212	>10^4	Complete inhibition	N/A
Escherichia coli ATCC® 25922	>10^4	Growth or partial inhibition	Yellow colonies if recovered
Escherichia coli ATCC® 8739	>10^4	Growth or partial inhibition	Yellow colonies if recovered
Salmonella enteritidis ATCC® 13076	50-200	≥50%	Red colonies with black center
Salmonella typhimurium ATCC® 14028	50-200	≥70%	Red colonies with black center

The organisms listed are the minimum that should be used for quality control testing.

Results

Fermentation of xylose, lactose, and sucrose generates acid, resulting in a color change in the colonies and in the medium from red to yellow.

Hydrogen sulfide production under alkaline conditions results in colonies with black centers. This reaction is inhibited by the acid conditions that accompany carbohydrate fermentation.

Lysine decarboxylation, in the absence of lactose and sucrose fermentation, results in a reversion to an alkaline pH. This alkaline pH causes the color of the medium to change back to red.

Expiration

The dehydrated medium should be discarded if it is not free flowing, or if the appearance has changed from the original color. Expiry applies to medium in its intact container when stored as directed.

Limitations of the Procedure

1. Red, false-positive colonies may occur with *Proteus* and *Pseudomonas*.
2. Incubation in excess of 48 hours may lead to false-positive results.

Storage

Store dehydrated culture media at 2 – 30°C away from direct sunlight. Once opened and recapped, place the container in a low humidity environment at the same storage temperature. Protect from moisture and light by keeping container tightly closed.

References

1. Taylor, W. I. (1965). Isolation of shigellae. I. Xylose lysine agars; new media for isolation of enteric pathogens. Am J Clin Pathol, 44(4), 471-475.

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