Xylose Lysine Deoxycholate Agar, Modified ISO

Intended Use
Xylose Lysine Deoxycholate Agar, Modified is moderately selective medium for isolation and differentiation of *Salmonella* and *Shigella* species in compliance with ISO specification ISO:6579:2017.

Summary
XLD Agar was formulated by Taylor for the isolation and differentiation of enteric pathogens including *Salmonella* typhi from other *Salmonella* species. XLD Agar, Modified is recommended for selective isolation and enumeration of *Salmonella typhi* and other *Salmonella* species in accordance with ISO Committee. XLD Agar has been recommended for the identification of *Enterobacteriaceae* and for the microbiological testing of foods, water and dairy products. The media formulation does not allow the overgrowth of other organisms over *Salmonella* and *Shigella*.

Principle
The medium contains yeast extract which provides nitrogen and vitamins required for growth. Though the sugars xylose, lactose and sucrose provide sources of fermentable carbohydrates, xylose is mainly incorporated into the medium since it is not fermented by *Shigella* but practically by all enterics. This helps in the differentiation of *Shigella* species. Sodium chloride maintains the osmotic balance of the medium. Lysine is included to differentiate the *Salmonella* group from the non-pathogens. *Salmonella* rapidly ferment xylose and exhaust the supply. Subsequently lysine is decarboxylated by the enzyme lysine decarboxylase to form amines with reversion to an alkaline pH that mimics the *Shigella* reaction. However, to prevent this reaction by lysine-positive coliforms, lactose and sucrose are added to produce acid in excess. Degradation of xylose, lactose and sucrose to acid causes phenol red indicator to change its colour to yellow. Bacteria that decarboxylate lysine to cadaverine can be recognized by the appearance of a red colouration around the colonies due to an increase in pH. These reactions can proceed simultaneously or successively, and this may cause the pH indicator to exhibit various shades of colour or it may change its colour from yellow to red on prolonged incubation. To add to the differentiating ability of the formulation, an H_2S indicator system, consisting of sodium thiosulphate and ferric ammonium citrate, is included for the visualization of hydrogen sulphide produced, resulting in the formation of colonies with black centers. The non-pathogenic H_2S producers do not decarboxylase lysine; therefore, the acid reaction produced by them prevents the blackening of the colonies.

Formula*

Ingredients	**g/L**
Sucrose	7.5
Lactose	7.5
Sodium Thiosulphate	6.8
L-Lysine	5.0
Sodium Chloride	5.0
Xylose	3.75
Yeast Extract	3.0
Sodium Deoxycholate	1.0
Ferric Ammonium Citrate	0.8
Phenol Red	0.08
Agar	15.0
Final pH (at 25°C)	7.4 ± 0.2

*Adjusted to suit performance parameters.

Storage and Stability
Store dehydrated medium below 30°C in tightly closed container and the prepared medium at 2°C-8°C. Avoid freezing and overheating. Use before expiry date on the label. Once opened keep powdered medium closed to avoid hydration.

Specimen Collection and Handling

Ensure that all samples are properly labelled. Follow appropriate techniques for handling samples as per established guidelines. Some samples may require special handling, such as immediate refrigeration or protection from light, follow the standard procedure. The samples must be stored and tested within the permissible time duration. After use, contaminated materials must be sterilized by autoclaving before discarding.

Directions

1. Suspend 55.43 g of the powder in 1000 mL purified / distilled water and mix well.
2. Mix thoroughly.
3. Heat with frequent agitation until the powder just boils to dissolve the powder completely.
4. DO NOT OVERHEAT OR AUTOCLAVE. Overheating causes precipitation.
5. Cool immediately in a water bath at 45°C-50°C and pour into sterile petridishes.

Quality Control

Dehydrated Appearance: Light yellow to pink coloured, homogeneous free flowing powder.
Prepared Appearance: Light red to red coloured, clear to slightly opalescent gel forms in petridishes.
Cultural Response: Cultural response is observed after an incubation at 34 to 38°C for 24 ± 3 hours. Recovery rate is considered as 100% for bacteria growth on Soyabean Casein Digest Agar.

Organism (ATCC)	**Growth**	**Colour of Colony**
Salmonella enterica subsp. *enterica* serovar *Typhimurium* (14028)	Good	Red with black centres
Salmonella Enteritidis (13076)	Good	Red with black centres
Inhibitory		
Escherichia coli (8739)	Partial Inhibition	Yellow

Interpretation of Results

1. XLD Agar is both selective and differential medium. It utilizes sodium deoxycholate as the selective agent and therefore it is inhibitory to Gram-positive microorganisms.
2. Some *Proteus* strains may give red to yellow colouration with most colonies developing black centers, giving rise to false positive reactions.
3. Non-enterics like *Pseudomonas* and *Providencia* may exhibit red colonies. *S. paratyphi A*, *S. choleraesuis*, *S. pullorum* and *S. gallinarum* may form red colonies without H_2S, thus resembling *Shigella* species.

Performance and Evaluation

Performance of the product is dependent on following parameters as per product label claim:

1. Directions
2. Storage
3. Expiry

Warranty

This product is designed to perform as described on the label and package insert. The manufacturer disclaims any implied warranty of use and sale for any other purpose.

Reference

1. Taylor W. L., 1965, Am. J. Clin. Pathol., 44:471-475.
2. Taylor W. L. and Harris B., 1965, Am. J. Clin. Pathol., 44:476.
3. Data on file: Microxpress®, A Division of Tulip Diagnostics (P) Ltd.

Product Presentation:

Cat. No.	Product Description	Pack Size
201240040100	Dehydrated Culture Media	100 g
201240040500	Dehydrated Culture Media	500 g