Xylose Lysine Deoxycholate Agar (Harmonized)

Intended Use
Xylose Lysine Deoxycholate Agar (Harmonized) is recommended as a selective medium for isolation and cultivation of *Salmonella* species from pharmaceutical products in accordance with microbial limit testing by harmonized methodology of USP/EP/BP/JP/IP.

Summary
XLD Agar is a differential medium used for the isolation of *Salmonella* and *Shigella* from clinical and non-clinical specimens like faeces and foods. It was developed by Taylor in order to increase the efficiency of isolation of the enteric pathogens, particularly *Shigella* from faecal specimens. The pathogens are differentiated not only from the non-pathogenic lactose fermenters but also from many non-pathogens, which do not ferment lactose or sucrose. Also, the medium was formulated to increase the frequency of growth of the more fastidious pathogens, which in other formulations have often failed to grow due to the inclusion of excessively toxic inhibitors. This medium is used in the microbial limit test for screening specimens for the detection of *Salmonella* and is recommended by APHA for the examination of foods, dairy products and water. XLD Agar conforms to the specifications of the USP, EP, BP, JP and IP and is included in the Bacteriological Analytical Manual for food testing.

Principle
XLD Agar is both, a selective and differential medium. Yeast extract provides nutrients while Sodium Thiosulphate, Ferric Ammonium Citrate and Sodium Deoxycholate inhibit Gram-positive organisms. Xylose is fermented practically by all enterics except *Shigella*, which enables the differentiation of *Shigella* species. Incorporation of lysine enables the *Salmonella* group to be differentiated from the non-pathogens since, without lysine, *Salmonella* would rapidly ferment xylose and be indistinguishable from non-pathogenic species. After *Salmonella* exhausts the supply of xylose, lysine is attacked, with reversion to an alkaline pH, which mimics the *Shigella* reaction. However, to prevent this reaction by lysine positive coliforms, lactose and sucrose are added in excess to produce acid and hence non-pathogenic H_2S producers do not decarboxylate lysine. The acid reaction produced by them prevents the blackening of the colonies. Sodium thiosulphate and ferric ammonium citrate are included for the visualization of hydrogen sulphide production, resulting in the formation of colonies with black centers. Sodium chloride maintains the osmotic balance.

Formula*

Ingredients	g/L
Xylose	3.5
L-Lysine	5.0
Lactose Monohydrate	7.5
Sucrose	7.5
Sodium Chloride	5.0
Yeast Extract	3.0
Phenol Red	0.08
Agar	13.5
Sodium Deoxycholate	2.5
Sodium Thiosulphate	6.8
Ferric Ammonium Citrate	0.8
Final pH (at 25°C)	7.4 ± 0.2

*Adjusted to suit performance parameters.

Storage and Stability
Store between 10-30°C in a tightly closed container and the prepared medium at 20-30°C. Avoid freezing and overheating. Use before expiry date on the label. Once opened keep powdered medium closed to avoid hydration.

Type of Specimen
Pharmaceutical samples.

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 54.80 g (the equivalent weight of dehydrated medium per litre) of the powder in 1000 mL purified water and mix thoroughly.
2. Boil with frequent agitation to dissolve the powder completely.
3. DO NOT AUTOCLAVE OR OVERHEAT. Overheating causes precipitation.

Note: It is advisable not to prepare large volumes that will require prolonged heating**.**

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.
Growth Promotion Test: Growth promotion is carried out in accordance with the harmonized method of USP/EP/JP/IP/BP and growth is observed after an incubation at 30°C-35°C for 18 to 48 hours.
Growth Promoting Properties: The test results observed are within the specified temperature and shortest period of time specified in the test, inoculating ≤ 100 cfu of appropriate microorganism at 30°C-35°C for 18 hours.
Indicative Properties: The test results observed are within the specified temperature and time, inoculating ≤100 cfu of appropriate microorganism.
Inhibitory Properties: No Growth of the test microorganism occurs for the specified temperature and not less than the longest period of the time specified, inoculating > 100 cfu of the appropriate microorganism at at 30°C-35°C for > 48 hours.

Growth Promoting + Indicative Organism (ATCC)	**Growth**	**Colour of Colony**
Salmonella enterica subsp. *enterica* serovar *Typhimurium* (14028)	Good	Red with black centres
Salmonella enterica subsp. *enterica* serovar *Abony* (NCTC 6017)	Good	Red with black centres
Inhibitory		
Staphylococcus aureus subsp. *aureus* (6538)	Inhibited	-

Note:

1. For good growth - Growth obtained on test media should not differ by a factor greater than 2 from calculated value for a standardized inoculum.
2. For inhibition no growth of test microorganism should occur.
3. Inoculum for good growth is 10 - 100 cfu and that for inhibition is greater than 100 cfu.

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. Koneman E. W., Allen S. D., Janda W. M., Schreckenberger P. C., Winn W. C. Jr., 1992, Colour Atlas and Textbook of Diagnostic Microbiology, 4th Ed., J. B. Lippinccott Company.
2. Taylor W. L., 1965, Am. J. Clin. Pathol., 44:471-475.
3. Taylor W. L. and Harris B., 1965, Am. J. Clin. Pathol., 44:476.
4. Taylor W. L. and Harris B., 1967, Am. J. Clin. Pathol., 48:350.
5. Taylor W. L. and Schelhart B., 1967, Am. J. Clin. Pathol., 48:356.
6. Taylor W. L. and Schelhart B., 1968, Am. J. Clin. Pathol., 16:1387.2.
7. The United States Pharmacopoeia, 2023, The United States Pharmacopoeial Convention. Rockville, MD.
8. British Pharmacopoeia, 2023, The Stationery office British Pharmacopoeia.
9. European Pharmacopoeia, 2011, European Dept. for the quality of Medicines.
10. Japanese Pharmacopoeia, 2008.
11. Indian Pharmocoepoeia, 2010 Ministry of Health and Family Welfare, Govt. of India.
12. Data on file: Microxpress®, A Division of Tulip Diagnostics (P) Ltd.

Product Presentation:

Cat. No.	Product Description	Pack Size
201240010500	Dehydrated Culture Media	500 g
201240012500	Dehydrated Culture Media	2.5 k
201240015000	Dehydrated Culture Media	5 k
203240070250	Bottle Media	6 x 250 mL
203240070100	Bottle Media	100 mL
205240080100	Ready Prepared Plates (90 mm)	100 plates
205240080020	Ready Prepared Plates (90 mm)	20 plates