ARENA BioScien

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XLD Agar

Selective solid medium recommended for the isolation, identification, and enumeration of *Salmonella* species

REF: BS.1/XA01.100.0100	100 Gram	REF: BS.1/XA01.250.0250	250 Gram
REF: BS.1/XA01.500.0500	500 Gram		

CLINICAL SIGNIFICANCE

Xylose Lysine Deoxycholate (XLD) Agar is a selective growth medium used for the isolation of *Salmonella* and *Shigella* Species from clinical specimens and non-clinical 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. Additionally, 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. XLD Agar is included in the USP microbial limit test for screening specimens for the presence or absence of *Salmonella* and is recommended for the testing of foods, dairy products, and water.

METHOD PRINCIPLE

XLD contains yeast extract, which provides nitrogen, and vitamins for growth. It utilizes sodium deoxycholate as the selective agent and, therefore, is inhibitory to gram-positive microorganisms. The sugars xylose, lactose and sucrose provide sources of fermentable carbohydrates, xylose is added to the medium since it is not fermented by *Shigella* but practically by all enteric microorganisms. 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 to yellow. Bacteria that decarboxylate lysine to cadaverine can be recognized by the appearance of a red coloration around the colonies due to an increase in pH. These reactions can proceed successively, and this may cause the pH indicator to exhibit various changes of color, or it may change its color 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 H_2S produced, forming colonies with black centers. The non-pathogenic H_2S producers do not decarboxylase lysine; therefore, the acid reaction produced prevents the blackening of the colonies.

MEDIA COMPOSITION

Item	Formula per liter of medium
Yeast extract	3.0 gm
Xylose	3.75 gm
L-Lysine	5.0 gm
Lactose	7.5 gm
Sucrose	7.5 gm
Sodium deoxycholate	1.0 gm
Ferric ammonium citrate	0.8 gm
Sodium thiosulphate	6.8 gm
Sodium chloride	5.0 gm
Phenol red	0.08 gm
Agar	15.0 gm

PRECAUTIONS AND WARNINGS

Media to be handled by entitled and professionally educated person. Do not ingest or inhale.

Good Laboratories practices using appropriate precautions should be followed in:

- Wearing personnel protective equipment (overall, gloves, glasses,).
- Do not pipette by mouth.
- In case of contact with eyes or skin; rinse immediately with plenty of soap and water. In case of severe injuries; seek medical advice immediately.
- Respect country requirement for waste disposal.
  S56: dispose of this material and its container at hazardous or special waste collection point.
  S57: use appropriate container to avoid environmental contamination.
  S61: avoid release in environment.

For further information, refer to the XLD Agar material safety data sheet.

STORAGE AND STABILITY

BioScien XLD Agar should be stored between 10-30°C in a firmly closed container and the prepared medium at 2-8°C. Use before expiry date on the label. On opening, product should be properly stored dry, after tightly capping the bottle in order to avoid lump development due to the hygroscopic nature of the product. Improper storage of the product may lead to lump formation. Store in a dry ventilated area protected from extremes of temperature and sources of ignition. Seal the container tightly after use. Product performance is best if used within stated expiry period.

Final pH 7.4 ± 0.2 at 25°C

PREPARATION

Dissolve 55.43 grams in 1 liter of distilled water. Heat with frequent stirring and boil for one minute. Cool to 45-50°C. Mix gently and pour into sterile petri dishes. DO NOT AUTOCLAVE OR OVERHEAT.

Deterioration

The color of ***BioScien*** XLD Agar is light yellow to pink homogeneous free flowing powder. Prepared Media is red in color. If there are any physical changes for powder or signs of deterioration (shrinking, cracking, or discoloration), and contaminations for hydrated media, discard the medium.

SPECIMEN

Food and meat samples. milk and milk products, animal feed, animal faeces, environmental samples

EQUIPMENT REQUIRED NOT PROVIDED

- Sterile petri dishes
- Incubator
- Autoclave

PERFORMANCE CHARACTERISTICS

Cultural characteristics observed after incubation at 35-37°C for 18-72H.

Microorganism	Result	Colony Color
Salmonella Typhi ATCC 6539	Luxuriant growth	Red with black centers
Salmonella Typhimurium ATCC 14028	Luxuriant growth	Red with black centers
Salmonella Abony NCTC 6017	Luxuriant growth	Red with black centers
Salmonella Enteritidis ATCC 13076	Luxuriant growth	Red with black centers
Salmonella Paratyphi A ATCC 9150	Luxuriant growth	Red
Salmonella Paratyphi B ATCC 8759	Luxuriant growth	Red with black centers
Shigella sonnei ATCC 25931	Good growth	Red
Shigella dysenteriae ATCC 13313	Luxuriant growth	Red
Shigella flexneri ATCC *12022*	Good growth	Red
Proteus vulgaris ATCC 13315	Luxuriant growth	Grey with black centers
Escherichia coli ATCC 25922	Fair growth	Yellow
Klebsiella aerogenes ATCC 13048	Fair growth	Yellow
Enterobacter cloacae ATCC 13047	Fair growth	Yellow
Enterococcus faecalis ATCC 29212	Inhibited	-
Staphylococcus aureus ATCC 25923	Inhibited	-

QUALITY CONTROL

To ensure adequate quality control, it is recommended that positive and negative control included in each run. If control still out of range please contact ***BioScien*** technical support.

REFERENCES

1. FDA Bacteriological Analytical Manual, 2005, 18th Ed., AOAC, Washington, D.C.
2. Isenberg, H.D. Clinical Microbiology Procedures Handbook. 2nd Edition.
3. Isenberg H. D., Kominos S., and Sigeal M., 1969, Appl Microbiol., 18, 656-659.
4. Jorgensen,J.H., Pfaller , M.A., Carroll, K.C., Funke, G., Landry, M.L., Richter, S.S and Warnock., D.W. (2015) Manual of Clinical Microbiology, 11th Edition. Vol. 1.
5. Salfinger Y., and Tortorello M.L. Fifth (Ed.), 2015, Compendium of Methods for the Microbiological Examination of Foods, 5th Ed., American Public Health Association, Washington, D.C
6. MacFaddin J. F., 1985, Media for Isolation-Cultivation-Identification-Maintenance of Medical Bacteria, Vol. 1, Williams and Wilkins, Baltimore.
7. 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.

SYMBOLS IN PRODUCT LABELLING			
IVD	For in-vitro diagnostic use	Σ	Number of <n> test in the pack
LOT	Batch Code/Lot number		Caution
REF	Catalogue Number		Do not use if package is damaged
	Temperature Limitation		Consult Instruction for use
	Expiration Date		
	Manufactured by		