14781 XLD Agar ISO 6579-1:2017
(Xylose Lysine Deoxycholate Agar)

XLD Agar, modified is recommended for the isolation and enumeration of *Salmonella Typhi* and other *Salmonella* species.

Composition:

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

Store prepared media below 8°C, protected from direct light. Store dehydrated powder, in a dry place, in tightly-sealed containers at 2-25°C.

Appearance: Light yellow to pink colored, homogeneous, free flowing powder.
Gelling: Firm
Color and Clarity: Red colored, clear to slightly opalescent gel forms in petri plates.

Directions:
Suspend 55.43 grams in 1000 ml distilled water. Heat with frequent agitation until the medium boils. DO NOT AUTOCLAVE OR OVERHEAT. Transfer immediately to a water bath at 50°C. After cooling, pour into sterile Petri plates. It is advisable not to prepare large volumes that will require prolonged heating.

Principle and Interpretation:
XLD Agar is a moderately selective and differential solid medium for the isolation of gram-negative enteric pathogens (like species from *Shigella* and *Salmonella*) from clinical and specimens or food products.
The medium contains yeast extract, which provides nitrogen and vitamins required for growth. Xylose, lactose and sucrose provide sources of fermentable carbohydrates. During carbohydrate fermentation acid is produced which cause that the indicator phenol red to change its color to yellow. Addition of xylose differentiate enteric pathogens from *Shigella*, the only enteric pathogens non-xylose fermenting. Sodium chloride maintains the osmotic balance of the medium. Deoxycholate is the selective agents and inhibits gram-positive bacteria. Lysine is included to differentiate the *Salmonella* group from the non-pathogens. Salmonellae 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. To prevent this reaction by lysine-positive coliforms, lactose and sucrose are added to produce acid in excess. Bacteria that decarboxylate lysine to cadaverine increase the pH and can be detected by the red colouration of the medium. The reactions influence the pH can proceed simultaneously or successively, and this may cause the indicator to exhibit various shades of color or it may change its color from yellow to red on prolonged incubation. Organisms which can produce hydrogen sulphide from sodium thiosulfate can be indicated black-centered colonies because in presence of H_2S ferric ammonium citrate precipitates (H_2S production).

The non-pathogenic H_2S producers do not decarboxylase lysine; therefore, the acid reaction produced by them prevents the blackening of the colonies (4).
Some *Proteus* strains may give red to yellow colouration with most colonies developing black centers, giving rise to false positive reactions. 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 (3).

Cultural characteristics after 18-24 hours at 35-37°C.

Organisms (ATCC)	Inoculum [CFU]	Growth	Observed lot value [CFU]	Recovery [%]	Color of Colony	Incubation time
Salmonella Typhimurium (14028)	50-100	+++	25-100	>50	red with black centres	18-72 h
Salmonella Abony (NCTC 6017)	50-100	++	25-100	>50	red with black centres	18-72 h
Escherichia coli (8739)	50-100	+/-	10-30	20-30	yellow	18-72 h
Escherichia coli (25922)	50-100	+/-	10-30	20-30	yellow	18-72 h
Escherichia coli (NCTC 9002)	50-100	+/-	10-30	20-30	yellow	18-72 h
Proteus vulgaris(13315)	50-100	++	25-100	>50	grey with black centres	18-72 h
Proteus mirabilis(25933)	50-100	++	25-100	>50	grey with black centres	18-72 h
Salmonella Paratyphi A (9150)	50-100	++	25-100	>50	red	18-72 h
Salmonella Paratyphi B (8759)	50-100	++	25-100	>50	red with black centres	18-72 h
Salmonella Enteritidis (13076)	50-100	++	25-100	>50	red with black centres	18-72 h
Salmonella Typhi (6539)	50-100	++	25-100	>50	red with black centres	18-72 h
Shigella dysenteriae (13313)	50-100	++	25-100	>50	red	18-72 h
Shigella flexneri (12002)	50-100	+	15-40	30-40	red	18-72 h
Shigella sonnei (25931)	50-100	+	15-40	30-40	red	18-72 h
Enterobacter aerogenes (13048)	50-100	+/-	10-30	20-30	yellow	18-72 h
Enterobacter cloacae (13047)	50-100	+/-	10-30	20-30	yellow	18-72 h
Staphylococcus aureus (25923)	>=10^3	-	0	0	-	>=72 h
Staphylococcus aureus (6538)	>=10^3	-	0	0	-	>=72 h
Enterococcus faecalis (29212)	>=10^3	-	0	0	-	>=72 h

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Precautions and Disclaimer
This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.