XLD/Agar
(Xylose-Lysine-Desoxycholate)

356-9124
354-1751

DEFINITION
Medium used for the detection and enumeration of *Enterobacteria*, and especially *Salmonella*, in the analysis of food products and for testing contamination of non-sterile pharmaceutical products.

STANDARDS
FOOD MICROBIOLOGY
- **NF EN ISO 6579 (December 2002):** Food microbiology - Horizontal method for the detection of *Salmonella* spp.

WATER
- **EN ISO 19250 (July 2010):** Water quality - Detection and enumeration of *Salmonella*

- **NF T90-461/A2 (May 2007)**: Water quality - Microbiology - Quality control for culture media

PRINCIPLE
Several differentiation reactions are revealed in this medium:
- attack by lactose, xylose and/or saccharose; the resulting acidity turns phenol red to yellow.
- production of H_2S: thiosulfate serves as a reaction component and ferric salts as indicators through the formation of iron sulfide, which blackens the colonies.
- decarboxylation of the lysine in cadaverin: the alkalinization resulting from the amine produced turns the area around LDC-positive colonies red.

PRESENTATION
- **Pre-poured**
  90 mm x 20 plates **code 354-1751**

- **Dehydrated**
  500g **code 356-9124**

STORAGE
- Pre-poured: +2-8°C
- Dehydrated: +15-25°C, in carefully-sealed bottles in a cool, dry place
- Expiration date and batch number are shown on the package.

THEORETICAL FORMULA

Yeast extract	3 g
L-lysine hydrochloride	5 g
Saccharose	7.5 g
Lactose	7.5 g
Xylose	3.75 g
Sodium desoxycholate	1 g
Sodium chloride	5 g
Sodium thiosulfate	6.8 g
Ferric ammonium citrate	800 mg
Phenol red	80 mg
Agar	13.5 g
Distilled water	1,000 ml

Final pH (25°C) = 7.4 ± 0.2

OTHER PRODUCTS REQUIRED (NOT SUPPLIED)
- Distilled water

EQUIPMENT REQUIRED (NOT SUPPLIED)
(non-exhaustive)
- Scales
- Sterile weighing bags
- Grinder
- Hotplate
- Mixer-homogenizer
- Sterile Petri dishes (Ø = 90 mm)
- Sterile pipettes (code 355-0751) or inoculating loop
- Water-bath precise to ±1°C
- Thermostatically-controlled incubator or incubation room, precise to ±1°C
- All usual laboratory equipment

PREPARATION OF DEHYDRATED MEDIUM
Always shake before use.
Dissolve 55 g of powder in 1 liter of distilled water. Mix until a homogenous suspension is obtained. Heat gently stirring frequently, then bring to boiling point until completely dissolved. **Do not prolong heating.**
Pour into Petri dishes and leave to dry.

Reconstitution ratio: 55 g/l
500 g of powder makes 9 liters of medium.

PROTOCOL
- **Preparation of samples**

According to the standards applicable to the product concerned.

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• **Enrichment**
According to the standards applicable to the product concerned.

• **Inoculation and incubation**
Inoculate the XLD medium in streaks or by spreading. Incubate at 37℃ ± 1℃ for 24-48 hours.

READING AND INTERPRETATION

Salmonella forms well-developed, red colonies, with or without a black center.
The following table can be used to interpret the reading:

RESULTS OBSERVED	STRAINS
Opaque yellow colonies (Fermentation of at least 2 sugars or of LDC(-), sometimes H_2S(+))	*Escherichia coli* *Enterobacter* *Klebsiella* *Citrobacter* *Proteus* *Serratia*
Red colonies (Fermentation or not of xylose or LDC(+))	*Shigella* *Providencia* *Salmonella* H_2S
Red colonies with black center (H_2S+)	*Salmonella* (H_2S+) *Edwardsiella* *Arizona*

PRECAUTION

Comply with Good Laboratory Practice.

PERFORMANCES/QUALITY CONTROL OF THE TEST

The growth performances of the media are verified with the following strains:

STRAINS	Results after 24–48 hr culture at 37℃
Salmonella Typhimurium ATCC 14028	Red colonies with a black center
Salmonella enteridis ATCC 13076	Red colonies with a black center
Escherichia coli ATCC 25922	Yellow colonies Partial inhibition
Enterococcus faecalis ATCC 19433	Total inhibition within 48 hours

QUALITY CONTROL OF MANUFACTURER

Every product manufactured and marketed by Bio-Rad is subject to a quality-assurance procedure at all stages, from the reception of raw materials to the marketing of the end-product. Each batch of finished product undergoes quality control and is marketed only if it satisfies the acceptability criteria.

Documentation relative to the production and control of each batch is kept on file.

KEY WORDS

XLD/*Salmonella*/Food products/Detection/Enumeration/Lactose/Xylose/Saccharose/H_2S/Decarboxylation/Phenol Red Medium

BIBLIOGRAPHY

TAYLOR, W.J. (1965): Isolation of *Shigella*. I. Xylose lysine agars, new media for isolation of enteric pathogens. American Journal of Clinical Pathology 44: 471-475

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