SIGMA-ALDRICH®
sigma-aldrich.com
3050 Spruce Street, St. Louis, MO 63103 USA
Tel: (800) 521-8956 (314) 771-5765 Fax: (800) 325-5052 (314) 771-5757
email: techservice@sial.com sigma-aldrich.com

Product Information

62915 Lysine Iron Agar

Test agar for the simultaneous detection of lysine decarboxylase, lysine deaminase enzymes and formation of hydrogen sulfide in the identification of Enterobacteriaceae, in particular *Salmonella* and *Arizona* according to Edwards and Fife. Primarily used for the examination of foods.

Composition:

Ingredients	Grams/Litre
Meat peptone	5.0
Yeast extract	3.0
D(+)-Glucose	1.0
L-Lysine monohydrochloride	10.0
Sodium thiosulfate	0.04
Ammonium ferric citrate	0.5
Bromocresol purple	0.02
Agar	12.5
Final pH 6.7 +/- 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.

Directions:
Dissolve 32 g in 1 litre distilled water and pour into tubes. Autoclave at 121°C for 15 minutes and let set as slants.

Principle and Interpretation:
Lysine Iron Agar was developed to detect lactose fermenting Salmonellae which are known to decarboxylate lysine rapidly and produce large amounts of hydrogen sulfide. This medium is a sensitive medium for the detection of lactose fermenting and lactose non-fermenting *Salmonella* species. Many strains of this group, ferment lactose very rapidly thus suppressing H_2S production on Triple Sugar Iron Agar (Cat. No. 44940). It is recommended to use Lysine Iron Agar and Triple Sugar Iron together for better discrimination between coliform organisms e.g. *Escherichia* and *Shigella*.
Meat peptone and Yeast extract is a source of nitrogen, sulfur, carbon, coenzym and Vitamine B complexes. D(+)-Glucose is a source of fermentable carbohydrate. Ferric ammonium citrate and sodium thiosulphate are indicators of H_2S formation. Cultures that produce hydrogen sulphide cause blackening of the medium due to ferrous sulphide production. *Proteus* species producing H_2S do not blacken this medium. Bromocresol purple is a pH indicator which has a yellow color below pH 5.3 and a purple color above pH 6.7. Lysine decarboxylation causes an alkaline reaction (purple color) to give the amine cadaverine and the organisms which do not decarboxylate lysine, produce acid butt (yellow colour) due to the glucose fermentation. Species of the *Proteus-Providencia* group, with the exception of a few *Proteus morganii* strains, deaminate the lysine to α-Ketocarboxylic acid, which reacts with iron salt near the surface of the medium under the influence of oxygen to form reddish-brown compounds. The medium is stabbed to the base of the butt and streaked on slant.

Characteristic reactions of some Enterobacteriaceae cultured on Lysine Iron Agar:

Organisms	Butt	Slant surface	H_2S Production
Arizona	violet	violet	+
Salmonella (except *Salm. paratyphi A*; no lysine decarboxylase production, butt = yellow, slant surface violet)	violet	violet	+
Proteus mirabilis (except some strains do not deaminate lysine)	yellow	red-brown	+
Proteus vulgaris *Proteus morganii* *Proteus rettgeri*	yellow	red-brown	-
Providencia	yellow	red-brown	-
Citrobacter	yellow	violet	+
Escherichia	yellow	violet	-
Shigella	yellow	violet	-
Klebsiella	violet	violet	-

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

Organisms (ATCC)	Growth	Butt	Slant surface	H_2S Production
Citrobacter freundii (8090)	+++	yellow	purple	+
Escherichia coli (25922)	+++	purple	purple	-
Proteus mirabilis (25933)	+++	yellow	deep red	+
Salmonella typhimurium (14028)	+++	purple	purple	+
Shigella flexneri (12022)	+++	yellow	purple	-
Salmonella choleraesuis subsp. arizonae (13314)	+++	purple	purple	+

References:

1. F.R. Edward, M.A. Fife, Lysine iron agar in the detection of Arizona cultures, Appl. Microbiol., 9, 478 (1961)
2. V. Möller, Acta Pathol. Microbiol. Scand., 355, 259 (1954)
3. W.H. Ewing, B.R. Davis, F.R.Edward, The decarboxylase reactions of Enterobacteriaceae and their value in taxonomy, Pub. Hlth. Labs., 18, 77 (1960)
4. P.S. Thatcher, D.S. Clark, Microorganisms in food, University of Toronto Press, p. 100. (1968)
5. J.G. Johnson, L.J. Kunz, W. Barron, W.H. Ewing, Biochemical differentiation of the Enterobacteriaceae with the aid of Lysine-iron-Agar, Appl. Microbiol., 14, 212 (1966)
6. S.M. Finegold, W.J. Martin, Bailey and Scott's Diagnostic Microbiology 6th ed., The CV. Mosby Co., St. Louis (1982)
7. S.Henner, W. Kleih, M. Schneiderhan, H. Burow, H. Friess, C. Grandjean, Reihenuntersuchungen an Rind- und Schweinefleisch auf Salmonellen, Fleischwirtsch., 62, 322 (1982)
8. H. Rappold, R.F. Bolderdijk, Modified lysine iron agar for isolation of Salmonella from food, Appl. Environ. Microbiol., 38, 162 (1979)

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.