LYSINE IRON AGAR

INTENDED USE
Remel Lysine Iron Agar (LIA) is a solid medium recommended for use in qualitative procedures for differentiation of microorganisms based on the production of lysine decarboxylase and hydrogen sulfide.

SUMMARY AND EXPLANATION
LIA was developed in 1961 for detection of lactose-positive *Arizona* strains implicated in outbreaks of food-borne disease.[1] In 1966, Johnson et al. recommended LIA to aid in the identification of *Salmonella* spp.[2] In later years, Ewing recommended the use of LIA in conjunction with TSI for the detection of enteric pathogens in routine examination of stools.[3]

PRINCIPLE
Gelatin peptone and yeast extract provide nitrogen, amino acids, and vitamins necessary for bacterial growth. Dextrose is a source of fermentable carbohydrate and brom cresol purple is a pH indicator. Sodium thiosulfate and ferric ammonium citrate serves as indicators which form a black precipitate in the butt of the tube when H_2S is produced. Lysine is the substrate for detection of lysine decarboxylase and lysine deaminase. When lysine is decarboxylated, as with *Salmonella* spp., the amine converts to cadaverine which results in a purple butt (alkaline). When lysine is deaminated, as with *Proteus* spp., the amine converts to α-ketocarboxylic acid and the slant turns red.

REAGENTS (CLASSICAL FORMULA)*
L-Lysine .... 10.0 g
Gelatin Peptone .... 5.0 g
Yeast Extract .... 3.0 g
Dextrose .... 1.0 g
Ferric Ammonium Citrate .... 0.5 g
Sodium Thiosulfate .... 0.04 g
Brom Cresol Purple .... 0.02 g
Agar .... 13.5 g
Demineralized Water .... 1000.0 ml

pH 6.7 ± 0.2 @ 25°C

*Adjusted as required to meet performance standards.

PRECAUTIONS
This product is For Laboratory Use only. It is not intended for use in the diagnosis of disease or other conditions.

PREPARATION OF DEHYDRATED CULTURE MEDIUM
1. Suspend 33 grams of medium in 1000 ml of demineralized water.
2. Heat to boiling with agitation to completely dissolve.
3. Dispense into tubes and sterilize by autoclaving at 121C for 15 minutes.
4. Cool in a slanted position so that deep butts are formed.

PROCEDURE
1. Consult current editions of appropriate references for the recommended procedure for sample preparation, inoculation, testing, and interpretation.

INTERPRETATION OF THE TEST
Lysine Decarboxylation (detected in butt):
Positive Test - Purple slant/purple butt (alkaline), the butt reaction may be masked by H_2S production
Negative Test - Purple slant/yellow butt (acid), fermentation of glucose only

Lysine Deamination (detected on slant):
Positive Test - Red slant
Negative Test - Slant remains purple

H_2S Production:
Positive Test - Black precipitate
Negative Test - No black color development

QUALITY CONTROL
Each lot number of Lysine Iron Agar has been manufactured, packaged, and processed in accordance with current Good Manufacturing Practice regulations. All lot numbers have been tested using the following quality control organisms and have been found to be acceptable. Testing of control organisms should be performed in accordance with established laboratory quality control procedures. If aberrant quality control results are noted, sample results should not be reported.

CONTROL	INCUBATION	RESULTS
Escherichia coli ATCC® 25922	Ambient, 18-24 h @ 33-37°C	Purple slant, purple butt, H_2S (-)
Proteus mirabilis ATCC® 12453	Ambient, 18-24 h @ 33-37°C	Red slant, yellow butt, H_2S (-)
Salmonella enterica subsp. Typhimurium ATCC® 14028	Ambient, 18-24 h @ 33-37°C	Purple slant, purple butt, H_2S (+)

(Continued on back)

LIMITATIONS

1. H_2S production may not be seen with organisms that do not produce lysine decarboxylase, such as *Proteus* spp., since acid in the butt may suppress H_2S formation.[4]
2. LIA is not a substitute for TSI or Moeller Decarboxylase media.[4]
3. Slant reaction with *Morganella morganii* may be variable after 24 hours incubation and may require longer incubation.[4]
4. Gas production may be irregular or suppressed with organisms other than *Citrobacter* spp.[4]
5. *Salmonella enterica* serovar Paratyphi A does not produce lysine decarboxylase.[4]
6. Before inoculation, a slight precipitate may be present on the slant. This will not affect the performance of the medium.[5]

BIBLIOGRAPHY

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3. Ewing, W.H. 1986. Identification of *Enterobacteriaceae*. 4th ed. Elsevier, New York, NY.
4. MacFaddin, J.F. 1985. Media for Isolation-Cultivation-Identification-Maintenance of Medical Bacteria. Vol. 1. Williams & Wilkins, Baltimore, MD.
5. Murray, P.R., E.J. Baron, M.A. Pfaller, F.C. Tenover, and R.H. Yolken. 1995. Manual of Clinical Microbiology. 6th ed. ASM, Washington, D.C.

Refer to the front of Remel *Technical Manual of Microbiological Media* for **General Information** regarding precautions, product storage and deterioration, sample collection, storage and transportation, materials required, quality control, and limitations.

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