TM 171 – LYSINE IRON AGAR

INTENDED USE

For differentiation of enteric organisms especially *Salmonella* species based on their ability to decarboxylate or deaminate lysine and production of H_2S.

PRODUCT SUMMARY AND EXPLANATION

Lysine Iron Agar was developed by Edwards and Fife to detect lactose fermenting Salmonellae. Salmonellae are known to decarboxylate lysine rapidly and produce large amounts of hydrogen sulphide. 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. So there is a possibility that the organisms frequently found in food poisoning outbreaks could be overlooked. Thatcher and Clark described the isolation of *Salmonella* species from foods from selective agar and to inoculate it on Lysine Iron Agar and Triple Sugar Iron together. Using these two media greater discrimination can be made between coliform organisms e.g. *Escherichia coli* and *Shigella* species. HENNER et al. (1982) reported that Lysine Iron Agar is superior to other comparable culture media for differentiating between *Proteus* and *Salmonella*.

COMPOSITION

Ingredients	Gms / Ltr
Agar	15.000
L-Lysine	10.000
Peptone	5.000
Yeast extract	3.000
Dextrose (Glucose)	1.000
Ferric ammonium citrate	0.500
Sodium thiosulphate	0.040
Bromocresol purple	0.020

PRINCIPLE

Peptone and yeast extract provide essential nutrients. Dextrose 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. Lysine decarboxylation causes an alkaline reaction (purple colour) to give the amine cadaverine and the organisms which do not decarboxylate lysine, produce acid butt (yellow colour).

Species of the *Proteus-Providencia* group, with the exception of a few *Proteus morganii* strains that deaminate lysine, form alpha - ketocarboxylic acid, which reacts with iron salt near the surface of the medium under the influence of oxygen to form reddish-brown compound. The medium is stabbed to the base of the butt and streaked on slant.

Lysine is decarboxylated by Lysine Decarboxylase positive microorganisms to give the amine cadaverine which causes the pH indicator bromocresol purple to change its colour to violet. As decarboxylation only occurs in an acidic medium (below pH 6.0), the culture medium must first be acidified by glucose fermentation. This medium can therefore only be used for the differentiation of glucose-fermenting microorganisms.

LDC-negative, glucose-fermenting microorganisms cause the entire culture medium to turn yellow. On prolonged incubation alkalinisation of the culture medium surface may occur, resulting in a colour change to violet. H_2S production causes a blackening of the culture medium due to the formation of iron sulphide.

INSTRUCTION FOR USE

- Dissolve 34.56 grams in 1000 ml distilled water.
- Gently heat to boiling to dissolve the medium completely.
- Dispense into tubes and sterilize by autoclaving at 15 psi (121°C) for 15 minutes.
- Cool the tubes in slanted position to form slants with deep butts.

QUALITY CONTROL SPECIFICATIONS

Appearance of Powder : Light yellow to greyish yellow colour, homogeneous free flowing powder
Appearance of prepared medium : Purple colour, clear to slightly opalescent gel form in tubes as slants
pH (at 25°C) : 6.7 ± 0.2

INTERPRETATION

Cultural characteristics observed after incubation.

Microorganism	ATCC	Inoculum (CFU/ml)	Growth	Slant (Lysine deamination)	Butt (Lysine decarboxylation)	H_2S production	Incubation Temperature	Incubation Period
Proteus mirabilis	25933	50-100	Luxuriant	Deep red, Lysine deamination	Acidic reaction, yellowing of the medium	Positive (blackening of the medium)	35 ± 2°C	18-24 Hours
Escherichia coli	25922	50-100	Luxuriant	Alkaline reaction, purple or no colour change	Alkaline reaction, purple or no colour change	Negative	35 ± 2°C	18-24 Hours
Salmonella enteritidis	13076	50-100	Luxuriant	Alkaline reaction, purple or no colour change	Alkaline reaction, purple or no colour change	Positive (blackening of the medium)	35 ± 2°C	18-24 Hours
Salmonella typhimurium	14028	50-100	Luxuriant	Alkaline reaction, purple or no colour change	Alkaline reaction, purple or no colour change	Positive (blackening of the medium)	35 ± 2°C	18-24 Hours
Shigella flexneri	12022	50-100	Luxuriant	Alkaline reaction, purple or no colour change	Acidic reaction, yellowing of the medium	Negative	35 ± 2°C	18-24 Hours

PACKAGING:

In pack size of 100 gm and 500 gm bottles.

STORAGE

Dehydrated powder, hygroscopic in nature, store in a dry place, in tightly-sealed containers between 25-30°C and protect from direct sunlight. Under optimal conditions, the medium has a shelf life of 4 years. When the container is opened for

the first time, note the time and date on the label space provided on the container. After the desired amount of medium has been taken out replace the cap tightly to protect from hydration.

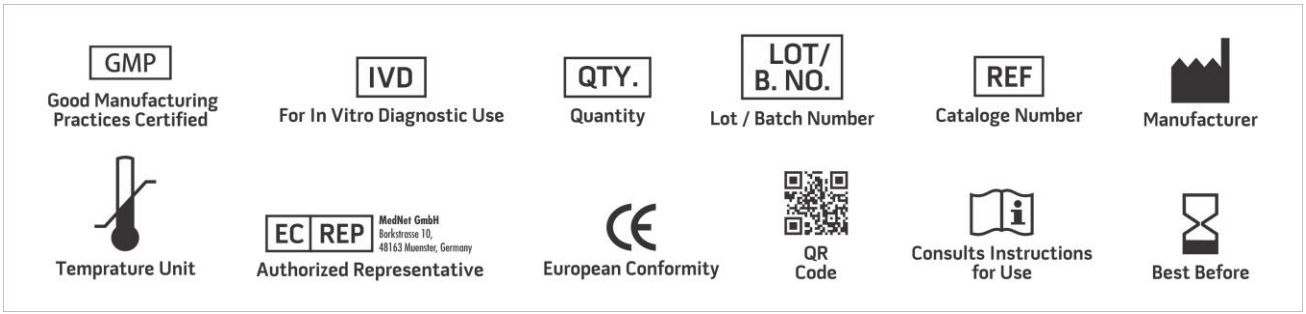
Product Deterioration: Do not use if they show evidence of microbial contamination, discoloration, drying or any other signs of deterioration.

DISPOSAL

After use, prepared plates, specimen/sample containers and other contaminated materials must be sterilized before discarding.

REFERENCES

1. F.R. Edward, M.A. Fife, Lysine iron agar in the detection of Arizona cultures, Appl. Microbiol., 9, 478 (1961)
2. Moeller V., 1954, Acta Pathol. Microbiol. Scand., 355:25
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. S. Henner, W. Kleih, M. Schneiderhan, H. Burow, H. Friess, C. Grandjean, Reihenuntersuchungen an Rind- und Schweinefleisch auf Salmonellen, Fleischwirtsch., 62, 322 (1982).



NOTE: Please consult the Material Safety Data Sheet for information regarding hazards and safe handling Practices.

***For Lab Use Only**

Revision: 08 Nov., 2019