41932 L-Lysine decarboxylation medium
(LD medium; Lysine Decarboxylase Broth without Peptone)

Lysine Decarboxylase Broth w/o Peptone are used for differentiating *Salmonella arizonae* from the Bethesda Ballerup group of Enterobacteriaceae.

Composition:

Ingredients	Grams/Litre
L-Lysine hydrochloride	5.0
Yeast extract	3.0
Dextrose	1.0
Bromocresol purple	0.015
Final pH 6.8 +/- 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 2-8°C.
Appearance: Faint yellow to greenish yellow coloured, homogeneous, free flowing powder.
Color and Clarity: Purple coloured, clear solution without any precipitate.

Directions:
Suspend 9.01 grams in 1000 ml distilled water. Heat if necessary to dissolve the medium completely. Dispense 5 ml amount into screw-capped test tubes. Sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes.

Principle and Interpretation:
Lysine decarboxylase test is based on the ability of some bacteria to cleave L-lysine to cadaverine under the liberation of carbon dioxide (1). Decarboxylase media were first described by Moeller (2-4) for detecting lysine and ornithine decarboxylase and arginine dihydrolase. Falkow developed a lysine decarboxylase medium for the identification and differentiation of *Salmonella* and *Shigella* (5). Taylor modified this medium (6) by removing the peptone from the formulation to avoid false positives caused by *Citrobacter freundii* and its paracolons. This modified medium has been recommended by the ISO committee (7). Lysine Decarboxylase Broth is generally usefull to study the decarboxylase reactions for members of Enterobacteriaceae.
Yeast extract serves as a nitrogen source and provides other important nutrients like e.g. vitamin B_{12} complex. Dextrose is the fermentable sugar and gives an acidic condition which is shown by yellow coloration of the media due the indicator bromocresol purple. The medium contains lysine as a substrate for the decarboxylase reaction. In case of a positive reaction (when the enzyme is present) cadavarine is built and this gives a alkaline conditions which is indicated by the indicator bromocresol purple by changing the color from yellow to purple. Dextrose non-utilizers will not show any change in the medium colour.
Use light inocula and do not read the tests after 24 hours incubation, as some organisms will also show positive reactions after longer incubation time up to 4 days. Use 25 grams of the test sample and start with an enrichment step in Buffered Peptone Water. After incubation at 35-37°C for 16-20 hours, inoculate into RVS Broth and Fluid Selenite Cystine Broth and incubate at 35-37°C for 24-48 hours. From the second enrichment, streak a loopful on Brilliant Green Agar modified. Presumptive Salmonella detected on Brilliant Green Agar modified are further confirmed by performing biochemical testing using the following media i.e. Nutrient Agar pH 7.0, Triple Sugar Iron Agar, Urea Agar, Lysine Decarboxylase Broth, VP test, Indole test (7).

Cultural characteristics after 18-24 hours at 35-37°C (Inoculum 50-100 cfu).

Organisms (ATCC)	Lysince decarboxylase reaction*
Citrobacter freundii (8090)	-
Escherichia coli (25922)	+
Enterobacter aerogenes (13048)	+
Klebsiella pneumoniae (13883)	+
Proteus mirabilis (25933)	-
Proteus vulgaris (13315)	-
Salmonella Arizonae (13314)	+
Salmonella Paratyphi A (9150)	-
Salmonella Typhi (6539)	+
Serratia marcescens (8100)	+
Shigella dysenteriae (13313)	-

* key:

- negative reaction = yellow colored media
- positive reaction = purple colored

References:

1. Collee J. G., Duguid J. P., Fraser A. G., Marmion B. P., (Eds.), Mackie and McCartney, Practical Medical Microbiology, 1989, 13th Edition, Churchill Livingstone
2. Moeller V., 1954, Acta. Pathol. Microbiol. Scand., 34:102.
3. Moeller V., 1954, Acta. Pathol. Microbiol. Scand., 34:259.
4. Moeller V., 1955, Acta. Pathol. Microbiol. Scand., 36:158.
5. Falkow, 1958, Am. J. Clin. Pathol., 29:598.
6. Taylor W. I., 1961, Appl. Microbiol., 9:487.
7. ISO 6579:2002 Microbiology of food and animal feeding stuffs -- Horizontal method for the detection of Salmonella spp.
8. ISO 22964 2006 Milk and milk products -- Detection of *Enterobacter sakazakii*

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.