MIO Medium (Motility Indole Ornithine Medium) (M1620)

For the identification of Enterobacteriaceae on the basis of motility, indole production and ornithine decarboxylase activity.

Composition

Ingredients	g/ L
Peptone	10.000
Tryptone	10.000
Yeast extract	3.000
L-Ornithine hydrochloride	5.000
Dextrose	1.000
Bromocresol purple	0.020
Agar	2.000

Description

Motility, indole production and ornithine decarboxylation are routine biochemical tests employed during identification of Enterobacteriaceae. Indole test is carried out to determine the ability of an organism to split indole from tryptophan by the tryptophanase enzyme. On reaction with Kovacs reagent, indole combines with the colour in the alcohol layer, which is visualized as a red ring (in the alcohol layer). If the test organisms possess the specific decarboxylase enzyme, then ornithine is decarboxylated to putrescine, an amine, resulting in a subsequent rise in the pH of the medium towards alkalinity. This causes the pH indicator bromocresol purple to change from purple to yellow colour. MIO (Motility Indole Ornithine Medium) is used for identification of Enterobacteriaceae on the basis of motility, indole production and ornithine decarboxylation in a single tube.

Peptone and tryptone provide amino acids and other nitrogenous substances. Yeast extract is the source of vitamin B complex. Dextrose is the fermentable carbohydrate. Test cultures are stab-inoculated into the medium butts. Motility and ornithine decarboxylation reactions are read before testing indole production. On addition of the Kovacs reagent, colour of the medium changes to yellow. Therefore positive ornithine decarboxylase test (purple) could be misinterpreted as negative (yellow). Organisms ferment dextrose to form acid, which causes the pH indicator bromocresol purple to change from purple to yellow.

Organisms possessing ornithine decarboxylase enzyme, decarboxylate ornithine to putrescine which increases the pH making it alkaline, indicated by a colour change from yellow to purple throughout the medium. Decarboxylase negative reaction is indicated by yellow colour or yellow with a purple band near the top of the medium. Indole is produced from tryptophan present in tryptone. The indole produced combines with the aldehyde present in the Kovacs reagent to form a red complex.

Type of specimen

Isolated microorganisms

Specimen Collection and Handling

For clinical samples follow appropriate techniques for handling specimens as per established guidelines. After use, contaminated materials must be sterilized by autoclaving before discarding.

MICROBES MEDIA

Warning and Precautions

In Vitro diagnostic use only. For professional use only. Read the label before opening the container. Wear protective gloves/protective clothing/eye protection/ face protection. Follow good microbiological lab practices while handling specimens and culture.

Limitations

1. Due to nutritional variations, some strains may show poor growth

Performance and Evaluation

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at recommended temperature.

Quality control

Physical/Chemical control

Color : Purple coloured clear in tubes as butts

pH: 6.30-6.70

Cultural Response

Cultural characteristics observed after an incubation at 35-37°C for 18-24 hours.

Microbiological activity

Organisms	Inoculum (CFU)	Motility Indole	Indole production	Ornithine Decarboxylation
Escherichia coli ATCC 25922	50-100	positive, growth away from stabline causing turbidity	positive reaction red ring formation	positive reaction, purple colour
Klebsiella pneumoniae ATCC 700603	50-100	negative, growth along the stabline, surrounding medium remains clear	negative reaction	negative reaction
Proteus mirabilis ATCC 12453	50-100	motility is temp. dependent, it is more pronounced at 20°C and almost absent at 35°C	negative reaction	positive reaction, purple colour

Storage and Shelf Life ,

Store between 2-25°C. Use before expiry date on the label. Product performance is best if used within stated expiry period.

Disposal

User must ensure safe disposal by autoclaving and/or incineration of used or unusable preparations of this product. Follow established laboratory procedures in disposing of infectious materials and material that comes into contact with sample must be decontaminated and disposed of in accordance with current laboratory techniques.

Reference

1. MacFaddin J. F., 2000, Biochemical tests for Identification of Medical Bacteria, 3rd Ed., Lippincott, Williams and Wilkins, Baltimore.
2. Isenberg, H.D. Clinical Microbiology Procedures Handbook 2nd Edition.
3. Jorgensen, J.H., Pfaller, M.A., Carroll, K.C., Funke, G., Landry, M.L., Richter, S.S and Warnock., D.W. (2015) Manual of Clinical Microbiology, 11th Edition. Vol. 1