



Ready Prepared Media

Technical Information

Deoxycholate Citrate Agar Plate

Product Code: PM 1065

Application: Recommended for the isolation of enteric pathogens particularly *Salmonella* and *Shigella* species

Composition**

Ingredients	Gms / Litre
HI solids #	10.000
Proteose peptone	10.000
Lactose	10.000
Sodium deoxycholate	5.000
Neutral red	0.020
Sodium citrate	20.000
Ferric ammonium citrate	2.000
Agar	13.500
Final pH (at 25°C)	7.5±0.2

**Formula adjusted, standardized to suit performance parameters

Equivalent to Heart Infusion solids

Principle & Interpretation

Deoxycholate Citrate Agar is prepared as per the modified formula of Leifson (1). This medium is used for the isolation and maximum recovery of intestinal pathogens belonging to *Salmonella* and *Shigella* groups from foods (2). However, it is recommended to use less inhibitory medium when *Shigella* have to be isolated (3). The selectivity of this medium permits the use of fairly heavy inocula without danger of overgrowth of *Shigella* and *Salmonella* by other microflora. For the routine examination of stool and urine specimens, it is suggested that other media such as MacConkey Agar (DM1082), Bismuth Sulphite Agar (DM1027) etc. be used in conjunction with this medium.

This medium is similar to deoxycholate agar in comparison but is moderately more selective for enteric pathogens owing to increased concentrations of both citrate and deoxycholate salts. Sodium deoxycholate at pH 7.3 to 7.5 is inhibitory for gram- positive bacteria. Citrate salts, in the concentration included in the formulation, are inhibitory to gram-positive bacteria and most other normal intestinal organisms.

HI solids is a source of carbon and nitrogen and this ingredient is used because the inhibition of coliforms produced is greater than when an extract or simple peptone is used. Proteose peptone provides carbon, nitrogen, vitamins and minerals. Coliform bacteria and gram-positive bacteria are inhibited or greatly suppressed due to sodium deoxycholate, sodium citrate and ferric ammonium citrate. Lactose helps in differentiating enteric bacilli, as lactose fermenters produce red colonies while lactose non-fermenters produce colourless colonies. Coliform bacteria, if present form pink colonies on this medium. The degradation of lactose causes acidification of the medium surrounding the relevant colonies and the pH indicator neutral red changes its colour to red. These colonies usually are also surrounded by a turbid zone of precipitated deoxycholic acid due to acidification of the medium. Sodium deoxycholate combines with neutral red in an acidic environment, causing the dye to go out of the solution with the subsequent precipitation of deoxycholate (1). The reduction of ferric ammonium citrate to iron sulfide is indicated by the formation of black iron sulfide. *Salmonella* and *Shigella* species do not ferment lactose but *Salmonella* may produce H₂S, forming colorless colonies with or without black centers. Citrate and iron (Fe) combination has a strong hydrolyzing effect on agar when the medium is heated, producing a soft and unelastic agar. If autoclaved the agar becomes soft and almost impossible to streak. *Salmonella* Gallinarum is inhibited if sodium deoxycholate concentration is increased to 0.1 % or greater (1). Surface colonies of non-lactose fermenters often absorb a little colour (pinkish) from the medium and organisms may be mistaken for coliforms (1).

Type of specimen

Clinical food samples



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Specimen Collection and Handling

For clinical samples follow appropriate techniques for handling specimens as per established guidelines (4,5). For food samples, follow appropriate techniques for sample collection and processing as per guidelines (5). After use, contaminated materials must be sterilized by autoclaving before discarding .

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. Standard precautions as per established guidelines should be followed while handling clinical specimens. Safety guidelines may be referred in individual safety data sheets.

Limitations

1. Individual organisms differ in their growth requirement and may show variable growth patterns on the medium .
2. Each lot of the medium has been tested for the organisms specified on the COA. It is recommended to users to validate the medium for any specific microorganism other than mentioned in the COA based on the user's unique requirement.
3. Further biochemical test have to be performed for confirmation of species .
4. It is recommended to store the plates at 24-30°C to avoid minimum condensation .

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 .

Methodology

Either streak, inoculate or surface spread the test inoculum (50-100 CFU) aseptically on the plate.

Quality Control

Appearance

Sterile Deoxycholate Citrate Agar in 90mm disposable plate with smooth surface and absence of black particles/cracks/ bubbles .

pH

7.30-7.70

Quantity of medium

25 ml of medium in 90 mm plates

Colour of medium

Reddish orange coloured medium

Sterility Test

Passes release criteria

Oragnism	Inoculum (CFU)	Growth	Recovery	Colour of Colony	H ₂ S
<i>Enterococcus faecalis</i> ATCC 29212 (00087*)	$\geq 10^3$	inhibited	0%		
<i>Escherichia coli</i> ATCC25922 (00013*)	50-100	Poor	20-30%	pink with bile precipitate	Negative reaction
<i>Salmonella Enteritidis</i> ATCC13076 (00030*)	50-100	good-luxuriant	$\geq 50\%$	Colourless	Positive reaction,black centerd colonies
<i>Salmonella Typhimurium</i> ATCC 14028 (00031*)	50-100	good-luxuriant	$\geq 50\%$	Colourless	Positive reaction,black centerd colonies
<i>Shigella flexneri</i> ATCC 12022 (00126*)	50-100	good	40-50%	Colourless	



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<i>Escherichia coli</i> ATCC 8739(00012*)	50-100	poor	20-30%	pink with bile precipitate	Negative reaction
<i>Escherichia coli</i> NCTC 9002	50-100	poor	20-30%	pink with bile precipitate	Negative reaction
<i>Salmonella Abony</i> NCTC 6017 (00029*)	50-100	good-luxuriant	>=50%	Colourless	Positive reaction,black centered colonies
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> ATCC 25923 (00034*)	>=10 ³	inhibited	0%		

Key : (*) Corresponding WDCM numbers.

Storage and Shelf Life

On receipt store between 20-30°C. Use before expiry date on the label.

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 (2,3).

Further Reading

1. Leifson, 1935, J. Path. Bact., 40:581.
2. Salfinger Y., and Tortorello M.L., 2015, Compendium of Methods for the Microbiological Examination of Foods, 5th Ed., American Public Health Association, Washington, D.C.
3. Frieker C.R., 1987, J. Appl. Bact., 63:99.
4. Isenberg, H.D. Clinical Microbiology Procedures Handbook 2nd Edition.
5. 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.

Disclaimer :

- User must ensure suitability of the product(s) in their application prior to use.
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