

Technical Information

Urea Broth Base (Diagnostic Stuarts Urea Broth Base)

Product Code: DM 1111

Application: Urea Broth is recommended for the identification of bacteria on the basis of urea utilization, specifically for the differentiation of *Proteus* species from *Salmonella* and *Shigella* species.

Composition**

Ingredients	Gms / Litre
Monopotassium phosphate	9.100
Dipotassium phosphate	9.500
Yeast extract	0.100
Phenol red	0.010
Final pH (at 25°C)	6.8±0.2

**Formula adjusted, standardized to suit performance parameters

Principle & Interpretation

Rustigian and Stuart developed Urea Broth ⁽¹⁾. Based on urea utilization this medium is especially recommended for the differentiation of *Proteus* species from *Salmonella* and *Shigella* species in the diagnosis of enteric infection ⁽²⁻⁴⁾. Gram-negative enteric bacilli are unable to utilize urea because of less nutrients and high buffering capacity of the medium. Urea Broth becomes alkaline due to the utilization of urea by the organisms & liberates ammonia during the incubation. This is indicated by change of colour of media from orange to pink. All urea test media rely on the alkalinity formation and so they are not specific for urease testing. The utilization of proteins may raise the pH to alkalinity due to protein hydrolysis and excess of amino acids results in false-positive reaction.

Prolonged incubation may cause alkaline reaction in the medium. A medium without urea should be included as negative control to rule out false positive results. Also, all urea test media rely on the alkalinity formation and so they are not specific for determining the absolute rate of urease activity ⁽⁴⁾.

Methodology

Suspend 18.71 grams of powder media in 950 ml distilled water. Shake well & heat if necessary to dissolve the medium completely. Sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes. Cool to 55°C. Aseptically add 50 ml of sterile 40% Urea solution (MS2048). Mix well and distribute in 10 ml amounts into sterile tubes.

Quality Control

Physical Appearance

Light yellow to light pink homogeneous free flowing powder

Colour and Clarity of prepared medium

Yellowish orange coloured clear solution in tubes.

Reaction

Reaction of basal medium (1.87gm in 95ml distilled water) at 25°C. pH : 6.8±0.2

pH Range:-

6.60-7.00

Cultural Response/Characteristics

DM 1111: Cultural characteristics observed on addition of sterile 40% Urea solution (MS2048) after an incubation at 35-37°C for 18-24 hours.



Dehydrated Culture Media
Bases / Media Supplements

Organism	Inoculum (CFU)	Growth
<i>Enterobacter aerogenes</i> ATCC 13048	50-100	negative reaction, no change
<i>Escherichia coli</i> ATCC 25922	50-100	negative reaction, no change
<i>Klebsiella pneumonia</i> ATCC 13883	50-100	positive reaction, cerise colour
<i>Proteus vulgaris</i> ATCC 13315	50-100	positive reaction, cerise colour
<i>Salmonella Typhimurium</i> ATCC 14028	50-100	negative reaction, no change
<i>Escherichia coli</i> ATCC 8739	50-100	negative reaction, no change
<i>Klebsiella pneumoniae</i> ATCC 10031	50-100	positive reaction, cerise colour
<i>Escherichia coli</i> NCTC 9002	50-100	negative reaction, no change
<i>Proteus mirabilis</i> ATCC 25933	50-100	positive reaction, cerise colour

Storage and Shelf Life

Dried Media: Store below 30°C in tightly closed container and use before expiry date as mentioned on the label.

Prepared Media: 2-8° in sealable plastic bags for 2-5 days.

Further Reading

1. Rustigian and Stuart, 1941, Proc. Soc. Exp. Biol. Med., 47:108.
2. Finegold and Baron, 1986, Bailey and Scotts Diagnostic Microbiology, 7th ed., The C.V. Mosby Co., St. Louis.
3. Christensen, 1946, J. Bact., 52:461.
4. MacFaddin J. F., 2000, Biochemical Tests for Identification of Medical Bacteria, 3rd Ed., Williams and Wilkins, Baltimore. Md.

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