Russell Double Sugar Agar (Double Sugar Agar, Russell) (DM088)

Intended Use
Russell Double Sugar Agar (Double Sugar Agar, Russell) (DM088) is recommended for differentiation of gram-negative enteric bacilli on the basis of their ability to ferment dextrose and lactose with or without gas formation.

Product Summary and Explanation
Most frequently encountered bacterial isolates recovered from clinical specimens are the Gram-negative bacilli belonging to *Enterobacteriaceae* family and for definitive identification of the members of *Enterobacteriaceae* requires a battery of biochemical tests.[1] Double Sugar Agar, Russell is used for the differentiation of gram-negative enteric bacilli on the basis of their ability to ferment dextrose and lactose with or without gas formation. In 1911, Russel[2] first formulated this medium using litmus indicator. It was later modified by Nichols[3] and Nichols and Wood[4] by replacing the litmus indicator with phenol red. This medium is used for differentiating gram-negative enteric bacilli especially the colon-typhoid-salmonellae-dysentery groups based on the fermentation of the double sugars incorporated namely, dextrose and lactose.

Principles of the Procedure
Russell Double Sugar Agar contains peptic digest of animal tissue, casein enzymic hydrolysate and beef extract serve as sources of carbon, nitrogen, vitamins and other essential nutrients. Lactose and dextrose serve as sources of energy by being the fermentable carbohydrates. Phenol red is the pH indicator in the medium that is pink under alkaline conditions and yellow under acidic conditions. Sodium chloride helps to maintain the osmotic equilibrium of the medium.

Formula / Liter

Ingredients	Gms / Liter
Peptic digest of animal tissue	2.50
Casein enzymic hydrolysate	7.50
Beef extract	3.00
Lactose	10.00
Dextrose	1.00
Sodium chloride	5.00
Phenol red	0.025
Agar	15.00
Final pH: 7.3 ± 0.2 at 25°C	
Formula may be adjusted and/or supplemented as required to meet performance specifications	

Precautions
1. For Laboratory Use only.
2. IRRITANT. Irritating to eyes, respiratory system, and skin.

Directions
1. Suspend 44.02 grams of medium in one liter of distilled water.
2. Heat to boiling, to dissolve the medium completely.
3. Dispense in tubes or as desired.
4. Autoclave at 121°C, 15 psi pressure, for 15 minutes / validated cycle.
5. Allow the tubes to solidify in slanting position to form a generous butt.

Quality Control Specifications

Dehydrated Appearance	Light yellow to pink homogeneous free flowing powder

Prepared Medium	Red coloured, clear to slightly opalescent gel forms in tubes as slants
Reaction of 4.4% Solution	pH : 7.3 ± 0.2 at 25°C
Gel Strength	Firm, comparable with 1.5% Agar gel

Expected Cultural Response: Cultural characteristics observed after an incubation at 35-37°C for 18-40 hours.

Sr. No.	Organisms	Results to be achieved				
		Inoculum (CFU)	Growth	Slant	Butt	Gas
1.	*Enterobacter aerogenes* ATCC 13048	50 - 100	good-luxuriant	acidic reaction, yellowing of the medium	acidic reaction, yellowing of the medium	positive reaction
2.	*Escherichia coli* ATCC 25922	50 - 100	good-luxuriant	acidic reaction, yellowing of the medium	acidic reaction, yellowing of the medium	positive reaction
3.	*Proteus vulgaris* ATCC 13315	50 - 100	good-luxuriant	alkaline reaction, red colour of the medium	acidic reaction, yellowing of the medium	positive reaction
4.	*Pseudomonas aeruginosa* ATCC 27853	50 - 100	good-luxuriant	alkaline reaction, red colour of the medium	alkaline reaction, red colour of the medium	negative reaction
5.	*Salmonella Typhimurium* ATCC 14028	50 - 100	good-luxuriant	alkaline reaction, red colour of the medium	acidic reaction, yellowing of the medium	positive reaction
6.	*Shigella dysenteriae* ATCC 13313	50 - 100	good-luxuriant	alkaline reaction, red colour of the medium	acidic reaction, yellowing of the medium	negative reaction

The organisms listed are the minimum that should be used for quality control testing.

Test Procedure
Refer to appropriate references for standard test procedures.

Results
1. On incubation of inoculated tubed medium, acid production under aerobic condition (on the slant) and under anaerobic condition (in the butt) can be detected by the change in colour of the indicator.
2. Gaseous fermentation is indicated by splitting of the agar or by bubble formation in the butt.
3. Organism like *Salmonella typhi* capable of fermenting dextrose but not lactose will show an initial acid slant in short incubation period.
4. Over a period of time as the dextrose gets consumed the reaction under aerobic condition reverts and becomes alkaline due to the oxidation of acids.
5. Under anaerobic condition (in the butt), the same organism fails to revert the reaction and remains acidic.

Storage
Store the sealed bottle containing the dehydrated medium at 10 - 30°C. Once opened and recapped, place container in a low humidity environment at the same storage temperature. Protect from moisture and light.

Expiration
Refer to the expiration date stamped on the container. The dehydrated medium should be discarded if not free flowing, or if the appearance has changed from the original color. Expiry applies to medium in its intact container when stored as directed.

Limitations of the Procedure

1. For identification, organisms must be in pure culture. Morphological, biochemical and/or serological tests should be performed for final identification.
2. Consult appropriate texts for detailed information and recommended procedures.

Packaging
Product Name : Russell Double Sugar Agar (Double Sugar Agar, Russell)
Product Code : DM088
Available Pack sizes : 500gm

References

1. Koneman E. W., Allen S. D., Janda W. M., Schreckenberger P. C., Winn W. C. Jr., 1992, Colour Atlas and Textbook of Diagnostic Microbiology, 4th Ed., J. B. Lippincott Company.
2. Russell F. F., 1911, J. Med. Res., 25:217.
3. Nichols H. J., 1921, J. Infect. Dis., 2982.
4. Nichols H. J. and Woods C. B., 1922, J. Infect. Dis., 30, 320.
5. MacFaddin J. F., 1985, Media for Isolation-Cultivation-Identification-Maintenance of Medical Bacteria, Vol. 1, Williams and Wilkins, Baltimore.

Further Information
For further information please contact your local MICROMASTER Representative.

MICROMASTER LABORATORIES PRIVATE LIMITED
Unit 38/39, Kalpataru Industrial Estate,
Off G.B. Road, Near 'R-Mall', Thane (W) – 400607. M.S. INDIA.
Ph: +91-9320126789/9833630009/9819991103
Email: sales@micromasterlab.com