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# PHENOL RED BROTH w/ and w/o CARBOHYDRATE w/ and w/o DURHAM TUBE

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## INTENDED USE

Remel Phenol Red Broth w/ and w/o Carbohydrate w/ and w/o Durham Tube are liquid media recommended for use in qualitative procedures for the determination of fermentation reactions of bacteria.

## SUMMARY AND EXPLANATION

The fermentation properties of bacteria are valuable criteria in their identification.<sup>1</sup> The ability of bacteria to ferment a specific carbohydrate contained in a basal medium may be used to differentiate between genera and species.<sup>2</sup> Vera recommended using casein peptone with phenol red as the pH indicator in fermentation test media.<sup>3</sup> Phenol Red Broth w/ and w/o Carbohydrate w/ and w/o Durham Tube is recommended by the AOAC International (AOAC) and the American Public Health Association (APHA).<sup>4-7</sup>

## PRINCIPLE

Phenol Red Broth w/ and w/o Carbohydrate w/ and w/o Durham Tube is a complete basal medium prepared with phenol red as an indicator of acid production. A color change from red-orange to yellow occurs when acid is produced as a result of the fermentation of carbohydrate. This medium may be used for many species of bacteria due to the high growth-promoting qualities of casein peptone. Carbohydrates are added to the broth base in a final concentration of 1%. Sodium chloride supplies essential electrolytes and maintains osmotic equilibrium of the medium. A Phenol Red Broth Base Control tube is used as a negative control for fermentation studies. A Durham tube may be inserted in a tube of Phenol Red Broth w/ Carbohydrate to allow for the detection of gas production.

## REAGENTS (CLASSICAL FORMULAE)\*

### Base Medium:

Casein Peptone.....	10.0 g
Sodium Chloride.....	5.0 g

pH 7.4 ± 0.2 @ 25°C

Phenol Red.....	18.0 mg
Demineralized Water.....	1000.0 ml

The following carbohydrates are available per liter of medium:

Adonitol .....	10.0 g
Arabinose .....	10.0 g
Cellobiose .....	10.0 g
Dextrose.....	10.0 g
Dulcitol .....	10.0 g
Fructose .....	10.0 g
Galactose.....	10.0 g
Glycerol .....	10.0 g
Inositol.....	10.0 g
Lactose.....	10.0 g

Maltose.....	10.0 g
Mannitol.....	10.0 g
Mannose.....	10.0 g
Melibiose .....	10.0 g
Raffinose .....	10.0 g
Rhamnose .....	10.0 g
Salicin .....	10.0 g
Sorbitol .....	10.0 g
Sucrose .....	10.0 g
Trehalose.....	10.0 g
Xylose.....	10.0 g

\*Adjusted as required to meet performance standards.

## PROCEDURE

1. The performance of this medium is dependent on proper inoculation. The test isolate should be 18-24 hours old and in pure culture.
2. Use a sterile inoculating loop or needle to select well-isolated colonies and heavily inoculate Phenol Red Broth tubes. A battery of 8-10 carbohydrates may be inoculated without flaming between tubes, since carryover of carbohydrates is minimal.
3. Incubate tubes in ambient air with loosened caps at 33-37°C for 18-48 hours. Prolonged incubation may be required, up to 30 days for some microorganisms to be considered a negative result.
4. A Phenol Red Broth Base Control tube should be inoculated and incubated in parallel with the fermentation test.
5. Examine tubes frequently for a yellow color development; different carbohydrates may be utilized at different rates.

## INTERPRETATION OF THE TEST

### Fermentation: (acid production)

Positive Test - Yellow color development (acid production)

Negative Test - Red-orange color

### Gas Production:

Positive Test - A bubble or bubbles in the Durham tube

Negative Test - No bubble(s) in the Durham tube

## QUALITY CONTROL

All lot numbers of Phenol Red Broth w/ and w/o Carbohydrate w/ and w/o Durham Tube have been tested for performance and have been found to be acceptable. Testing of control organisms should be performed in accordance with established laboratory quality control procedures. Control organisms should be selected that demonstrate a positive and negative reaction for each carbohydrate tested. If aberrant quality control results are noted, test isolate results should not be reported.

## BIBLIOGRAPHY

1. Koneman, E.W., S.D. Allen, W.M. Janda, P.C. Schreckenberger, and W.C. Winn, Jr. 1997. Color Atlas and Textbook of Diagnostic Microbiology. 5<sup>th</sup> ed. Lippincott Williams and Wilkins, Philadelphia, PA.
2. MacFaddin, J.F. 1985. Media for Isolation-Cultivation-Identification-Maintenance of Medical Bacteria. Vol. 1. Williams & Wilkins, Baltimore, MD.
3. Vera, H.D. 1950. Am. J. Public Health. 40:1267-1272.
4. Food and Drug Administration. 2001. Bacteriological Analytical Manual Online. Chapter 14. Authors: E.J. Rhodehamel and S.M. Harmon. AOAC International, Gaithersburg, MD.
5. Eaton, A.D., L.S. Clesceri, E.W. Rice, and A.E. Greenberg. 2005. Standard Methods for the Examination of Water and Wastewater. 21<sup>st</sup> ed. APHA, Washington, D.C.
6. Wehr, H.M. and J.F. Frank. 2004. Standard Methods for the Examination of Dairy Products. 17<sup>th</sup> ed. APHA, Washington, D.C.
7. Downes, F.P. and K. Ito. 2001. Compendium of Methods for the Microbiological Examination of Foods. 4<sup>th</sup> ed. APHA, Washington, D.C.

Refer to the front of Remel *Technical Manual of Microbiological Media* for **General Information** regarding precautions, product storage and deterioration, specimen collection, storage and transportation, materials required, quality control, and limitations.

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IFU 62202, Revised March 29, 2011

Printed in U.S.A.



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