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# BD BBL™ Prepared Plated Medium for Detection of Enterococci Resistant to Vancomycin

## Enterococcosel™ Agar with Vancomycin, 8 µg/mL



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### INTENDED USE

Enterococcosel™ Agar with Vancomycin, 8 µg/mL, is used for primary screening of asymptomatic gastrointestinal carriage of vancomycin-resistant enterococci (VRE).<sup>1</sup>

### SUMMARY AND EXPLANATION

Enterococci are known to cause a wide variety of infections. Most commonly they infect the urinary tract, abdomen, bloodstream, endocardium, biliary tract, burn wounds and in-dwelling catheters.<sup>2</sup> *Enterococcus faecalis* causes 80 to 90% of infections, while *E. faecium* causes the remainder.<sup>3</sup> Today the enterococci are the fourth leading cause of nosocomial infection and the third leading cause of bacteremia in the United States.<sup>4</sup> The case/fatality rates for enterococcal bacteria range from 12 to 68% with death due to sepsis in 4 to 50% of the cases.<sup>5</sup> Because the potential exists for vancomycin resistant genes to be transferred to other gram-positive organisms and because the treatment options for VRE infections are limited, the CDC issued infection control guidelines for hospitals and long-term care facilities.<sup>6</sup> Guidelines include stool and rectal swab culture surveys of asymptomatic patients who may be carrying VRE.

### PRINCIPLES OF THE PROCEDURE

Enterococcosel Agar, a modified esculin bile agar, is used for the rapid, selective detection and enumeration of fecal streptococci (group D).

Group D streptococci, including enterococci, hydrolyze the glucoside esculin to esculetin and dextrose. Esculetin reacts with an iron salt to form a dark brown or black complex.<sup>7</sup> Ferric citrate is incorporated into the medium as an indicator of esculin hydrolysis and resulting esculetin formation. Oxgall is used to inhibit gram-positive bacteria other than enterococci. Sodium azide is inhibitory for gram-negative organisms.

Vancomycin at 8 µg/mL is used to detect resistance to vancomycin.<sup>1</sup>

### REAGENTS

#### Enterococcosel™ Agar with Vancomycin, 8 µg/mL

Approximate Formula\* Per Liter Purified Water

Pancreatic Digest of Casein .....	17.0 g
Peptic Digest of Animal Tissue .....	3.0 g
Yeast Extract .....	5.0 g
Oxgall .....	10.0 g
Sodium Chloride .....	5.0 g
Esculin .....	1.0 g
Ferric Ammonium Citrate .....	0.5 g
Sodium Azide .....	0.25 g
Sodium Citrate .....	1.0 g
Agar .....	13.5 g
Vancomycin .....	8.0 mg

\*Adjusted and/or supplemented as required to meet performance criteria.

#### Warnings and Precautions:

For *in vitro* Diagnostic Use.

If excessive moisture is observed, invert the bottom over an off-set lid and allow to air dry in order to prevent formation of a seal between the top and bottom of the plate during incubation.

Pathogenic microorganisms, including hepatitis viruses and Human Immunodeficiency Virus, may be present in clinical specimens. "Standard Precautions"<sup>8-11</sup> and institutional guidelines should be followed in handling all items contaminated with blood and other body fluids. Prior to discarding, sterilize prepared plates, specimen containers and other contaminated materials by autoclaving.

Sodium azide may react with lead or copper plumbing to produce metal azides which are explosive by contact detonation. To prevent sodium azide accumulation in plumbing, flush with copious amounts of water immediately after waste disposal.

**Storage Instructions:** On receipt, store plates in the dark at 2 to 8°C. Avoid freezing and overheating. Do not open until ready to use. Minimize exposure to light. Prepared plates stored in their original sleeve wrapping at 2 to 8°C until just prior to use may be inoculated up to the expiration date and incubated for recommended incubation times. Allow the medium to warm to room temperature before inoculation.

**Product Deterioration:** Do not use plates if they show evidence of microbial contamination, discoloration, drying, cracking or other signs of deterioration.

### SPECIMEN COLLECTION AND HANDLING

Refer to appropriate texts for details of specimen collection and handling procedures.<sup>1,12,13</sup>

### PROCEDURE

**Material Provided:** Enterococcosel™ Agar with Vancomycin, 8 µg/mL

**Materials Required But Not Provided:** Ancillary culture media, reagents, quality control organisms and laboratory equipment as required for this procedure.

**Test Procedure:** Observe aseptic techniques. Inoculate the medium as soon as possible after the specimen arrives at the laboratory. Allow the contents of a rectal swab (or a cotton-tipped swab sample from a stool specimen) to elute in 1 mL *Trypticase*™ Soy Broth.<sup>1</sup> Using a new swab, absorb eluent, rotate swab firmly several times against the upper inside wall of the tube to express excess fluid, rub the swab over a small area of the surface at the edge of the plate and streak from this inoculated area.

Incubate the plates in an inverted position (agar-side up) for 24 to 48 h at 35 ± 2°C in an aerobic atmosphere.

### User Quality Control

1. Examine plates for signs of deterioration.
2. Check performance by inoculating a representative sample of plates with pure cultures of stable control organisms that give known, desired reactions. The following test strains are recommended:

TEST STRAIN	EXPECTED RESULT
<i>Enterococcus faecalis</i> ATCC™ 51299 (vancomycin-resistant strain)	Moderate to heavy growth; colonies translucent with brownish-black to black halos
<i>Enterococcus faecalis</i> ATCC 29212 (vancomycin-sensitive strain)	Inhibition (partial to complete)
<i>Escherichia coli</i> ATCC 25922	Inhibition (partial to complete), colorless colonies
<i>Streptococcus pyogenes</i> ATCC 19615	Inhibition (partial to complete)

Quality control requirements must be performed in accordance with applicable local, state and/or federal regulations or accreditation requirements and your laboratory's standard Quality Control procedures. It is recommended that the user refer to pertinent NCCLS guidance and CLIA regulations for appropriate Quality Control practices.

### RESULTS

Examine plates after 24 and 48 h for the presence of translucent to light gray, pinpoint colonies exhibiting black halos (discoloration of the agar) in areas of heavy growth. Perform a Gram stain, catalase test and PYR test. Gram-positive cocci which are either catalase negative or weakly positive and PYR positive may be presumptively identified as VRE pending confirmatory tests.<sup>1</sup>

### LIMITATIONS OF THE PROCEDURE

This product provides a screening method for detecting vancomycin resistance. Occasionally, enterococcal isolates with borderline antimicrobial susceptible MICs may show growth. Any *Enterococcus* isolate that grows on this medium should be tested quantitatively by broth dilution to confirm vancomycin resistance.

The determination of the phenotypic type of resistance to vancomycin (VanA, VanB, or VanC) is recommended in order to optimize infection control measures.<sup>5,14</sup>

### PERFORMANCE CHARACTERISTICS

Twenty-four (24) *Enterococcus* isolates were tested in-house. Eleven (11) isolates were *E. faecalis*, of which five were vancomycin sensitive (5S) and six were vancomycin resistant (6R). Thirteen (13) were *E. faecium*, of which seven were vancomycin sensitive (7S) and six were vancomycin resistant (6R). Phenotypic characterization included the use of agar and/or broth dilution to establish vancomycin MICs.

Pure culture suspensions were prepared in *BBL*™ *Trypticase*™ Soy Broth and adjusted to a concentration of 10<sup>6</sup> CFU (colony-forming units)/mL. Plates of *BBL Enterococcosel* Agar with Vancomycin, 8 µg/mL, and *BBL Trypticase* Soy Agar with 5% Sheep Blood (TSA II), were streaked with 10 µL of each suspension, incubated for 24 and 48 h, and read for growth and reactions. One hundred percent (100%) correlation was seen between test results and expected results for all 24 *Enterococcus* strains tested. The 12 vancomycin sensitive strains were completely inhibited, and the 12 vancomycin resistant strains grew well. All strains grew well on the TSA II.

### AVAILABILITY

<b>Cat. No.</b>	<b>Description</b>
292234	<i>BBL</i> ™ Enterococcosel™ Agar with Vancomycin, 8 µg/mL, Pkg. of 10 plates

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Becton, Dickinson and Company  
 7 Loveton Circle  
 Sparks, MD 21152 USA  
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