Evaluation Of Brilliance VRE Agar For The Detection Of Vancomycin-Resistant Enterococci

J. Beaves, E. Scopes.
Thermo Fisher Scientific, Wade Road, Basingstoke, UK, RG24 8PW

Overview

Purpose: An assessment of the performance of Thermo Scientific™ Oxoid™ *Brilliance*™ VRE (Thermo Fisher Scientific) after broth enrichment of VRE and non-VRE isolates.

Methods: vanA and vanB resistant *E. faecium* and *E. faecalis* and other species were enriched in Tryptone Soya Broth (TSB) overnight prior to plating onto *Brilliance* VRE Agar.

Results: *Brilliance* VRE Agar is an effective tool for the recovery of clinically important vancomycin-resistant enterococci

Introduction

The first vancomycin-resistant enterococcus (VRE) was isolated in 1986 in France; a year later, the first UK strain was isolated. Outbreaks of VRE infection within hospitals have been reported mainly from renal dialysis, transplant, haematology and intensive care units. VRE are becoming more common in hospitals worldwide. In the USA, between 1989 and 1993, there was a 20-fold increase in the proportion of enterococci resistant to vancomycin, with some infection rates estimated as high as 1 in 3 patients on intensive care units[1].

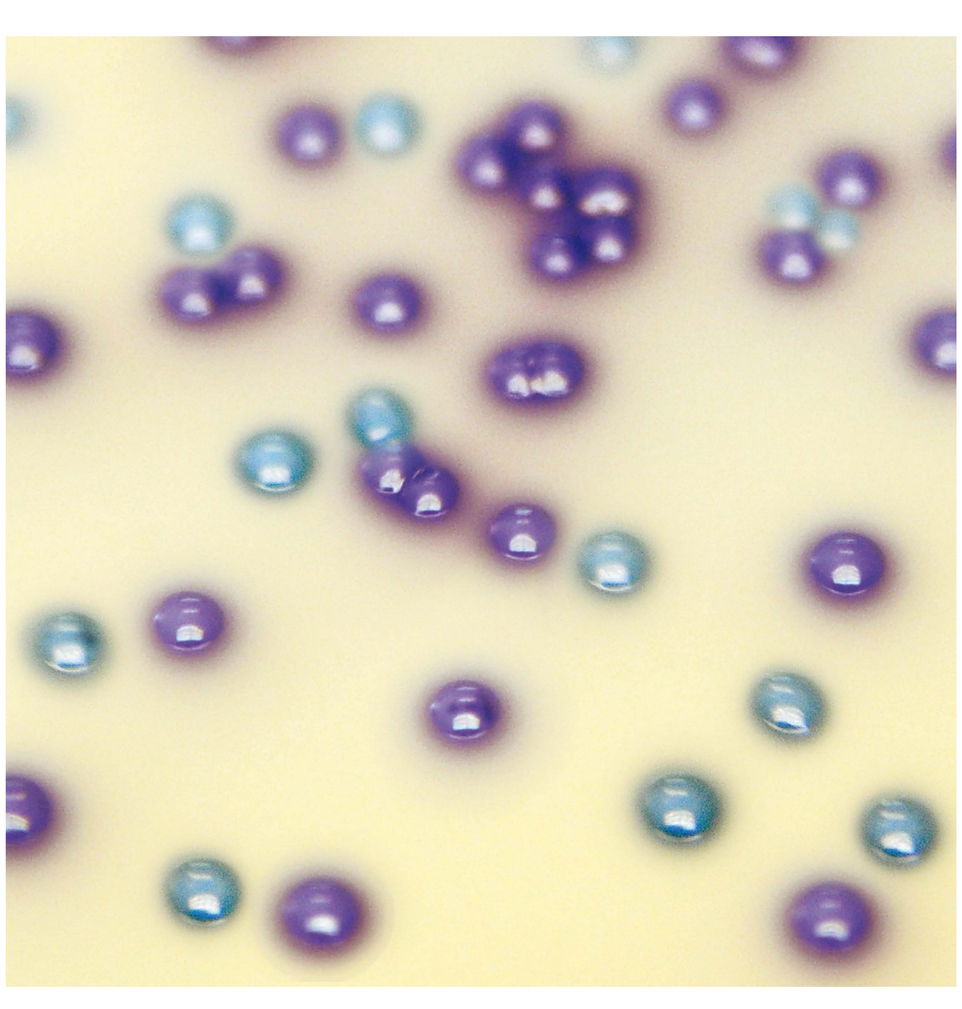
In Europe, the high level of intestinal carriage has been attributed to the use of antibiotics related to vancomycin, such as avoparcin in animal husbandry. While in North America and Australia, where avoparcin was banned, intestinal carriage may be lower, but the clinical problems are much worse due to more prolific use of vancomycin to treat MRSA[2]. *Brilliance* VRE Agar (figure 1) is a chromogenic screening medium for the detection of VRE directly from clinical samples. It provides early, presumptive identification of VRE, allowing appropriate treatment and infection control procedures to be adopted earlier, improving treatment outcomes and the effectiveness of infection control measures.

Methods

Thirty vanA and vanB resistant *E. faecium* and *E. faecalis,* obtained from the Centers for Disease Control and Prevention (CDC), and an additional 135 isolates, including yeast, leuconostoc, pediococcus, intrinsically resistant *E. casseliflavus* and *E. gallinarum* and vancomycin-sensitive enterococci, were inoculated into TSB and incubated for 18-24 h at 36±1°C.

A 0.5 McFarland suspension was prepared from the vanA and vanB resistant *E. faecium* and *E.* faecalis broths; all other broths were further diluted 1:100 prior to streaking onto *Brilliance* VRE Agar, using a 1:1000 calibrated loop. Plates were incubated for 24 h at 36±1°C.

Figure 1. *E. faecalis* - blue colonies and *E. faecium* - purple colonies on *Brilliance* VRE Agar



Results

The number and type of isolates tested during this evaluation are outlined in tables 1 and 2. For the purposes of this evaluation, isolates with an MIC of >8 µg/ml were deemed vancomycin-resistant.

TABLE 1. vanA and vanB resistant enterococci tested

Isolate	No.	Isolate	No.
E. faecalis vanA	2	*E. faecium* vanA	7
E. faecalis vanB	11	*E. faecium* vanB	10

Table 2. Vancomycin sensitive isolates or vanC harbouring enterococci tested

Isolate	No.	Isolate	No.
E. faecalis	16	*Streptococcus* spp.	4
E. faecium	7	*Vibrio* spp.	4
E. casseliflavus	19	*Shigella* spp.	3
E. gallinarum	21	*Bacillus* spp.	3
E. gallinarum vanC	5	*Klebsiella* spp.	3
E. coli	10	*Enterobacter* spp.	2
Leuconostoc	10	*P. aeruginosa*	2
Pediococcus	7	*Proteus* spp.	2
Lactobacillus spp.	5	Other*	8
Staphylococcus spp.	4		

Twenty seven of the 30 vanA and vanB resistant *E. faecium* and *E. faecalis* isolates showed characteristic growth on *Brilliance* VRE Agar (90% inclusivity).

All vancomycin-resistant *E. faecium* isolates grew as characteristic, pink/purple/indigo colonies, and *E. faecalis* isolates grew as characteristic, light-blue colonies.

None of the 135 vancomycin-sensitive isolates or intrinsically resistant (vanC) enterococci grew on *Brilliance* VRE Agar (100% exclusivity). By extrapolating a prevalence rate of 22% from the data, an estimated NPV was calculated as 97.8% (95% CI 95.6-100%).

Conclusion

The data suggests that *Brilliance* VRE Agar is an effective tool for the recovery of clinically important vancomycin-resistant enterococci (acquired resistance) and provides a number of benefits over traditional media:

- clear differentiation between vancomycin-resistant *E. faecium* and *E. faecalis* after 24 hours.
- improved colony size of enterococci
- enhanced recovery of VanB enterococci
- total inhibition of VanC enterococci, lactobacilli, pediococci, yeast, other non-VRE
- user-friendly, ready-to-use, pre-poured plates

References

1. Centers for Disease Control and Prevention (2006). Recommendations for Preventing the Spread of Vancomycin Resistance: HICPAC.
2. Bell J.M., Paton J.C., Turnidge J. (1998). Emergence of Vancomycin Resistant Enteroccocci in Australia: Phenotypic and Genotypic Characteristic of Isolates. *J. Clin. Microbiol.* ***36, 2187-2190.***

LT1339A November/2009

Thermo SCIENTIFIC