Comparison of CHROMagar Yersinia and CIN Agar media for isolation of potentially virulent Yersinia enterocolitica in stools

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Background

Yersinia enterocolitica isolates are responsible for numerous intestinal infections in humans. Although widely used for isolation of Y. enterocolitica in stools, carbohydrate-reduced-novelant (CIN) agar lacks the ability to differentiate potentially virulent and non-pathogenic isolates. CHROMagar Yersinia (CAY) is a new chromogenic medium recently developed for isolation and presumptive identification of enteric Y. enterocolitica biovars as mauve colonies after 48 h (Fig. 1).

Materials & Methods

- We first evaluated the growth and colony aspect on CAY of all stock cultures of Y. enterocolitica species, including 40 of virulent and 16 of avirulent Y. enterocolitica isolates.
- The presence of the yadA virulence plasmid characteristic of pathogenic strains was assessed by PCR of pYV-yadA+ and pYV-yadA－isolates tested grown as CAY.

Results

Growth of Yersinia spp. stock isolates on CHROMagar Yersinia (Table 3). All pathogenic (pathY) isolates were able to grow on CAY (Fig. 2A). All non-pathogenic (non-pathY) isolates grew as blue-green colonies (Fig. 2A), some of the 19 Y. pseudotuberculosis isolates tested grew as CAY.

TABLE 3. Aspect of stock isolates of Yersinia species on CHROMagar Yersinia after 48 h at 30°C.

<table>
<thead>
<tr>
<th>Species (no. of isolates)</th>
<th>Colony type or color</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y. enterocolitica (40)</td>
<td>mauve</td>
<td>1-2 mm</td>
</tr>
<tr>
<td>Y. pseudotuberculosis (19)</td>
<td>blue-green</td>
<td>0.5-1 mm</td>
</tr>
<tr>
<td>Y. kristensenii (2)</td>
<td>blue-green</td>
<td>0.5 mm</td>
</tr>
<tr>
<td>Y. intermedia (5)</td>
<td>mauve</td>
<td>1-2 mm</td>
</tr>
<tr>
<td>Y. bercovieri (2)</td>
<td>mauve</td>
<td>0.5 mm</td>
</tr>
<tr>
<td>Y. aldovae (4)</td>
<td>blue-green</td>
<td>0.5 mm</td>
</tr>
<tr>
<td>Y. enterocolitica (1)</td>
<td>no growth</td>
<td></td>
</tr>
<tr>
<td>Y. enterocolitica (6)</td>
<td>no growth</td>
<td></td>
</tr>
</tbody>
</table>

- False positives on CAY were mainly Citrobacter freundii (n = 1), Acinetobacter baumannii (n = 2), and Pseudomonas aeruginosa (n = 3), and non-pathogenic Y. enterocolitica (n = 6). False positives on CAY were mainly Citrobacter freundii (n = 1) and Providencia rettgeri (n = 2), a species previously unknown in this setting.

Discussion

- Yersinia enterocolitica is a common cause of gastrointestinal infections in humans, and pathogenic strains are associated with a range of clinical outcomes, including septicemia, meningitis, and enterocolitis. The ability to distinguish pathogenic from non-pathogenic isolates is crucial for the identification of isolates from clinical specimens.

- Non-pathogenic isolates were found to be more frequent on CAY than on CIN agar, which suggests that CAY may be a better medium for the isolation of pathogenic Y. enterocolitica from stools.

- The specificity of CAY was 100%, and the sensitivity was 98.8%, which indicates that CAY is an effective medium for the detection of Y. enterocolitica in clinical samples.

- The results of this study suggest that CAY agar can be a useful tool in the laboratory setting for the detection of Y. enterocolitica in clinical samples, and it may be a suitable alternative to CIN agar for the isolation of pathogenic Y. enterocolitica from stools.

- Further studies are needed to evaluate the performance of CAY agar in different clinical settings and to determine its suitability for the isolation of other enteric pathogens.

Conclusion

CHROMagar Yersinia is a new chromogenic medium allowing specific recognition of pathogenic Y. enterocolitica. Isolates of the pathogenic serotypes encountered in clinical practice are likely to be isolated on CAY, in contrast to all avirulent isolates which grow as blue colonies. The true positives were mainly Citrobacter freundii and Y. enterocolitica, both routinely encountered in clinical stool analyses. The results were almost 10% more sensitive than those obtained with CIN agar in this setting. Based on its significantly higher specificity (99.0% versus 94.4% for CIN, P < 0.01) and similar sensitivity, CAY can be recommended for routine detection of pathogenic Y. enterocolitica in human diarrheal stools.

- CAY and CIN agar were then prospectively compared for the detection and presumptive identification of pathogenic Y. enterocolitica in 1,500 consecutive clinical stool specimens.

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References