Regina Qu'Appelle HEALTH REGION

Evaluation of CHROMagar ™ Campylobacter (CAC)

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Abstract

Background

Campylobacter Blood Free agar (CBFA) is commonly used for primary isolation of Campylobacter species. However, final culture results require incubation for 72 hours and break through of non-Campylobacter organisms is common. CAC agar was evaluated to determine if performance could be improved.

Method

Growth and colonial morphology were evaluated with known Campylobacter organisms. Breakthrough growth was evaluated with non-Campylobacter organisms. Clinical specimens were inoculated in parallel to CBFA and CAC, and incubated microaerophilically at 42°C. CAC were examined at 24, 48 and 72 hours. CBFA were examined at 48 and 72 hours. Organisms were identified using the bioMerieux Vitek®-MS.

Results

10 clinical isolates of C.jejuni and 1 of C.fetus grew easily identifiable red colonies on CAC at 24 hours. Isolates of C.albicans, E.faecium, Salmonella, Enterobacter, Proteus, S.aureus, S.epidermidis, and E.coli were totally inhibited. Klebsiella grew as teal green colonies. P.aeruginosa grew as red colonies. 182 clinical stool specimens were inoculated onto both plates. C.jejuni was isolated from 2 specimens: 1 on both CBFA and CAC, and 1 on CAC alone. Both isolates on CAC were identified at 24 hours. 8% of CAC plates had breakthrough of non-Campylobacter red colonies.

Conclusion

The CHROMagar TM Campylobacter produced distinct red colonies at 24 hours that identified directly with the bioMerieux Vitek®-MS, and if implemented, would reduce the final TAT by 24 hours.

Background

Campylobacter is a microaerophilic organism that inhabits the gastrointestinal tract of a variety of animals including poultry, dogs, cats, sheep and cattle. The most common gastrointestinal infection in humans are caused by the Campylobacter jejuni and Campylobacter coli species. C. jejuni and C. coli infections can range in symptoms including fever, abdominal cramping, and diarrhoea that can last for several days to more than 1 week. Most of these infections do not require antibiotic therapy and most patients make a full recovery. 5- 10% of patients may relapse.

The most common source of human infection from Campylobacter comes from the ingestion of contaminated milk, water or from improperly handling of undercooked poultry products.

Current screening for Camplybacter in stool specimen is a culture based method using a charcoal-based selective media or a blood containing media. The culture plates are inoculated with specimen and incubated in a microaerophilic atmosphere at 42 °C for up to 72 hours. Selective components in these media may inhibit some strains of C. jejuni, C. coli and C. fetus.

CHROMagar Campylobacter (CAC) is a new chromogenic media that is both selective and differential for the isolation of this enteric pathogen. This media also requires incubation in a microaerophilic atmosphere at 42 °C, however distinct red colonies of Campylobacter will grow after 24 hours and a negative report can be issued after 48 hours incubation rather than 72 hours. This new CAC media can decrease the result turnaround time and therefore significantly improve patient diagnosis and laboratory workflow.

Objective

To evaluate CHROMagar Campylobacter to determine if isolation and reporting of Campylobacter from stool could be improved.

Method

Media Preparation
CHROMagar plates were prepared in-house according to the manufacturer's guidelines. Each batch of media was checked for sterility, inhibition, and color performance.

Testing of Known Isolates
Dilutions of 11 known Campylobacter isolates (10 C.jejuni and 1 C.fetus) were prepared and inoculated onto both the OXOID Campylobacter Blood Free (CBFA) plate and the Chromagar Campylobacter (CAC) plate. All plates were incubated in the same microaerophilic conditions, for the same amount of time and at the same temperature.

Dilutions were also prepared of 10 isolates of non-Campylobacter organisms (C.albicans, E.faecium, Salmonella, Klebsiella, Enterobacter, Proteus, S. aureus, S. epidermidis, E.coli, and P.aeruginosa) and inoculated onto the CAC plates. Plates were incubated for 48 hours at 42°C in microaerophilic conditions.

Clinical Specimen Processing
182 stool specimens from patients were inoculated onto CBFA and CAC plates All plates were incubated at 42°C in microaerophilic conditions. CBFA were examined at 48 and 72 hours. CAC plates were examined at 24, 48 and 72 hours.

Identification of Isolates
Organisms that grew on the CAC media were Grammed and were identified using the bioMerieux Vitek-MS. Correct identifications were obtained using the colonies taken directly from the CAC plate.

Results

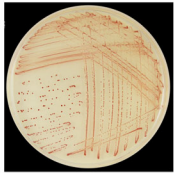
Growth of the known Campylobacter organisms showed that 7 isolates grew the same on both plates, but 4 of the isolates grew as tiny colonies after 24 hours incubation on the CBFA compared to good growth of red colonies on the CAC plate.

Isolates of Candida albicans, Enterococcus faecium, Salmonella spp., Enterobacter spp., Proteus spp., Staphylococcus aureus, Stahpylococcus epidermidis, and Escherichia. coli were totally inhibited.

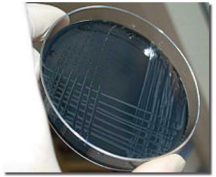
Klebsiella oxytoca grew as teal green colonies and Pseudomonas aeruginosa grew as smaller, red colonies.

C. jejuni was isolated from 2 clinical specimens, 1 being isolated on both CBFA and on the CAC plates, and 1 isolated on CAC alone. Both of the isolates on CAC were correctly identified after 24 hours incubation by the Vitek MS.

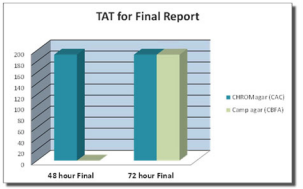
8% breakthrough of non- Camplyobacter red colonies was noted on the CAC plates.



CHROMagar Campylobacter plate



Campylobacter Blood Free plate



No additional Campylobacter was isolated at 72 hours, therefore, all of the culture results could have been finalized after 48 hours incubation thus dramatically reducing the TAT.

Conclusion

- CAC media appears to be more sensitive in the detection of Camplyobacter species.
- CAC media appears to be more selective with the inhibition of many common fecal organisms.
- Distinct red colonies were present after 24 hours of incubation and organisms taken directly from the CAC plate could be reliably identified by the Vitek- MS.
- Implementation of the CAC media would reduce the final TAT for the majority of stool cultures by 24 hours.

Culture results for the clinical stool samples isolated C. jejuni from 2 specimens, 1 being isolated on both CBFA and on the CAC plates, and 1 isolated on CAC alone. Both of the isolates on CAC were correctly identified after 24 hours incubation by the Vitek MS.

8% breakthrough of non- Camplyobacter red colonies was noted on the CAC plates.

References

CHROMagar Campylobacter package insert, CHROMagar, Paris, France.