A Clinical Evaluation Of Chromogenic UTI Media

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INTRODUCTION

Urine specimens account for a high proportion of samples analysed within a diagnostic microbiology laboratory. Culture of these specimens requires methods that provide simple and fast results with accurate presumptive identification. Compared to traditional culture media such as CLED (Cysteine Lactose Electrolyte Deficient) Agar chromogenic media allow for rapid identification of organisms by colour differentiation making interpretation of clinical significance easier and faster, whilst reducing the need for extensive confirmatory testing. The Clinical Microbiology department at The Windeyer Institute, London compared three chromogenic media for the recovery and identification of common urinary pathogens: CM1106 Oxoid Chromogenic UTI *Clarity* (*Clarity*), bioMérieux CHROMID CPS (CHROMID) and BD CHROMagar Orientation (CHROMagar).

Figure 1: Oxoid Chromogenic UTI *Clarity* Medium

Individual colonies on Oxoid Chromogenic UTI *Clarity* Media left – right: *E.coli* (pink), *Klebsiella* spp. (dark blue), *Proteus* spp. (brown), *Enterococcus* spp. (turquoise) and *Staphylococcus* spp. (white).

MATERIALS AND METHODS

Over 1000 urine specimens were screened during the study of which 513 were positive. These comprised *Acinetobacter* spp. (n=2) *Candida albicans* (n=4), *Citrobacter* spp. (n=3), Coagulase negative staphylococci (n=15), *E.coli* (n=302), *Enterobacter* spp. (n=14), Group B streptococci (n=9), *Klebsiella* spp. (n=40), *Morganella* spp. (n=9), *Proteus* spp. (n=20), *Pseudomonas aeruginosa* (n=11), *Staphylococcus aureus* (n=6) and *Staphylococcus saprophyticus* (n=6). Media were inoculated using a 1µL loop and then incubated at 37ºC for 18-24 hours. All media were examined for colour of colonies and quality of growth. Positive cultures were further confirmed using biochemical testing.

RESULTS

Table 1: Rates of correct identification on each medium

N=513	*Clarity*	CHROMID	CHROMagar
Number of true positives	507 (98.8%)	496 (96.7%)	504 (98.2%)
Number of false negatives	6	17	9

Table 2: Number and type of discrepant isolates on each medium

		Number of discrepant strains on each medium		
Organism	**Total number of strains**	***Clarity***	**CHROMID**	**CHROMagar**
Citrobacter freundii	3	0 (0%)	1 (33.3%)	1 (33.3%)
E. coli	302	5 (1.6%)	14 (4.6%)	4 (1.3%)
Group B streptococci	9	0 (0%)	2 (22.2%)	1 (11.1%)
Staph. saprophyticus	6	1 (16.6%)	0 (0%)	3 (50%)
Total	320	6 (1.88%)	17 (5.31%)	9 (2.81%)

DISCUSSION

All of the chromogenic media tested identified those organisms which commonly cause urinary tract infection. *Clarity* detected 98.8% of positives whilst CHROMagar detected 98.2% and CHROMID 96.7%.

Most discrepant results were due to lack of colour which had been observed with 14 *E. coli* isolates on CHROMID. In a clinical laboratory these isolates may be misidentified unless tested further. Both coliforms and enterococci produced turquoise colonies on CHROMID and CHROMagar. On *Clarity* coliforms appeared dark blue and enterococci turquoise. This allowed easier differentiation of these organisms. *Staphylococcus saprophyticus* grew as colourless colonies on CHROMID. On CHROMagar and *Clarity* colonies appeared pale pink, however, one culture was colourless on *Clarity* and three on CHROMagar. *Streptococcus agalactiae* showed variable pigmentation on CHROMagar and CHROMID. One strain of *C. freundii* unexpectedly appeared colourless on CHROMagar and CHROMID compared to *Clarity,* on which it appeared as dark blue. Where mixed cultures were observed, the colour differentiation between the organisms present was easier to interpret on *Clarity* especially between enterococci and coliforms, compared to CHROMagar and CHROMID. All trial media showed high performance, with *Clarity* and CHROMagar demonstrating the most accurate identification.

CONCLUSIONS

Chromogenic media allow for reliable and rapid presumptive identification of urinary pathogens. All media in this study were able to identify the important urinary pathogens i.e. *E. coli*, *Klebsiella*, *Enterobacter* and *Proteus*. Oxoid Chromogenic UTI *Clarity* gave an overall better performance compared to CHROMagar and CHROMID.

ACKNOWLEDGEMENTS

Thanks to MWD Wren (Consultant Microbiologist and visiting Professor, Windeyer Institute, London) for conducting the study.