

COMPARATIVE EVALUATION OF TWO DIFFERENT AUTOMATED INSTRUMENTS (Sysmex UF1000 and DIESSE Plus Finder ++) FOR THE MICROBIOLOGICAL SCREENING OF URINE SPECIMENS

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Introduction

Urinary tract infections (UTIs) are among the most common clinical infectious conditions and very often the etiology is related to germs translocated from the gastrointestinal tract to the lower urinary apparatus. UTI occurs when there is compromise of host defense mechanisms and a virulent microbe adheres, multiplies, and persists in a portion of the urinary tract. Most commonly, UTI is caused by bacteria, but fungi and viruses are possible. Urine culture and sensitivity are the gold standards for diagnosis of bacterial UTI.

A rapid screening of UTI is a technique frequently used in the microbiology laboratory rapidly discriminate between infected and not infected urine specimens (1). Several different approaches have been made commercially available in the last 5 years: most of these techniques are based on rapid incubation in broth of urine samples. The appearance of bacterial growth is monitored at defined time points and detected with different techniques (2).

Objectives

This study aimed to the evaluation of an innovative method for the rapid detection of bacterial and fungal growth in urine samples by monitoring the carbon dioxide production within BHI tubes inoculated with 1 ml of individual urine specimens. The PLUS FINDER ++ instrument (DIESSE_Diagnostic Systems R&D Haeed Diesse Ricerche Srl ,Italy) is a fully automated machine that can screen up to 160 urine samples within 3 hours.

Methods:

A total of 4000 urine specimens randomly selected among those received in laboratory, (in the Urine tube containing boric acid as preservative) were tested by the routinely adopted screening test (UF1000i Sysmex – Japan) and comparatively evaluated with the Plus Finder ++.

This latter system consists of two separated parts: preparator (pre-Analytical equipment) and analyzer. The two parts are designed to perform independently and consecutively the two phases of the screening workflow: the first step consists in the dispensation in sterile test-tubes of 1 ml of urinary sample and 1 ml of liquid Eugonic broth; the inoculated tubes are subsequently incubated and 3 automatic measurements of the carbon dioxide within each individual tube are performed with a specific probe along the incubation at 38° f or up to 120 minutes (Fig. 1).

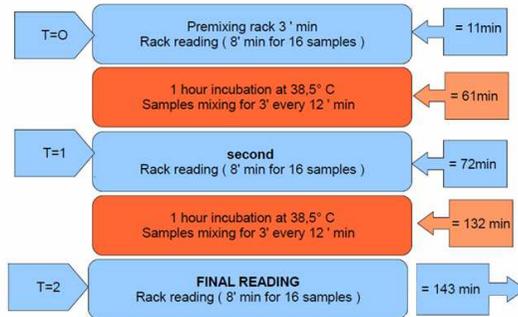


Fig.1: Workflow of Analyzer

Results:

Out of the 4000 urine specimens evaluated the overall agreement in term of positivity/negativity between the Sysmex UF1000i and the PLUS FINDER++ systems was 95 %. Each discrepant urine samples was also cultured by plating onto a cromIDTM CPS® (Biomerieux) 20x90 mm agar plate in order to evaluated the total bacterial load and the composition of the microbial flora.

| | |
|-------------|--------|
| Prevalence | 22.90% |
| Sensivity | 0.98% |
| Specificity | 0.94% |
| PPV | 83.30% |
| NPV | 99.40% |

| | | Plus Finder | | |
|----------|---|-------------|----------|-------|
| | | POSITIVE | NEGATIVE | TOTAL |
| Sismex | | % | | |
| POSITIVE | % | 22.5 | 0.5 | 23 |
| NEGATIVE | | 4.5 | 72.5 | 77 |
| TOTAL | | 27 | 73 | 100 |

| | Sismex | | Plus Finder | |
|----------|-------------|-----|-------------|------|
| | No. Samples | % | No. Samples | % |
| NEGATIVE | 3081 | 77 | 2900 | 72.5 |
| POSITIVE | 919 | 23 | 1100 | 27.5 |
| TOTAL | 4000 | 100 | 4000 | 100 |

Conclusion:

According to the results obtained, the automated system Plus Finder ++ can be an efficient method to screen urine cultures in real time.

References

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