Micropro® - Broth Culture System

Intended Use

Micropro® - BCS (Broth Culture System) is a complete system that detects, enumerates and identifies most pathogens involved in Urinary tract infections, in less than five hours. It consists of:

1. Broth Culture System that uses a Turbidimetry-based analyzer for the detection and enumeration of UTI pathogens.
2. ID System for biochemical identification of the UTI organisms.

Summary and Principle

Urinary tract infection or UTI, is a major cause of morbidity in humans and one of the most frequently encountered infections that needs to be detected and diagnosed at the very earliest. These infections can occur at different points in the urinary tract, including bladder where it is called cystitis, in the urethra urethritis and in severe cases when infection moves upwards and affects the kidneys, where it is known as pyelonephritis. Symptoms of a lower urinary tract infection can include painful urination and either frequent urination or urge to urinate (or both); while the symptoms of pyelonephritis include fever and flank pain in addition to the symptoms of a lower UTI. About 40% of women and 12% of men have a urinary tract infection at some time in their life. The main causative agent of most UTI's is *Escherichia coli*, though other bacteria, viruses or fungi may rarely be the cause. Most of the UTI are caused by eight common urinary pathogens that account for approximately 97% of infections. The primary pathogen involved is *Escherichia coli*. The fairly common secondary pathogens are *Enterococcus faecalis, Klebsiella pneumoniae, Proteus mirabilis, Proteus* spp., *Pseudomonas aeruginosa*. The secondary pathogen which is rarely involved is *Citrobacter* spp. The common urethral or genital florae include the *Lactobacillus*, alpha haemolytic *streptococci, Gardnerella vaginalis, Corynebacteria* spp. etc.

Diagnostic testing of UTI includes urinalysis and urine culture. Urinalysis is a screening test, while the urine culture is considered the gold standard and the only way to make conclusive diagnosis of UTI. Antibiotic sensitivity can also be performed with these cultures, making them useful in the selection of an appropriate antibiotic for treatment. Conventional diagnostic methods include quantitative culture on solid media, Gram staining of selected colonies and biochemical identification testing. This process can take more than twenty-four to forty-eight hours before the microorganisms can be reported to the physicians.

Micropro® - BCS comprises of novel way to detect and diagnose UTI by the Turbidimetry-based Bacterial broth culture detection. This system ensures that the entire process of detection and enumeration of UTI organisms is completed in four hours.

Apart from this a separate Micropro® - ID kit is available for the biochemical identification of UTI pathogens. The biochemical analysis of UTI organisms can be completed in less than twenty-five minutes.

SPECIMEN COLLECTION AND PREPARATION

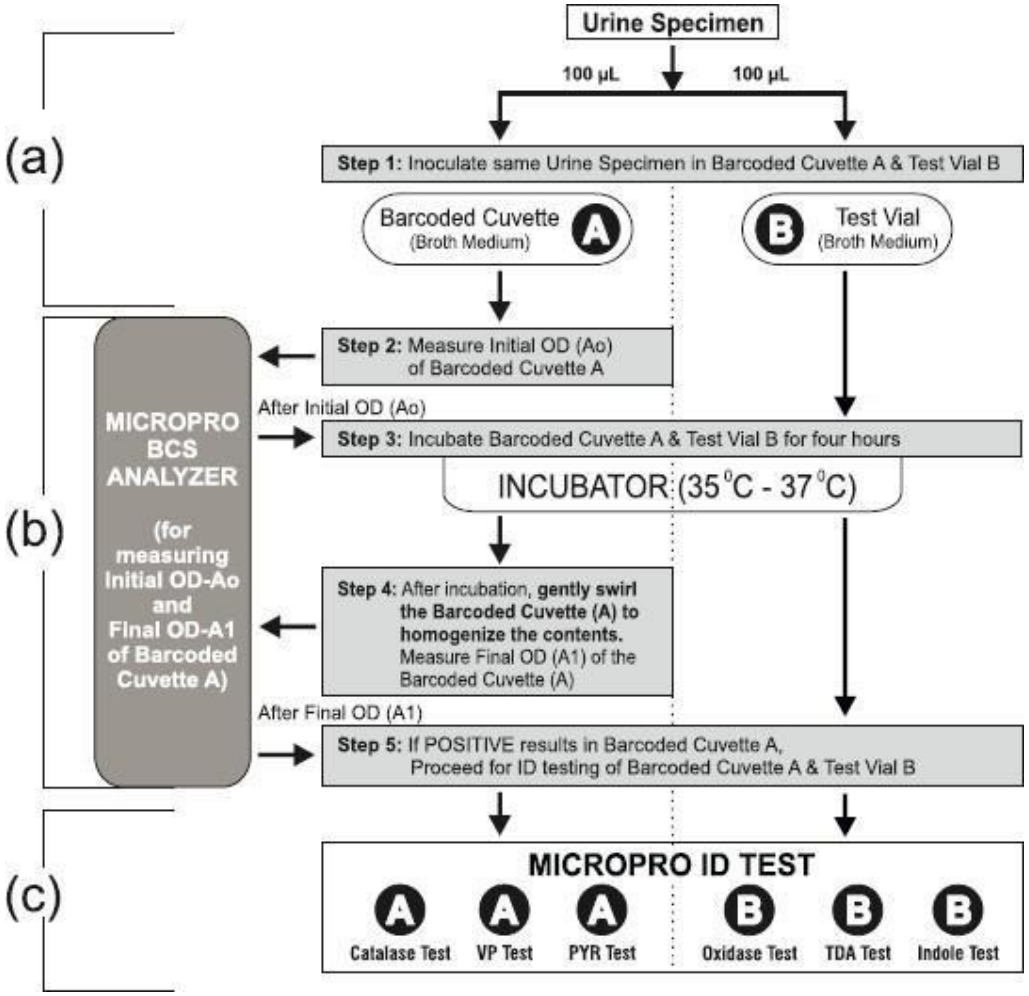
a) First morning voided, midstream and clean catch urine is recommended for testing. Urine from first morning catheterization or suprapubic taps can also be used. Follow standard recommended procedures for collection of urine specimen.
b) Fresh urine should be used for testing. If a delay in testing is anticipated, store the specimen immediately at 2°C-8°C and ensure that the test is performed within 3 hours.
c) It is recommended that sterile containers are used to collect specimen. Contamination of specimen must be avoided.

TEST PRINCIPLE

The entire system is based on three fundamentals:

a) Proprietary broth culture medium to support growth of typical UTI pathogens.
b) Detection and enumeration of UTI based on Turbidimetry.

c) Identification of the UTI pathogen based on well-characterized biochemical tests.



STORAGE AND STABILITY

a) Store the Barcoded Cuvettes (A) - Black cap, Test Vials (B) - green cap and the ID reagents at 2°C - 8°C. b) DO NO FREEZE. Avoid exposure to light.

c) The shelf life of the Barcoded Cuvettes (A)-black cap, test vials (B)- green cap and the ID reagents is as per expiry date mentioned on respective carton/bottle packaging.

MATERIAL REQUIRED BUT NOT PROVIDED WITH THE KIT

Bacteriological incubator (at 35°C - 37°C), Marker pens, Timer, Tissue paper, 70% IPA, Bactericidal Handrub, Gloves, Mask and Removable stickers.

PRECAUTIONS

a) For laboratory use only.

b) Bring all reagents and specimen to room temperature (20°C-30°C) before use.

c) Do not use the kits beyond expiry date.

d) Carefully read the user manual and package inserts before use.

e) Take universal precautions. All human body fluids should be treated as potentially infectious.

f) Always be prepared for any accidental spillage. In case of accidental spillage clean the area thoroughly and wipe with 70% IPA at least three times.

g) It is recommended that basic Personal Protective Equipment like gloves and masks are use at all times.

h) Use a Bactericidal Handrub before and after test procedure.

i) Visually examine the Barcoded Cuvettes (A) with black caps and the Test Vials (B) with green caps to ensure there is no physical damage, microbial contamination, discoloration, precipitation, evaporation or other signs

of deterioration. If any of these is observed, do not use these reagents and contact service provider immediately.

j) The Barcoded Cuvettes (A) and the Test Vials (B) are capped tightly, open carefully to avoid injury due to breakage of glass.

k) Minimize exposure to light.

l) Ensure that the broth culture media (Barcoded Cuvettes (A), the Test Vials (B)) attain room temperature before inoculation and biochemical identification test.

CLEANING AND DECONTAMINATION

a) Spills of potentially infectious material should be cleaned up immediately with absorbent paper tissue and the contaminated area should be decontaminated such as 0.5% freshly prepared sodium hypochlorite (10 times dilution of 5% sodium hypochlorite i.e. household bleach) before continuing work.

b) Sodium hypochlorite should not be used on an acid-containing spill unless the spill-area is wiped dry first. Materials used to clean spills, including gloves, should be disposed off as potentially biohazardous waste e.g. in a biohazard waste container.

TEST PROCEDURE

The user is requested to familiarize with the working of the Micropro® - BCS Analyzer before embarking on the Test Procedure. (Kindly refer the Micropro® - BCS Analyzer user manual).

1. Detection and Enumeration of the UTI pathogens

The detection and enumeration procedure involves the following steps:

A). Inoculation of the Barcoded Cuvettes (A) - Black cap and the Test Vials (B)- green cap with the patient's urine specimen

Note: (a). After inoculation only the Barcoded Cuvettes (A)- black cap, are to be used for testing on the **Micropro® - BCS** Analyzer. (b) The Test Vials (B) - green cap along with the Barcoded Cuvettes (A)- black cap are for

Biochemical identification of the UTI organisms using **Micropro® - ID** kit.

1. Retrieve the required number of Barcoded Cuvettes (A)- black cap and the Test Vials (B)- green cap corresponding to the number of samples to be tested and place it on a stand or a flat clean table top. Kindly note that a single set of Barcoded Cuvette (A) - black cap and the Test Vial (B)- green cap is to be used for one patient.
2. Write patient IDs/names specifically within the space indicated on each set of Barcoded Cuvette (A)- black cap and the Test Vial (B)- green cap.
3. Retrieve the required number of 100µL micropipette tip pouches from the pack. A pair of microtip is to be used for testing one patient sample. The individual microtip pouches must be opened just before the inoculation process so as to minimize contamination risk.
4. Open the black cap of the Barcoded Cuvette (A) and the green cap of the Test Vial (B) of one patient and keep aside. Do not remove the yellow coloured rubber stopper.
5. Pipette out 100µL of well-mixed urine from the sample container and transfer it to the opened Barcoded Cuvette (A) by piercing the pipette microtip through the stopper of the Cuvette and pressing the plunger of micropipette up to the bottom. Do not release the plunger. Holding the rubber stopper tight in its place, slowly remove the microtip, ensuring that the rubber stopper does not come out along with the microtip. Ensure that urine is mixed well with the broth in the Barcoded Cuvette (A) by gently swirling it. **Note:** For detailed pipetting procedure, refer **Point (C) of Remark.**
6. Using a fresh microtip, pipette out 100µL of well mixed urine from same sample container and transfer it to the opened Test vial (B) by piercing the micropipette tip through the stopper of the Test Vial and pressing the plunger of micropipette up to the bottom. Do not release the plunger. Holding the rubber stopper tight in its place, slowly remove the microtip, ensuring that the rubber stopper does not come out along with the microtip. Ensure that urine is mixed well with the broth in the Test Vial (B) by gently swirling the urine-broth mixture inside the vial.
7. Repeat step 4-6 for all urine samples to be tested. Use fresh microtips each time.

8. The Barcoded Cuvette (A) and the Test Vials (B) must be recapped with their original black and green cap respectively and placed in the cuvette stand (cardboard fitment) supplied with the kit.

B) Blanking the Micropro® - BCS Analyzer

Blanking is to be done once a day or when the machine gets switched OFF during the procedure.

9. Switch ON the **Micropro® - BCS** Analyzer. The red power display LED will blink, press power button followed by the "NEXT" key. The Analyzer will display "Insert Blank and press NEXT or EXIT".
10. Retrieve one Blanking Cuvette Provided with Analyzer. Clean the Blanking Cuvette with the dry tissue. **Note:** Always make sure to clean the Cuvette with a clean dry tissue paper before blanking or taking OD readings.
11. Insert it in the reading chamber carefully ensuring that the arrow mark on the Blanking Cuvette aligns with the arrow mark next to the reading chamber of the Analyzer and press "NEXT".
12. After Blanking, enter the lot number details of the Barcoded Cuvette (A) - black cap, in the Analyzer followed by the expiry details which is also mentioned on the Barcoded Cuvette (A) - black cap, in the Analyzer and press "NEXT".
13. The main menu will be displayed, using the scroll down Arrow key, bring the cursor from Lot number to "Initial Absorbance" and press "Next".

C) Measuring Initial Absorbance (Ao) of inoculated Barcoded Cuvette (A)-black cap on the MIcropro® - BCS Analyzer

14. Retrieve one Barcoded Cuvette (A) inoculated with patient's urine sample.
15. Insert it carefully in reading chamber as in step No. 11.
16. The initial absorbance **(Ao)** for the particular Barcoded Cuvette (A) will be displayed on the Analyzer screen. Press "NEXT" key as this will ensure recording of the Initial absorbance (Ao) value in the memory of the Analyzer. Remove the Barcoded Cuvette (A) from the reading chamber and place it in the cuvette stand.
17. Repeat steps (14-16) for rest of the inoculated Barcoded Cuvettes (A). Do not insert Test Vial (B) in the reading chamber.
18. After measuring **(Ao)** Values of all the Barcoded Cuvettes (A), do not switch OFF the Analyzer.
19. Proceed for Incubation of the Barcoded Cuvettes (A) and the Test Vials (B).

D) Incubation of the inoculated Barcoded Cuvette (A)-black cap and the Test Vials (B)-green cap

20. Incubate all the inoculated Barcoded Cuvette (A) and the Test Vials (B) for 4 hours in a Bacteriological Incubator (at 35°C - 37°C).
21. After 4 Hrs. of incubation, proceed to measure the Final absorbance **(A1)** values of the Barcoded Cuvettes (A) on the **Micropro® - BCS** Analyzer.

E) Measuring Final Absorbance **(A1)** of the incubated Barcoded Cuvettes (A)-black cap

22. In the display menu of the Analyzer using the scroll down Arrow key, bring the display cursor to "Final Absorbance" in the Main Menu and press "NEXT".
23. Retrieve one incubated Barcoded Cuvette (A), before inserting it in Analyzer for measuring Final absorbance, kindly note **it is imperative to gently swirl the Barcoded Cuvette (A) to disperse culture in the broth.** Do not shake the cuvette vigorously as this may result in false negative results. Check **Section Remarks.** After mixing the contents, follow the procedure as in step (11).
24. On valid identification of the Barcoded Cuvette (A), the Analyzer will display the patient's name, sample ID, test ID and Final absorbance. Press "NEXT" key as this will ensure recording of the Final absorbance **(A1)** value in the memory of the Analyzer. Remove the Barcoded Cuvette (A) from the reading chamber and place it in the Cuvette stand.
25. Repeat steps (23-24) for rest of the incubated Barcoded Cuvettes (A)
26. After completing the Final absorbance (A1) for all the incubated Barcoded Cuvettes (A) scroll down in main menu to bring the display cursor to "Results" and press "NEXT". The results will be displayed Sample Id Wise and the printout can be taken. Details of the "Result" menu management is mentioned in the **Micropro® - BCS** Analyzer user manual.

F) Result interpretation of Barcoded Cuvettes (A)-Black cap

There are five types of results expected for the urine sample in **Micropro® - BCS** Analyzer and based on these results further action is recommended.

S. No.	Result reported in Micropro® - BCS Analyzer.	Interpretation of the results	Further Action
1	Negative	Negative for UTI	No further action required. Report with printout of result.
2	$10^3 < 10^5$ cfu/mL	Threshold or Evolving UTI infection	Can perform plating on MacConkey or CLED agar from BCS Broth itself for identification as well as Antimicrobial susceptibility testing if confirmed as positive
3	$10^5 < 10^7$ cfu/mL	Positive (Frank UTI)	Proceed for Biochemical identification testing is recommended in Biochemical ID Kit packinsert. Can perform plating on MacConkey or CLED agar from BCS Broth itself for identification as well as Antimicrobial susceptibility testing if confirmed as positive
4	$10^7 < 10^8$ cfu/mL	Positive (Frank UTI with High Count)	
5	$> 10^8$ cfu/mL	Positive (Very High Count Mixed infection possible)	Proceed for Biochemical identification testing is recommended in Biochemical ID Kit packinsert. Can perform plating on MacConkey or CLED agar from BCS Broth itself for identification as well as Antimicrobial susceptibility testing if confirmed as positive

Negative Test results:

- The Barcoded Cuvettes (A) with Negative results along with its Test Vials (B) are to be discarded as per local disposal guidelines, and sample to be reported negative with printout of the result.

Positive Test results:

- The Barcoded Cuvette (A) with Positive results along with the corresponding Test Vial (B) are to be retained in the Cuvette stand and then proceed for Biochemical identification testing using **MICROPRO® - ID** Kit.

Note (a) OD displayed on the instrument screen are for indicative purpose only.

BIOCHEMICAL IDENTIFICATION OF UTI PATHOGENS

The **Micropro® - ID** test helps in identifying the eight possible UTI pathogens namely *E.coli, Enterococcus faecalis, Streptococcus pyogenes, Proteus mirabilis, Proteus* spp., *Pseudomonas aeruginosa*, *Citrobacter* spp., *Klebsiella pneumoniae*. **For the Test procedure refer the Micropro® - ID - kit Pack insert.**

ANTIBIOTIC SUSCEPTIBILITY TEST

After the completion of Biochemical Identification tests, proceed for Antibiotic Susceptibility Test in four steps as follows:

Steps 1) After completing Biochemical Identification tests about 1mL of broth will remain in **Micropro®** Barcoded Cuvette (A). Centrifuge the cuvettes at RCF of 5000 g for 10 minutes at room temp. A visible pellet will be observed. Discard the supernatant carefully by inverting the cuvette and retain the pellet.
With a sterile loop, touch the pellet and transfer it to the tube of saline/peptone water. Dissolve inoculum thoroughly to avoid clumping of the cells. Adjust turbidity of inoculum to match the standard, i.e., McFarland 0.5 equals approximately 10^8cfu/mL.

Step 2) Proceed for inoculation on Mueller-Hinton Agar Plate. Visually examine the Mueller Hinton Agar plates prior to use, ensure that the plates are free from visible contamination, poured to a uniform depth of approximately 4mm, not excessively wet and not cracked or dry. Sterile Ready Prepared **Mueller-Hinton Agar Plates** (Cat. No. 205131790100) is available with **Microxpress®.** Within 15 minutes of preparing the adjusted inoculum, dip a sterile cotton swab (**Steristik®**, Cat no.208191270100) into the inoculum. Rotate the swab several times and press firmly on the inside wall of the tube above the fluid level to remove excess inoculum from the swab. Streak the swab over the entire surface of the Mueller Hinton agar plate. Rotate the plate approximately 60° then repeat streaking motion. Rotate 60° again and repeat streaking for the third time. Complete inoculation by running the swab around the rim of the agar.

Step 3) Dispense the required number of antibiotic disks to the agar surface with a sterile forceps/ **sterile disposable forceps** (Cat no. 208192920250**)** or disc dispenser (Forceps can be sterilized by flaming with alcohol. Avoid using over-heated forceps). Do not relocate any antibiotic disk after contact with the agar. After application, ensure that the antibiotic disk has made complete contact with the agar surface by touching the top of the disk with forceps. Antibiotics discs (Biogram®) recommended for UTI pathogens (as per CLSI) are available with Microxpress®. (Refer antibiotics list mentioned in section 16).

Step 4) Keep the plates in the incubator set at 35°C - 37°C for overnight and then look for zone of inhibition as per CLSI guidelines. Refer **Biogram®** Packinsert for detailed AST analysis.

Note: this procedure is valid only for infection cases with single pathogen and not for mixed infection cases. For mixed infection cases as indicated by **Micropro® - ID** kit, perform plating on MacConkey or CLED agar from BCS Broth itself for identification as well as antimicrobial susceptibility testing.

QUALITY CONTROL PROCEDURES

Quality control is to be performed for each batch to ensure that (1) Barcoded Cuvettes (A), Test Vials (B), the **Micropro® - ID** Kit reagents and the **Micropro® - BCS** Analyzer are working as per specifications.

PERFORMANCE DATA

A) Two hundred and sixty-four samples in total were used for the evaluation performed in 10 different states in India covering North, south, east, west and central India, involving 53 microbiologists/ pathologists, in the year 2015.

To evaluate the performance of **Micropro® - BCS,** a spectrophotometric/ turbidimetric system for the detection and identification of Urinary Tract Infection (UTI), extensively at the field level.
To compare its performance with the conventional method generally preferred by the microbiologist and Pathologists, the Solid Plate Culture (SPC) method.
Out of the total 264 urine samples used for the evaluation, 98 samples were detected as true UTI positives by **Micropro® - BCS** immediately after four hours of incubation and 101 samples by the solid plate culture after overnight incubation. The two false negative cases by **Micropro® - BCS** were identified as *Staphylococcus haemolyticus* and *Providencia* spp. statistically these rare samples account for less than 1% of cases (2 out of 265 in our study). The true negatives, 159 samples in all were detected by both the methods. Most of the UTI positive

samples were identified accurately by the **Micropro® - ID KIT** in less than 30 minutes and the results are comparable to the conventional identification technique.

In the Pan India performance evaluation of **Micropro® - BCS** carried out in the year 2015, **Micropro® - BCS** showed 97% correlation with conventional plated culture technique for the detection and identification of Urinary Tract Infection.

Detection of UTI samples

UTI Culture Method	Total No. of Samples	Positive Samples	False Positive	Negative Samples	False Negative	Mixed Infection
Micropro® - BCS	264	98	0	159	2	5
Plate Culture	264	101	0	159	0	4

Identification of Positive UTI Samples

Pathogens	**MIcropro® - ID**	Conventional	Pathogens	**Micropro® - ID**	Conventional
E. coli	59	58	*K. pneumoniae*	4	4
E. faecalis	6	6	Staph group	11	11
S. pyogenes	3	3	*S. haemolyticus*	0	1
P. mirabilis	0	0	*Providencia*	0	1
Proteus spp.	1	1	*Candida*	0	2
P. aeruginosa	7	8	*Yeast*	0	1
Citrobacter spp.	3	3	Unidentified	4	2

B) Six hundred samples in total were used for the evaluations performed in 5 different Labs in India covering north and south India, involving 5 microbiologists/ Pathologists, in the year 2016. The reagents **Micropro® - BCS** bearing Lot No. AA4 were used in the evaluations, and the performance were compared with the conventional gold standard, the Solid Plate Culture (SPC) method.

To evaluate the performance of **Micropro® - BCS,** a spectrophotometric/ turbidimetric system for the detection and identification of Urinary Tract Infection (UTI), extensively at the field level.

To compare its performance with the conventional method generally preferred by the microbiologist and Pathologists, the Solid Plate Culture (SPC) method.

Out of the total 600 urine samples used for the evaluation, 132 samples were detected as UTI positive by

Micropro® - BCS immediately after four hours of incubation and 137 samples by the Solid Plate Culture after overnight incubation.

In the Pan India performance evaluation of **Micropro® - BCS** carried out in the year 2016, **Micropro® - BCS** showed 98.33% correlation with conventional plated culture technique for the detection of Urinary Tract Infection.

Detection of UTI Samples

UTI Culture Method	Total No. of Samples	Positive Samples	Negative samples
Micropro® - BCS	600	132	468
Plate Culture	600	137	463

Number and Type of Pathogens successfully screened and those missed by Micropro® - BCS.

Pathogens	Detected	Missed	Pathogens	Detected	Missed
E. coli	54	0	Staph group	2	1
E. faecalis	6	0	Morganella	0	1
Proteus spp.	8	0	*Acinetobacter*	3	2

P. aeruginosa	8	0	*Candida*	10	0
Citrobacter spp.	2	1	Unidentified	12	0
K. pneumoniae	15	0	*Contamination*	11	0
K. oxytoca	1	0	Total	132	5

Performance: Repeatability and Reproducibility were performed with 3 lots where same samples was inoculated in five barcoded Cuvettes (A) and initial and final OD measured. Despite variation in initial and final OD for the sample inoculated in five cuvettes, the results obtained is same, owing to the delta OD, which diminishes the variation from cuvette to cuvettes resulting in 100% reproducibility of results.

REMARKS

(A) False negative results can occur if the contents of the Barcoded Cuvette (A) are not mixed properly prior to measuring the Final absorbance A1 as the culture growth tends to settle sown in the Barcoded Cuvette (A)/Test Vial (B) during incubation.

To dislodge the cultures settled during incubation, the correct way is to:
Hold the cap of the Barcoded Cuvette (A)/ Test Vial (B) and gently swirl it to form a homogeneous suspension. Do not shake vigorously or turn the vial upside down during shaking. (See Fig 1)

Fig 1

(B) Use only the gamma sterile tips provided for the sample pipette (100 µL). Avoid using ETO sterilized tips as, there will be ETO residue left on the tip surface which might get added into the broth during inoculation, leading to growth inhibition.

(C) Procedure for dispensing sample in Broth culture cuvettes (A&B):

(1) Place your thumb over the top of the pipette plunger and press down to the first stop. Hold the plunger in this position.

(2) Place the pipette tip into the sample at the proper immersion depth and release the pressure on the plunger slowly. Be sure that the pipette is either vertical or within 20°C off vertical. This will allow the piston to rise, aspirating sample fluid into the pipette tip. Do not remove your thumb from the plunger abruptly or let the plunger rise up quickly. This will result in aspirating incorrect sample volumes.

(3) Once the plunger reaches the starting position, pause for a second or two to ensure that the aspiration of the sample fluid is complete. Be sure there are no bubbles in the tip.

(4) Remove the pipette tip from the sample volume.

(5) To dispense, pierce the cuvette stopper with the pipette tip and then press the plunger down slow and steadily pass the first stop all the way to the bottom of the piston stroke. Wait 1-2 seconds to allow complete dispensing of the sample fluid. Do not release the plunger now.

(6) Remove the pipette tip from the Broth culture cuvette and then release the plunger.

(7) Press the ejector button to remove the pipette tip or carefully pull the tip off with your fingers and dispose off the tip in the proper biohazard container according to the safety requirements of your facility.

REFERENCES

(1). Practical Medical Microbiology, Mackie and MacCartney, Vol 2, 13 th ed, Churchill Livingston 1989, Edited by J,G Collee Duguid, A.G. Fraser, B.P. Marmion.

(2). Detection, Prevention and management of Urinary Tract infection, C.M Kunin, 4 th Edition, 1987,

(3). McPherson RA, Ben-Ezra J. Basic examination of urine. In: McPherson RA, Pincus MR, eds. (Henry's clinical Diagnosis and Management by Laboratory Methods.) 22nd ed. Philadelphia, PA: Elsevier Sauders; 2011: chap 28.

(4). Hoon TM, Bradley SF, Cardenas DD, et al. Diagnosis, prevention, and treatment of catheter-associated urinary tract infection in adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America. Clin Infect Dis. 2010; 50(5):625-663.

(5). Ban KM, Easter JS. Selected urologic problems. In: Marx JA, Hockberger RS, walls RM, et al, eds. Rosen's Emergency Medicine:

concepts and Clinical Practice. 7th ed. Pheladelphia, Pa: Mosby Elsevier; 2009: chap 97.

(6). Dean AJ, Lee DC. Bedside laboratory and microbiologic Procedure. In: Roberts JR, Hedges JR, eds. Clinical Procedure in Emergency Medicine. 5th ed. Philadelphia, Pa: Saunders Elsevier; 2009: chap 68.

(7). McaFaddin, Jean F. "Biochemical Tests for Identification of Medical Bacteria. "Williams & Wilkins, 1980, pp 173 - 183.

(8). Bachoon, Dave S., and Wendy A. Dustman. Microbiology Laboratory Manual. Ed. Michael Stranz. Mason, OH: Cengage Learning, 2008. Exercise 15, "Normal Flora of the Intestinal Tract" Print.

(9). Bergey's Manual of Systematic Bacteriology, Vol. 1. Baltimore, williams and Wilkins, 1984.

(10). Nicola F1, Centorbi H, Bactar C, Smayevsky J, Bianchini H., Utility of pyrrolidonyl-arylamidase detection for typing Enterobacteriaceae and Non-fermenting Gram-negative bacteria, Rev Argent Microbiol. 1995 Oct-Dec; 27 (4):204-9.

(11). Gordon J, McLeod JW. Practical application of the direct oxidase reaction in bacteriology. J Pathol Bacteriol 1928; 31:185-90.

(12). Koneman EW, Allen SD, Janda WM, Schreckenberger PC, Winn WC Jr. Color atlas & textbook of diagnostic microbiology. 5th ed. Philadelphia: JB Lippincott, 1997.

(13). L Essers and K Radebold, Rapid and reliable identification of Staphylococcus aureus by a latex agglutination test. J Clin Microbiol. Nov 1980; 12(5): 641-643.

(14). Kloos, W.E. and P.B. Smith. Staphylococci. 1980. Manual of Clinical Microbiology, 3rd ed. E.H. Lennette, A. Balows, W.J. Hausler, Jr. And J.P. Truant, ed. ASM, Washington, D.C.

(15). Finegold, S.M. and E.E. Sweeney. 1961. New Selective and Differential Medium for Coagulase-Positive Staphylococci Allowing Raid Growth and Stain Differentiation. J. Bateriol.; 81:636-641.

(16). Data on file: Microxpress® (P) Ltd.

Product Presentation:

S.No.	Component	Purpose	Qty.	Cat. No.
Installation Pack				
1	**Micropro® - BCS** Analyzer + one cable cord and two fuses	Turbidimetry-based analyzer system for detection and enumeration of UTI pathogens.	1 Unit	**209131120001**
2	Blanking Cuvettes (3 mL)	Cuvettes for zero blanking the **Micropro® - BCS** Analyzer.	2 Nos.	
3	Printer Paper Roll	Paper roll for printing the test results.	2 Nos.	
5	Micropro® - ID Well Stand	For ID Test Wells	1 No.	
6	Fixed volume micropipette 100 µL	Micropipette for dispensing urine specimen into Barcoded Cuvette (A) and testing vial (B).	1 No.	
7	Fixed volume micropipette 300 µL	Micropipette for dispensing the Broth culture growth into ID test wells.	1 No.	
8	User Manual		1 No.	
REAGENT PACKS				

1	**Micropro® - Broth culture kit** a) Barcoded Cuvettes (A)- Black Cap (3 mL) b) Test Vials (B)- Green Cap (1.5mL) c) Gamma-Sterile Microtips (100 µL)	Ready to use, Barcoded cuvettes for use on **Micropro® - BCS** Analyzer. Ready to use, Broth culture test vials for ID test only. Gamma- Sterile microtips with filter barrier for use with 100 µL fixed volume pipette.	2×25 Nos. 2×25 Nos.	**209131130025**
2	**Micropro® - ID KIT** a) **Micropro® - ID reagents** (5mL) b) **Micropro® - ID** wells	Reagents for biochemical identification of the UTI pathogens Breakable test wells for use in the Biochemical ID test	8×1 No. 12 Wells × 25 Nos.	**209131140050**
3	**Micropro® -UTI Screening Kit** a) Barcoded Cuvettes (A)- Black Cap (3 mL) b) Gamma-Sterile Microtips (100 µL)	Ready to use, Barcoded broth culture cuvettes for use on **Micropro® - BCS** Analyzer. Gamma- Sterile microtips with filter barrier for use with 100 µL fixed volume pipette.	50 Nos. 50 Nos.	**209131150050**