

# RightBiotic

**Rapid Antibiotic Sensitivity Testing System for Culture & Sensitivity Test**

**A Technology developed by Dr. Suman Kapur, BITS-Pilani Hyderabad  
Campus, Hyderabad**

---

## **PURPOSE:-**

UTI is the most common infectious disease and the known treatment is antibiotics. Presently used technology takes at least 1-3 business days for the report to arrive. This compels the doctor to give clinical judgment based prescription/s. The patient has to further wait for the report to get the appropriate antibiotic for the treatment of UTI. This empirical treatment contributes significantly leads to AMR (Antimicrobial resistance). AMR is a global threat because it makes TREATABLE infections NON- TREATABLE. The world needs a solution to this problem and that inspired the invention of **RightBiotic**, a Rapid, Reliable and Robust technology for testing for UTI.

## **INTRODUCTION:-**

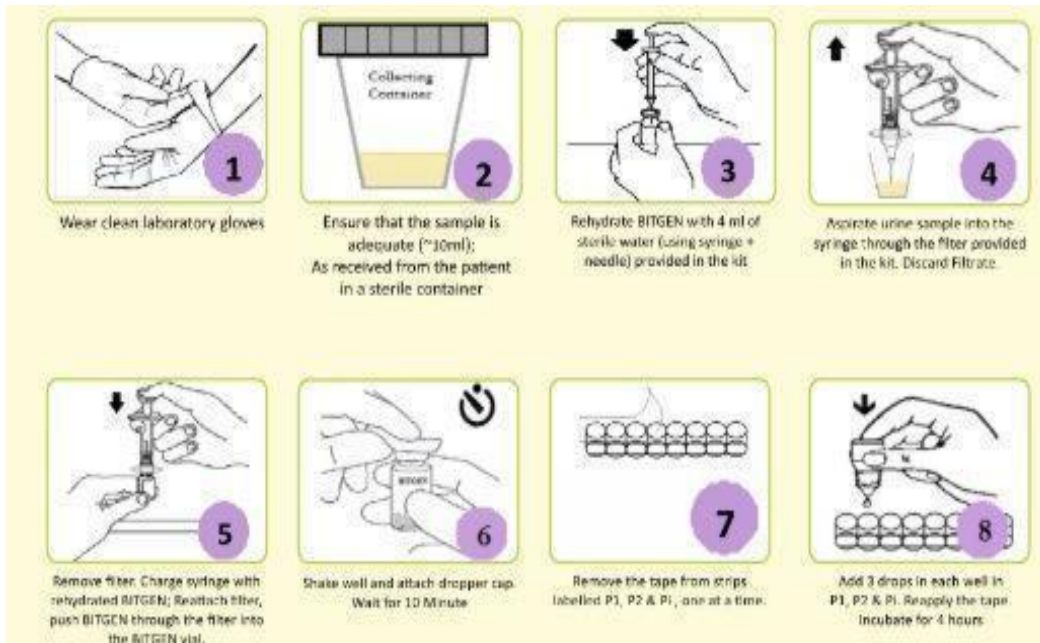
**RightBiotic** (The Fastest Antibiotic Finder) is the flagship product of xBITS and the fastest system for carrying out culture and sensitivity testing. **RightBiotic** is affordable and yet provides you a report in just **4 hours** as opposed to ~4days. The report consists of both the identification and AST (Antibiotic susceptibility test) results. This system comes with a well-designed kit to be used with the biological sample. The kit contains media vial with proprietary media for accelerated bacterial growth and pre-functionalized strips with a panel of 42 (6x7) antibiotics. **RightBiotic platform** is also suitable for rapid diagnosis of Tuberculosis, Sepsis, meningitis, etc.



**RightBiotic Machine**

## HOW TO USE:-

**RightBiotic** is a patented system with user friendly GUI. The method to process the biological sample is depicted below:-



After dispensing the media in pre-functionalized strips, these strips have to be incubated for 2 and 3 hours at 37° C. These strips are then read in the **RightBiotic** machine. The machine gives a printout in the form of a report with bacteria name and sensitivity profile for antibiotics. This enables the doctor to prescribe the “Right Antibiotic” from the very beginning of the treatment from Day 1. **RightBiotic** machine is portable and conducting the test does not require any other additional infrastructure.

## Panel of Antibiotics

### Customisable panel of 42 antibiotics

Amoxyclav	Pip-Tazobac	Aztreonam	Nitrofurantoin	Linezolid	Vancomycin
Gentamicin	Cefotaxime	Teicoplanin	Sparfloxacin	Cefalexin	Cloxacillin
Amikacin	Cefuroxime	Meropenem	Tigecycline	Azithromycin	Cefoperazon+Salb
Cefepime	Colistin	Prulifloxacin	Co-Trimexazole	Lincomycin	Ceftazidime
Ofloxacin	Levofloxacin	Erythromycin	Cefadroxil	Bacitracin	Cefixime
Ciprofloxacin	Cefazolin	Clindamycin	Polymyxin B	Optochin	Netilmicin
Ceftriaxone	Imipenem	Amp-Sulbactam	Penicillin-G	Norfloxacin	Moxifloxacin



# RESULTS



## Media Vials

Acceptable



**Warning:** Send Back to Distributor/Manufacturer

## ADVANTAGES OF RIGHTBIOTIC

- **RightBiotic** system is semi-automated so the chances of error are minimized
- **RightBiotic** assay is easy to perform and can be performed by a semi-skilled person
- Conventional method requires human intervention at each step viz., media selection, setting of antibiotic discs in the plate, zone measurement, or identification or preparation of report
- It has been observed that due to financial consideration, very often, labs do not worry about crowding of antibiotic discs and even use of media for growing bacteria present in the sample
- **RightBiotic** is a low cost machine that can run on battery backups. Machine can store data upto 5000 samples which can be reprinted from memory and transferred to external storage device. Machine carries a warranty of 3 years or 8000 tests whichever is earlier.
- The kit has to be stored at 4°C and has a warranty period of 6-12 months from manufacturing.

## CLINICAL VALIDATION

The validation of this technology has been carried out at many government hospitals and private labs such as Gandhi Hospital, Hyderabad, AIIMS, Jodhpur and many more centers.

The results with this system for identification and AST in 4 hours were compared with 24 hrs (Vitek 2) and 72 hrs conventional method (AIIMS, Jodhpur). Availability of this rapid assay will obliterate the need for empirical treatment in case of UTI leading to specific treatment at the earliest. Early availability of results facilitates de-escalation necessary for containment of bacterial resistance, targeted patient therapy with reduced antimicrobial spectrum of prescribed antibiotics thereby lowering the cost of treatment.

N= 2324 cases

Sensitivity= 95.4% (95% CI- 92.44 to 97.48)

Specificity= 85.6% (95% CI: 82.10 to 86.11)

Positive Predictive Value 90.68% (95% CI: 79.82 to 83.57)

Negative Predictive Value 97.91% (95% CI: 92.14 to 94.77)

## INDIGENOUS TECHNOLOGY:-

**RightBiotic** has been developed at Birla Institute of Technology and Science, BITS-Pilani with funding support from DRDO under its national program on Micro Smart Systems (NPMASS) and BIRAC-SPARSH, GYTI-SRISTI, DBT, GOI.

### Intellectual Property (IP) details:

No. 2783/DEL/2013;

No. 267834, dt 01-12-2014;

No. 2195/DEL/2015;

PCT No. PCT/IN2016/000153;

US Patent No. 15746424, dated 21.01.2018



**Receiving the National Technology Startup Award for 2018  
bestowed by TDB on May 11<sup>th</sup> '18**



## Related publications from our group

1. Manish Gehani, Shivani Gupta, <b>Suman Kapur</b> Diagnostic accuracy of a novel, rapid point of care test for antibiotic susceptibility testing in urinary tract infection	Diagnostic microbiology and infectious Disease (submitted)
2. Manish Gehani, <b>Suman Kapur</b> , Sudharsanam Manni Balasubramaniam, K Nagamani, D. Sudha Madhuri, Unmet need of antenatal screening for asymptomatic bacteriuria: A risk factor for adverse outcomes of pregnancy	Indian Journal for Community Medicine (accepted)
3. <b>Suman Kapur</b> and Shivani Gupta, Indigenous rapid diagnostic technology for antibiotic susceptibility testing in urinary tract infection: from bench side to bedside	BMJ Innovations, doi:10.1136/bmjinnov-2015-000111
4. Shivani Gupta, DV Padmavathi, Apoorva Verma and <b>Suman Kapur</b> , Garlic: An effective functional food to combat the growing antimicrobial resistance, <b>covered in Asia Research News</b> , "Combating anti-microbial resistant urinary tract infections".	JTAS, 2015, 38 (2):271–278
5. Shivani Gupta, <b>Suman Kapur</b> and DV Padmavathi, Comparative prevalence of antimicrobial resistance (AMR) in uropathogens as observed in urinary tract infection cases from representative states of northern and southern India	Journal of Clinical & Diagnostic Research, 2014, 8(9):09-12
6. <b>Suman Kapur</b> , Shivani Gupta, Padmavathi DV, Anuradha Pal, Jitendra Pant, Rashi Jain, Rapid sensor based technology: A novel tool for direct antimicrobial susceptibility testing in urinary tract infection	Translational Medicine and Biotechnology, 2014, 2(1), 22-28.
7. <b>S. Kapur</b> , S Gupta, S Sharad, S. Shastry, Padhmavati, DV, Growing antibiotic resistance in uropathogens due to irrational use of antibiotics	J. of Antimicrobials. Photon 2013, 128:166-71

## Peer recognition of this technology Platform

1. BEST India 2014 award bestowed by Association of Biotechnology Led Enterprise (ABLE), India: **RightBiotic team**
2. Gandhian Young Technology Innovation award 2015 bestowed by National Innovation Foundation, India: **RightBiotic team**
3. BITSAA 30 under 30 award 2015: **Ms Shivani Gupta of RightBiotic team**
4. BIRAC- DBT, GOI under their SPARSH scheme, 2015: **Dr Suman Kapur**
5. Women Entrepreneur Quest (WEQ) 2015: **Dr. Suman Kapur**
6. India Innovation Initiative, I3 jointly bestowed by CII and DST, GOI, 2015: **RightBiotic team**
7. TiE Hyderabad 2016 International Start-up Competition, held on 15th December 2015: **RightBiotic team**
8. TiE Asia Regional 2016 International Start-up Competition, held on 5th February 2016: **RightBiotic team**
9. 3<sup>rd</sup> batch “In residence scholars program” at Rashtrapati Bhawan: **RightBiotic team**
10. 100 Women Achievers in the category of 'Science, Innovation and Technology', Ministry of Women and Child Development, GOI: **Dr. Suman Kapur**
11. Innovation Ninja award bestowed by Ricoh Education Excellence award 2016: **Dr. Suman Kapur**
12. Innovation for India Awards 2016 bestowed by Marico Innovation Foundation: **Dr. Suman Kapur**
13. Venus International Women Awards-VIWA 2018 bestowed by Venus International Foundation: **Dr. Suman Kapur**
14. Prof. Indira Parikh 50 Women in Education Leaders” citation, conferred on World CSR Day at the World Education Congress on 5<sup>th</sup> July 2018: **Dr. Suman Kapur**
15. Best Technology Start up award bestowed by Technology Development Board, DST, GOI, 2018: **Dr. Suman Kapur**
16. Among the top 80 women in the “Women Transforming India (WTI)” initiative of Niti Ayog, GOI, 2018: **Dr. Suman Kapur**
17. Among the top 200 women in the “Women Entrepreneurs, WEP initiative of Niti Ayog, GOI, 2018: **Dr. Suman Kapur**
18. 51 Most Impactful Social Innovators (Global Listing) conferred on World CSR Day at the World Sustainability Congress on 17<sup>th</sup> & 18<sup>th</sup> Feb 2019: **Dr. Suman Kapur**