Department of Science & Technology
(Government of Gujarat)

GBRC NEWS

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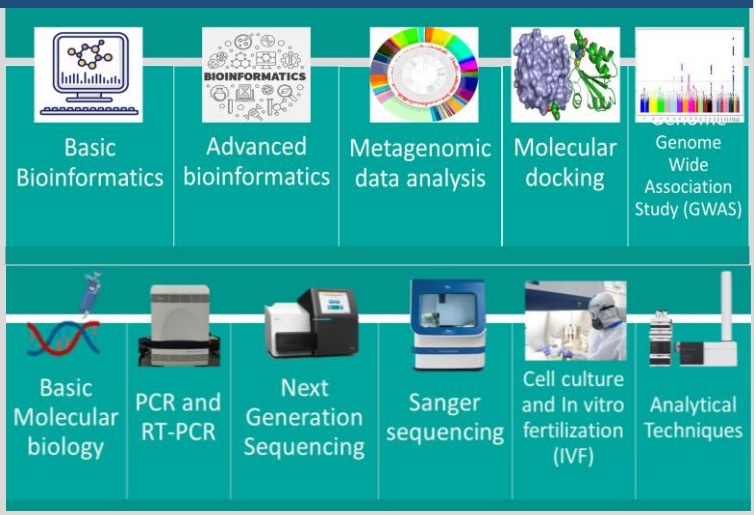
KAUSHALYA TRAINING PROGRAM FOR SKILL DEVELOPMENT IN BIOTECHNOLOGY 2022-23

***KAUSHALYA (K**nowledge **A**dvancement **U**sing **S**kills **on H**igh-end **A**pplied **L**ifetechnolog**Y for A**spirants)* is an initiative by GBRC and sponsored by Gujarat State Biotechnology Mission (GSBTM) for the year 2022-23 to help in developing biotechnological skills of the researchers, academicians and other stakeholders. The program's aim is to provide learners extensive and specialized practical knowledge for the development of their functional skill set in biotechnology and related fields. Total 30 trainings has been planned under the program on the different advance tools and technologies in the subject area of biotechnology.



KAUSHALYA TRAINING PROGRAMS 2023-24

*As a part of **KAUSHALYA (K**nowledge **A**dvancement **U**sing **S**kills **on H**igh-end **A**pplied **L**ifetechnolog**Y for A**spirants),* an initiative by GBRC, total 12 trainings has been planned for the year 2023-24. Considering feedbacks from the participants' training duration has been extended upto 2 weeks.

CONTENTS

GLIMPSE OF VARIOUS ACTIVITIES AT/BY GBRC

RECENT PUBLICATIONS

COMBINED APPROACH OF DNA METABARCODING COLLECTIVELY ENHANCE DETECTION EFFICIENCY OF MEDICINAL PLANTS IN SINGLE AND POLYHERBAL FORMULATIONS

Authors: Tasnim Travadi, Abhi P. Shah, Ramesh Pandit, Sonal Sharma, Chaitanya Joshi, Madhvi Joshi

Journal: Frontiers in Plant Science

Impact factor: 6.627

With the widespread adoption of barcoding and next-generation sequencing, metabarcoding is emerging as a potential tool for detecting labeled and unlabeled plant species in herbal products. This study validated newly designed rbcL and ITS2 metabarcode primers for metabarcoding using in house mock controls of medicinal plant gDNA pools and biomass pools. The applicability of the multi-barcode sequencing approach was evaluated on 17 single drugs and 15 polyherbal formulations procured from the Indian market. The rbcL metabarcode demonstrated 86.7% and 71.7% detection efficiencies in gDNA plant pools and biomass mock controls, respectively, while the ITS2 metabarcode demonstrated 82.2% and 69.4%. In the gDNA plant pool and biomass pool mock controls, the cumulative detection efficiency increased by 100% and 90%, respectively. A 79% cumulative detection efficiency of both metabarcodes was observed in single drugs, while 76.3% was observed in polyherbal formulations. An average fidelity of 83.6% was observed for targeted plant species present within mock controls and in herbal formulations. Our results demonstrated the applicability of multi-locus strategies in metabarcoding as a potential tool for detecting labelled and unlabeled plant species in herbal formulations.

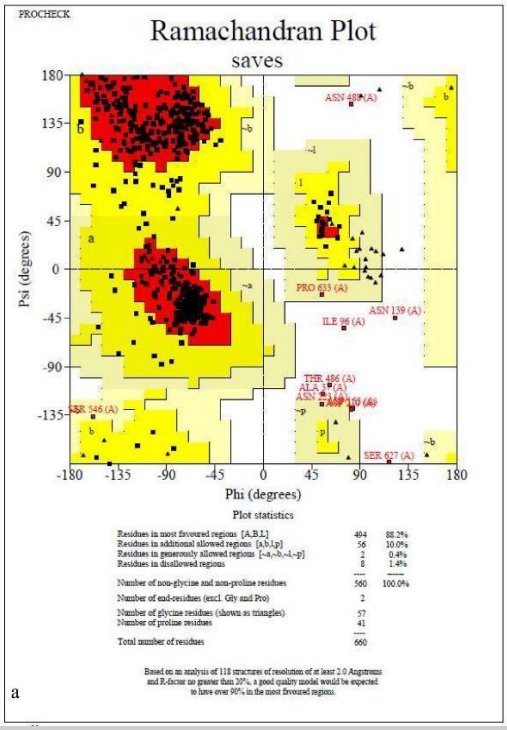
HETEROLOGOUS EXPRESSION AND BIOCHEMICAL CHARACTERIZATION OF NOVEL MULTIFUNCTIONAL THERMOSTABLE ALPHA-AMYLASE FROM HOT-SPRING METAGENOME

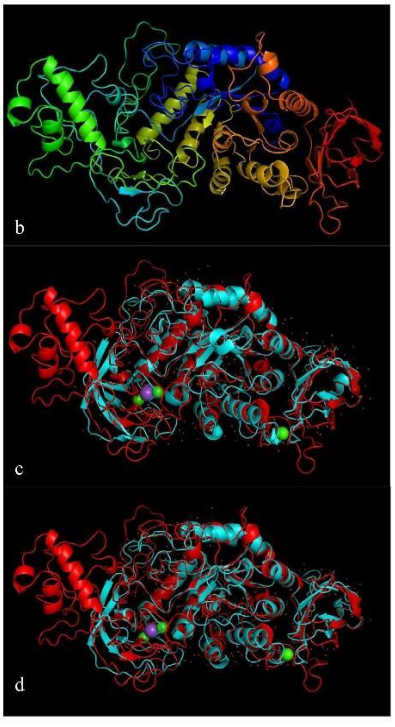
Authors: Krishna Bharwad, Satyamitra Shekh, Niraj Kumar Singh, Amrutlal Patel, Chaitanya Joshi

Journal: International Journal of Biological Macromolecules

Impact factor: 8.025

Hot-springs are regarded as the best source of industrially significant biocules and one of the unique locations for extremophiles. The α-Amylase is one of the most important enzymes used in starch consuming industries, where the need of thermostability is paramount. In this study, the full metagenome sequences obtained from the soil of Tuwa hot-spring (Gujarat, India) were examined for the presence of several thermostable enzymes using bioinformatic techniques. The whole gene sequence for α-Amylase was found from the metagenome. The α-Amylase gene was amplified, cloned, and expressed in *Escherichia coli* and further characterized *in vitro.*





The rm-α-Amylase was found optimally active at 60°C and at pH 6.0 and showed significantly high activity in 0.1 mM Co2+ as well as in other heavy metal ions without any effect on its thermostability. Apart from α-Amylase activity the purified rm-α-Amylase was also shown to hydrolyse agar, xylan, pectin, alginate and cellulose. To our knowledge, this is the first report of a new, multifunctional, thermostable Amylase that was discovered from the hot-spring metagenomes. Owing to their multifunctionality, resilience towards high temperature and heavy metal ions, stability with solvents, additives and inhibitors, rm-α-Amylase can be exploited for a variety of biotechnological applications.

RECENT PUBLICATIONS

ASSESSING THE EFFICACY OF PROBIOTICS IN AUGMENTING BOVINE REPRODUCTIVE HEALTH: AN INTEGRATED *IN VITRO*, *IN SILICO*, AND *IN VIVO* STUDY

Authors: Purva Gohil, Bhavya Nanavati, Kajal Patel, Vishal Suthar, Madhvi Joshi, Deepak B. Patil and Chaitanya G. Joshi

Journal: Frontiers in Microbiology

Impact factor: 6.064

The aim of this study was to isolate and characterize bovine-vaginal probiotics genotypically and phenotypically using *in silico* and evaluate their *in vivo* performance in buffaloes with endometritis. Two isolates *Lactiplantibacillus plantarum* KUGBRC (LPKUGBRC) and *Pediococcus pentosaceus* GBRCKU (PPGBRCKU) demonstrated optimum *in vitro* probiotic activities as compared to *Lacticaseibacillus rhamnosus* GG including, acid production, secretion of fatty acids and exopolysaccharide, cell surface hydrophobicity, self-aggregating and co-aggregating capacity with pathogens, anti-microbial activity and bacteriocin-like compounds against pathogens *Escherichia coli* and *Staphylococcus aureus* in cell-free supernatant and absence of hemolytic activity. WGS analysis showed absence of any virulent gene in these probiotic isolates. *In vivo* study of 92 buffaloes suffering from clinical endometritis with purulent cervico-vaginal mucus (CVM) were randomly allocated 40 × 108 CFU/ml LPKUGBRC and PPGBRCKU and 40 ml Normal saline. The LPKUGBRC reduced the duration between administration of probiotic to induction of healthy estrus significantly. However, no effect was observed on pregnancy rate. These results suggest that LPKUGBRC and PPGBRCKU probiotic bacteria demonstrate probiotic efficiency and adaptability. Further sourced from the same niche as the targeted infection, they offer a distinct advantage in targeting the specific microbial population associated with endometritis. The findings of this study highlight the potential of LPKUGBRC and PPGBRCKU probiotics in treating endometritis and suggest further exploration of their clinical applications.

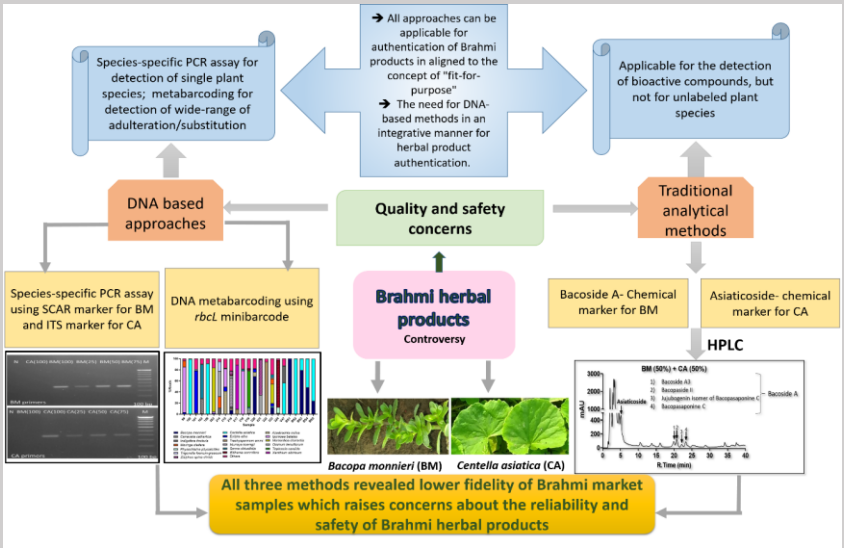
COMPREHENSIVE ANALYSIS USING DNA METABARCODING, SCAR MARKER BASED PCR ASSAY, AND HPLC UNVEILS THE ADULTERATION IN BRAHMI HERBAL PRODUCTS

Authors: Abhi P Shah, Tasnim Travadi, Sonal Sharma, Ramesh Pandit, Chaitanya Joshi, Madhvi Joshi

Journal: Molecular Biology Reports

Impact factor: 2.7

Brahmi is one of the important nootropic botanicals, widely sold in the market, with the name "Brahmi'' being used to describe both *Bacopa monnieri* and *Centella asiatica* species. This study aimed to develop DNA-based methods, including SCAR marker-based PCR and metabarcoding, to authenticate Brahmi herbal products and compare these methods with HPLC.



All targeted plant species in mock controls were detected successfully with all three methods, whereas, in market samples, only 22.2%, 55.6%, and 50.0% were found positive for Brahmi by PCR assay, DNA metabarcoding, and HPLC, respectively. Metabarcoding can detect the presence of non-labeled plants together with targeted species, which is an advantage over PCR assay or HPLC. SCAR marker-based PCR is a rapid and cost-effective method for detecting the presence of *B. monnieri* and *C. asiatica*. On the other hand, metabarcoding can be utilized to identify the target plants, even in very small quantities, while also providing simulated identification of other botanicals.

INVITED TALKS DELIVERED BY GBRC TEAM

- Dr. Madhvi Joshi delivered a talk entitled “Genetic Analysis of AMR: Down to Brass Tacks” at Scientific Conclave on Antimicrobial Stewardship, organized by Department of Microbiology, GMERS Medical college, Gandhinagar on 9th April 2023.
- Dr. Madhvi Joshi delivered a talk entitled “Skill Development in Biotechnology” at Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar on 12th April 2023.
- Dr. Madhvi Joshi delivered a talk entitled “Ongoing initiatives in Gujarat on AMR and one health surveillance” at a multi-institute panel discussion on Building post-pandemic resilience including moving towards one health, organized by SHSRC and World Bank at IIPH, Gandhinagar on 24th April 2023.
- Prof. Chaitanya G. Joshi delivered a lecture on "Omics in Environment Biotechnology" delivered on the National Technology Day Celebration with the Chemical Synthesis & Catalysis Group of R&D, Reliance Industries Limited, Vadodara.
- Dr. Amrutlal Patel delivered a talk entitles “Applications of Biotechnology; An Overview” at GTU on National Technology Day i.e., 11th May 2023.
- Prof Chaitanya Joshi, Director, GBRC delivered a talk on “Universal Holistic Health” under a session “Disruptive Science for Innovative and Sustainable Development” as a part of G20 Summit organized by National Innovation Foundation - India and Indian National Science Academy on 26th June.
- Dr. Madhvi Joshi, Joint Director, GBRC, delivered an expert talk on "Climate Change and Its Impact on Health" at Indrashil University on World Environment Day i.e., 5th June 2023.
- Dr. Madhvi Joshi delivered talk on “Learnings from Past: Extending Wastewater Based Epidemiology Beyond COVID” at Tata Institute for Genetics and Society, Bengaluru on 28th June 2023.

MOU’S

- GBRC signed MoU with Gujarat Ayurved University, Jamnagar on 25th April 2023 in the august presence of Honorable Governor of Gujarat, Shri. Acharya Dev Vrat . The objective of this MoU is to conduct collaborative research and skill development.

- GBRC signed MoU with Parul University on 28th April 2023. The objective of this MoU is to conduct collaborative research and skill development.

CONSULTATIVE MEETING CUM WORKSHOP FOR DEVELOPING BSL4 FACILITY AT GANDHINAGAR

GBRC coordinated a consultative meeting cum workshop on developing Greenfield BSL-4 lab with ABSL facility from 13th to 16th June 2023 at IIT Gandhinagar.

More than 50 participants including key personnel from academia, research institutions and pharma industry players attended the workshop. The key pharma players/ prospective users for the BSL-4 facility included Zydus Life Sciences, Hester Biosciences, Intas Pharma and Animal Vaccine Institute attended and further showed their willingness & also need of having this facility.

Institutions like NIPER, GTU, GU, GSBTM, IIT-GN, CHARUSAT, College of Veterinary Science, IIPH, GIDM also attended the workshop and highlighted the requirement for such type of facilities for conducting research on high-risk pathogens.

Moreover, more than 40 participants including key personnel from Vendors, Suppliers and DBOT players also present at the workshop on 14th June 2023 at IIT Gandhinagar in the afternoon. The DBOT players/ prospective Contractors for the BSL-4 facility included IClean (DBOT for ICFMD, Bhubneshwar BSL3Ag), Klenzaids (DBOT for NIV Pune), GMP Technical (NISHAD Bhopal) attended the workshop. Prospective vendors, suppliers and laboratory equipment manufacturers such as Thermo Fisher, Agilent, Hester Biosciences and Cytiva attended and further showed their willingness to participate and work on the project.

Prof. P.C. VAIDYA MEMORABLE WORKSHOP

GBRC staff and research fellows attended Prof. PC Vaidya Memorable workshop organized at IIT-Gandhinagar organized by Vigyan Gurjari on 19th June 2023.

PRABODH

GBRC is conducting "PRABODH" (Promoting Research Awareness in Biotechnology for Development of Human Resource) to accelerate the research work and to develop research-oriented thought processes in staff.

APRIL-2023

INVITED GUESTS

Expert (15/04/2023)

Prof. Kumanan Kathperumal,

Former Director of Research and Dean,

Tamilnadu Veterinary and Animal Sciences

University (TANUVAS)

Topic: "Genotype specific vaccine for Newcastle disease".

PRESENTATIONS FROM GBRC MEMBERS

Article: A broad-spectrum synthetic antibiotic does not evoke bacterial resistance.

Journal: eBioMedicine

Impact factor: 11.2

Dr. Pritesh Sabara
Scientist-B, GBRC

Article: Gut colonization by proteobacteria alters host metabolism and modulates cocaine neurobehavioral response.

Journal: : Cell Host & Microbe

Impact factor: 31.32

Ms. Bhavya Nanavati
JRF, GBRC

MAY-2023

INVITED GUESTS

Expert (20/05/2023)

Shri S. K. Srivastava (IFS),

APCCF-Wildlife

Topic: "Importance of timber in mitigation of climate change".

PRESENTATIONS FROM GBRC MEMBERS

Article: Increasing floral visitation and hybrid seed production mediated by beauty mark in *Gossypium hirsutum*.

Journal: Plant Biotechnology Journal

Impact factor: 13.26

Dr. Poonam Patel
RA, GBRC

Article: Gut colonization by proteobacteria alters host metabolism and modulates cocaine neurobehavioral response

Journal: : Cell Host & Microbe

Impact factor: 31.32

Ms. Urvi Budhbhatti
JRF, GBRC

JUNE-2023

INVITED GUESTS

Expert (19/06/2023)

Prof. Pranjal R. Modi,

Vice Chancellor,

Gujarat University of Transplantation Sciences

Topic: "Transplantation Sciences".

PRESENTATIONS FROM GBRC MEMBERS

Article: Novel compound FLZ alleviates rotenone-induced PD mouse model by suppressing TLR4/MyD88/NF-κB pathway through microbiota–gut–brain axis

Journal: Acta Pharmaceutica Sinica B

Impact factor: 14.907

Dr. Sonal Sharma
Scientist-B, GBRC

Article: Identification of the periplasmic DNA receptor for natural transformation of *Helicobacter pylori*

Journal: Nature Communications

Impact factor: 17.694

Ms. Meha Bhatt
JRF, GBRC

INVITED LECTURE

Dr. Sher Ali,
Distinguished Professor,
Era University, Lucknow (UP)

Topic: Personalized Medicines, Genetic and Cancer

BIOTECHNLOGY NEWS

The relationship between the burden of antibiotic resistance in humans and community access to drinking water and sanitation

Researchers determined the link between improved access to sanitation and better water quality and the human intestines' antibiotic resistance gene frequency.

Source:
https://www.news-medical.net/?tag=/Biotechnology

STAFF WELFARE CLUB ACTIVITY

The main objective of the staff welfare club is to establish, promote, subsidize, encourage, provide, maintain, organize, undertake, manage, equip, develop, recondition, operate, conduct and to run for in the music, dance, sports, social welfare, carry out scientific and technical, other than political activities.

March-2023

BEST MONTHLY PRESENTATION AWARD

Mr. Nitin Shukla
(JRF)

AWARD FOR BEST QUESTION IN PRABODH

Ms. Priyanka Nagal
(JRF)

EMPLOYEE OF THE MONTH AWARD

Dr. Sahil Kapoor
(RA)

BEST CUBICLE AWARD

LC-MS/MALDI LAB

April-2023

BEST MONTHLY PRESENTATION AWARD

Ms. Krishna Bharawad
(RA)

AWARD FOR BEST QUESTION IN PRABODH

Mr. Vikas Patidar
(TA)

EMPLOYEE OF THE MONTH AWARD

Ms. Urmi Vyas
(JRF)

BEST CUBICLE AWARD

MOLECULAR BIOLOGY LABORATORY

STAFF WELFARE CLUB ACTIVITY

May-2023

BEST MONTHLY PRESENTATION AWARD

Dr. Maitri Trivedi
(RA)

AWARD FOR BEST QUESTION IN PRABODH

Ms. Pooja Doshi
(RA)

EMPLOYEE OF THE MONTH AWARD

Mr. Tejas Shah
(Project Scientist)

BEST CUBICLE AWARD

Bioinformatics Laboratory

MONTHLY EVALUATION ACTIVITY

GBRC has internal evaluation system of the project progress where all the fellows present their work for the month and their performances are also evaluated in front of external expert.

April-2023

Dr. Surya Ramachandran,
Associate Professor,
Gujarat Biotechnology University

May-2023

Dr. Rohini Nair
Assistant Professor
Gujarat Biotechnology University

June-2023

Dr. Neeta Shrivastava
Assistant Director,
Shri B.V. Patel Education Trust

ARRIVAL & DEPARTURE

GBRC would like to extend a hearty Welcome of the new members to family

Ms. Damyanti Prajapati
Ms. Jyoti Sadhwani
Ms. Trusha Baraiya
Mr. Ritik Thumar
Ms. Zeba Jiwa Khan
Mr. Jigneshkumar Mochi
Mr. Sandipkumar Danabhai Chhasia
Ms. Kinjalben Sandipkumar Dobaria
Mr. Dhruvinkumar Vadee
Ms. Suchi Patel
Mr. Raghav Vora

GBRC wishes best for the future of the bright minds who had left

Dr. Monika Jain
Dr. Abhi Shah
Mr. Dinesh Kumar
Dr. Arpan Modi
Dr. Rushika Patel
Dr. Pranitha Pandit
Mr. Akhilesh Modi
Mr. Shail Khambholja
Ms. Nikita Dalal
Dr. Deepak Kumar Prasad

VISIT BY DIGNITARIES

Dr. V. Pathsarathy, Vice President, VIBA, Tamilnadu

Dr. H. C. Chauhan, Professor, College of Veterinary Science and Animal Husbandry, Sardarkrushinagar

Dr. Desh Deepak Singh, Professor, Department of Biotechnology, , Punjab University

VISIT BY COLLEGE/ ACADEMIC INSTITUTES

Students and faculty members from HVHP Institute of Post Graduate Studies and Research, Kadi Sarva Vishwavidyalaya visited GBRC.

Students and faculty members from Government Akhandanand Ayurveda College, Ahmedabad visited GBRC.

Students and faculty members from GSFC University, Vadodara visited GBRC.

KAUSHALYA TRAINING PROGRAMS SPONSORED BY GSBTM

COMPLETED TRAININGS

No	Training	Date
1	Basic Molecular Biology	10th – 14th April 2023
2	Research Data and Statistical Analysis using R Programming	17th – 21st April 2023
3	Capillary Sequencing and Fragment Analysis	17th – 21st April 2023
4	Analytical Techniques	24th – 28th April 2023
5	Bioinformatics from Basic to Advance	12th – 23rd June 2023

UPCOMING TRAININGS

No	Training	Date
1	Capillary Sequencing and Fragment Analysis	10th – 21st July 2023
2	Next Generation Sequencing	14th – 25th August 2023
3	Metagenomic Data Analysis	11th – 22nd September 2023

"My brain is only a receiver, in the Universe there is a core from which we obtain knowledge, strength and inspiration. I have not penetrated into the secrets of this core, but I know that it exists."
~ Nikola Tesla~

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For Shared Lab Facility : https://gbrc.org.in/

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Director - GBRC

Executive Editors:

Dr. Madhvi Joshi
Joint-Director – GBRC

Dr. Amrutlal Patel
Joint-Director – GBRC

Editorial Team:
Dr. Sonal Sharma (Scientist B- GBRC)
Dr. Sanman Samova (Scientist B- GBRC)
Nimesh Patel (Technical Assistant- GBRC)

GUJARAT BIOTECHNOLOGY RESEARCH CENTRE

DEPARTMENT OF SCIENCE & TECHNOLOGY

GOVERNMENT OF GUJARAT

ANNOUNCES

Shared LAB

Online System

- NGS Illumina NovaSeq 6000
- NGS Illumina MiSeq
- NGS Ion S5 & S5 Plus
- NGS IonChef
- BD Flow Cytometer & Cell sorter
- Capillary ABI 3500 Sequencer
- PCR + Gel Doc
- Nanodrop, Qubit
- Lyophilizer
- HPLC
- GC-MS (Clarus 680/Clarus SQ8C)
- LC-MS
- Digital PCR
- Real time PCR machine
- HPC Server & Param Shavak Server for Bioinformatics (with CLC Genomics)

GBRC shared lab online booking system:

https://gbrc.org.in