GUJARAT BIOTECHNOLOGY RESEARCH CENTRE
विज्ञानंब्रह्म
GBRC
TRANSLATING BRIGHTER BIO FUTURE

ANNUAL REPORT

2022-23

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GUJARAT BIOTECHNOLOGY
॥ विज्ञानं ब्रह्म ॥
GBRC
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BRIGHTERBIOFUTURE

FROM THE **DIRECTOR'S DESK**

It gives me great pleasure to present before you the fifth Annual Report for Gujarat Biotechnology Research Centre (GBRC), an autonomous society, set up in the state to foster innovation and promote translational discovery through biotechnology. Recognizing the need for promoting and coordinating research and development in the cutting edge areas of biotechnology and interdisciplinary sciences, The Department of Science and Technology, Government of Gujarat, on 11th August 2017, established GBRC.

GBRC carries out research in the frontier areas of biotechnology and interdisciplinary sciences which include (i) Agri-horticulture, (ii) Animal and Veterinary sciences, (iii) Industrial technology, (iv) Healthcare, (v) Marine Sector and (vi) Forestry and Environment. It serves as a single window for emerging organisations and biotech industries to help them establish connectivity with professional and institutional networks for quality innovation and product development. GBRC also provides centralized instrumentation and shared laboratory facility for the stakeholders within the state and the country.

GBRC aims to set up centres of excellence, specialized laboratories and units with a specific objective of facilitating biotechnology research and development within GBRC, independently or in collaboration with any agencies, institutes, organizations, individuals, industries, Government and Non-Government bodies of state at national and international level. The centre also maintains a library, including e-library, specimen repository and research facilities catering to the needs of GBRC and the state.

With a very sound foundation built during its first year, GBRC now strives to march ahead to enrich its scientific temperament and partner with all the stakeholders to fulfil its research and innovation goals.

(Prof. Chaitanya G. Joshi)
Director, GBRC

TABLE OF **CONTENTS**

A JOURNEY
GSBTM TO GBRC

2004

Establishment of GSBTM

2007

Bioinformatics (BitVirtual)

2007

Formation of Gujarat Biodiversity gene Bank (BioGene)

2009

Marine Bio-Resource Centre (MBRC)

2013

Healthcare Biotechnology

2017

Establishment of a new society for Translational Research (GBRC)

ABOUT **GBRC**

The Gujarat Biotechnology Research Centre is an autonomous society working under the aegis of Department of Science and Technology, Government of Gujarat. The centre conducts research in frontier areas of biotechnology with applications in Agri-horticulture, Industrial, Healthcare, Marine, Animal and Veterinary Sciences, Forestry and Environment.

GBRC aims to assist, promote, support and coordinate the approach for identifying state relevant problem and design programs, projects, network for solving it with biotechnology interventions for the upliftment of socio-economic welfare for the state and country. The core focus of the centre is to carry out translational research work in the state issues using biotechnology resulting into product, process or prototype. It has also evolved as state of art shared laboratory facility for various stakeholders.

Key Objectives

GBRC has following objectives:

- To undertake, promote, coordinate and catalyze research and development activities in all areas of biotechnology in the State for the overall socio-economic welfare and sustainable development of Gujarat.
- To undertake, assist, support and promote the research and development in the cutting edge areas of biotechnology and interdisciplinary sciences with reference to research, manpower and technology upgradation.
- To build an approach for identifying state relevant problem and design programs projects network for solving it with biotechnology interventions and to undertake translational research that results in development of product, process or prototype.
- To act as the state-of-art R&D facility for the State Government for coordinating the issues pertaining to research and development of biotechnology and to provide expert advice to various agencies/line departments in the areas of biotechnology and its applications and any other matters as may be assigned by the Government from time to time.

Executive Committee
GBRC

S.No.	Designation	Status
1	Additional Chief Secretary/Principal Secretary/Secretary, Science & Technology Department, Government of Gujarat	Chairperson
2	Director, Agriculture, Krishi Bhavan, Gandhinagar	Member
3	Director, Animal Husbandry, Krishi Bhavan, Gandhinagar	Member
4	Commissioner, Fisheries, Jivraj Mehta Bhavan, Gandhinagar	Member
5	Additional Secretary/Joint Secretary/Deputy Secretary (BT), Science & Technology Department, Government of Gujarat	Member
6	Chairperson, Scientific Advisory Committee, Gujarat Biotechnology Research Centre, Gandhinagar	Member
7	Mission Director, Gujarat State Biotechnology Mission, Gandhinagar	Member
8	Director of Research, Anand Agricultural University, Anand	Member
9	Director of Research, Sardarkrushinagar Dantiwada Agricultural University, Dantiwada	Member
10	Director of Research, Kamdhenu University, Gandhinagar	Member
11	Dean/Head, Biological Engineering Department, Indian Institute of Technology, Gandhinagar (IIT-GN)	Member
12	Additional Secretary/Joint Secretary/Deputy Secretary, Finance Department, New Sachivalaya, Gandhinagar	Member
13	Director, Gujarat Biotechnology Research Centre, Gandhinagar	Member Secretary

Governing Body
GBRC

S.No.	Designation	Status
1	Additional Chief Secretary/Principal Secretary/Secretary, Science & Technology Department, Government of Gujarat	Chairperson
2	Additional Chief Secretary/Principal Secretary/Secretary(Agriculture), Agriculture & Co-operation Department, Government of Gujarat	Member
3	Additional Chief Secretary/Principal Secretary/Secretary, Agriculture & Co-operation Department,Government of Gujarat	Member
4	Additional Chief Secretary/Principal Secretary/Secretary (Expenditure), Finance Department, Government of Gujarat	Member
5	Commissioner of Health, Jivraj Mehta Bhavan, Gandhinagar	Member
6	Nominee of Secretary, Department of Biotechnology, Government of India	Member
7	Mission Director, Gujarat State Biotechnology Mission, Gandhinagar	Member
8	Chairperson, Scientific Advisory Committee, Gujarat Biotechnology Research Centre, Gandhinagar	Member
9	Director, IIT-Gandhinagar or his nominee	Member
10	Shri. Sudhir Vaid, Chairman & Managing Director, Concord Biotech Limited Ahmedabad	Member
11	Mr. Rajiv Gandhi, Chairman & Managing Director, Hester Bioscience Pvt. Ltd. Ahmedabad	Member
12	Director of Research, Junagadh Agricultural University, Junagadh	Member
13	Director of Research, Navsari Agricultural University, Navsari	Member
14	Director, Gujarat Biotechnology Research Centre, Gandhinagar	Secretary

Scientific Staff

Director

Prof. Chaitanya G. Joshi

Scientist D and Joint Director

Dr. Madhvi Joshi	**Dr. Amrutlal Patel**	**Dr. Niraj Kumar Singh**

Scientist B

Dr. Bhumika Prajapati	**Dr. Dhwani Jhala**	**Dr. Rameshchandra Pandit**
Dr. Satyamitra Shekh	**Dr. Fenilkumar Patel**	**Dr. Apurvasinh Puvar**
Dr. Ishan Raval	**Dr. Sonal Sharma**	**Dr. Haidar Abbas Masi**
Dr. Darshan Dharajiya	**Dr. Sanman Samova**	**Dr. Pritesh Sabara**

Technical Assistant

Dr. Dalipsingh Rathore	**Mr. Vikas Patidar**	**Mr. Nimesh Patel**
Mr. Priyank Chavda	**Ms. Kajal Patel**	**Dr. Vamsi Satyavolu**
Dr. Hemanshu Maisuria	**Ms. Chetana Bhalaiya**	

GBRC
At a Glance

Projects

30

Funding in New Projects

Rs. 8,42,00,000/-

Publications

34

Patent

1 (Applied)

Funding Agencies

- Global Challenges Research Fund, UK
- DBT, Government of India
- SERB, Government of India
- INSACOG, Government of India
- GSBTM, Government of Gujarat
- DST, Government of Gujarat

Trainings

30

Human Resources Trained

~500

New Permanent Staff Recruited

04

Research Fellows Recruited

66

Revenue Generated 2021-22

Rs. 36,00,000/-

New Facilities

MALDI-TOF, 2-D Gel Electrophoresis System, High-end Inverted Microscope, Vertical Autoclave, LABMAN Automatic Ice Flake Machine, BioTek Cytation 5 Multimode Reader, Orbital Shaker Incubator

Other New Endeavours

- Development of BSL/ABSL-4 facility
- Development of GBRC new building

New Projects Sanctioned in 2022-2023

S.No.	Title	Funding agency	Grant (Figures in Rs.)	PI/Co-PI
1	Genomic Surveillance For SARS-CoV-2 In India : Indian SARS-CoV-2 Genomics Consortium (INSACOG)-Phase II	DBT	18,61,600/- + 5000/- per SARS-CoV2 genome sequence	Dr. Madhvi Joshi Dr. Ramesh Pandit Dr. Apurvasinh Puvar
2	Genomic Surveillance For SARS-CoV-2 In India : Indian SARS-CoV-2 Genomics Consortium (INSACOG)-Phase II for Component of Sewage Surveillance	DBT	69,31,200/-	Dr. Madhvi Joshi Dr. Bhumika Prajapati
3	Development of Neural Network Models by Innovatively Expanding Conventional WBE Dataset for the Monitoring of Variability of COVID-19, Variants of SARS-CoV-2, and Antidrug Resistance in Four Major Cities of India	SERB	14,31,000/-	Dr. Madhvi Joshi Dr. Bhumika Prajapati
4	Establishing Environmental Surveillance of Emerging Pathogens and Pollutants from Gujarat using Multiomics Approaches	GSBTM	1,37,03,510/-	Dr. Madhvi Joshi Dr. Ramesh Pandit
5	Soil Nutrients, Enzyme Activities and Microbial Community in Natural Farming of Coastal and Semi-arid Agroecosystems of Gujarat	GSBTM	78,41,504/-	Dr. Darshan Dharajiya
6	Development of Pheromone based Method for Estrus Detection in Buffalo	GBRC	45,90,000/-	Dr. Ishan Raval Dr. Amrutlal Patel

7	Development of Cell Culture Protocols for Guggulsterone Production in Commiphora wightii (Arnott) Bhandari	GBRC	32,00,000/-	Dr. Fenil Patel
8	Pilot Study on Clinical Metagenome: Approach to Detect Causative Agent for Infectious Disease in Human Clinical Sample Through NGS	GBRC	17,75,000/-	Dr. Apurvasinh Puvar
9	Mutation Profiling of Hemoglobinopathies in Gujarat	GBRC	50,60,000/-	Dr. Madhvi Joshi Dr. Bhumika Prajapati
10	Probiotics and Anti-Microbial Peptides for the Treatment of Metabolic and Infectious Diseases	GBRC	45,90,000/-	Dr. Satyamitra Shekh Dr. Bhumika Prajapati
11	Evaluating the Success of Panchkarma, An Ancient Ayurvedic Treatment in Rheumatoid Arthritis Through Biotechnology	GBRC	1,91,92,800/-	Dr. Madhvi Joshi Dr. Apurvasinh Puvar
12	Development of Camelid Single Domain Antibodies (SdAb) Against Life Threatening Pathogens	GBRC	50,00,000/-	Dr. Amrutlal Patel Dr. Dhwani Jhala
13	Development of Adenovirus Based Vector Vaccine Platform Against Life threatening Infectious Diseases	GBRC	70,00,000/-	Dr. Amrutlal Patel Dr. Dhwani Jhala
14	Scale up Production of Important Biopharmaceuticals e.g., Recombinant Hyaluronidase and TPA	GBRC	20,00,000/-	Dr. Nirajkumar Singh Dr. Ishan Raval

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ANIMAL BIOTECHNOLOGY

Title of Project

Translational Applications for Therapeutics from Veterinary and Allied Microbials (TATVAM)

Funding Agency

Department of Biotechnology, Government of India, India

Grant

Rs. 4,22,06,000/-

Total Duration

3 Years

Objectives in Brief

- To develop a repertoire of rumen originating efficient agro industrially important enzymes
- To culture and characterize different anaerobic as well as facultative anaerobic ruminal microbes (Bacteria & fungi) for biocules screening pertaining to agro industrial applications
- To harness the potential of ruminal microbes to convert agro waste into animal feed
- Toxicity assessment, formulation and large scale production for field applications
- To develop a potential probiotic consortium

Project Progress

- An experiment of feeding animals (Kids and Lambs) with the Moringa Leaf Meal (MLM) was set up at CAZRI, Jodhpur. The experiment used Marwari Lambs and kids, Parbatsari kids, Heifers and lactating goats. Randomly four animals from the above experiment (kids and lambs) were slaughtered at CSWRI, Jaipur and animal gut samples from 9 gut sites were collected.
- From the CAZRI samples (rumen liquor and faecal), we isolated facultative anaerobic bacteria (n=112), fungi (n=46) and anaerobic bacteria (n=12). The major plant polymers degradation capacity of the 112 bacterial isolates was evaluated.
- A total of 110 facultative anaerobic bacteria, 43 fungi and 11 anaerobic bacteria were subjected to whole genome sequencing. Similarly, we also prepared shotgun metagenome libraries and sequenced 241 rumen (solid and liquid fraction) and faecal samples. Similarly, 120 shotgun libraries were also prepared for the samples collected from the 9 sites of gastrointestinal tract of four animals and 27 libraries from anaerobic enrichment DNA samples. A total of 361 metagenomes, 164 whole genome sequencing (bacteria and fungi) and 27 anaerobic enrichment libraries were sequenced using Illumina's NovaSeq 6000.
- For cloning and expression of the industrially important enzymes, we have successfully cloned two genes namely, PHY1 (Phytase), and Cel1_GH5 (Cellulase). The other two genes Mann_GH113 (Mannanase) and MFuncENZ_GH9 (multifunctional novel gene) have been cloned and their expression studies are underway.

Key Outcomes

- The full length coding sequence of Cellulase and Phytase from *Prevotella ruminicola* originated from buffalo rumen is successfully cloned, expressed and activity is checked. Several bacterial and fungal cultures with plant biomass degrading enzymes have been isolated. We also identified several CAZymes from the shotgun metagenome and whole genomes of bacteria.

Publication / Patent

NA

Manpower Detail

Project Coordinator:	Prof. Chaitanya G. Joshi
PI:	Dr. Madhvi Joshi
Scientist:	Dr. Rameshchandra Pandit
Project Scientist III:	Dr. Arivudainambi Seenichamy
Project Scientist I:	Tejas Shah
	Dr. Pranitha Pandit
RA:	Dr. Himanshu Joshi
	Dr. Chitra Nehra
	Dr. Kumal Khatri
	Dr. Abhishek Parmar
	Dr. Harshvadan Patel
	Dr. Kiran Lokhande
	Akhilesh Modi
JRF:	Kaksha Savaliya
	Sonal Patil
	Sneha Agula
	Devanshi Patel
	Shail Khambholja
Project Assistant:	Minal Bhure
	Deepika Gupta
	Bhumika Patel

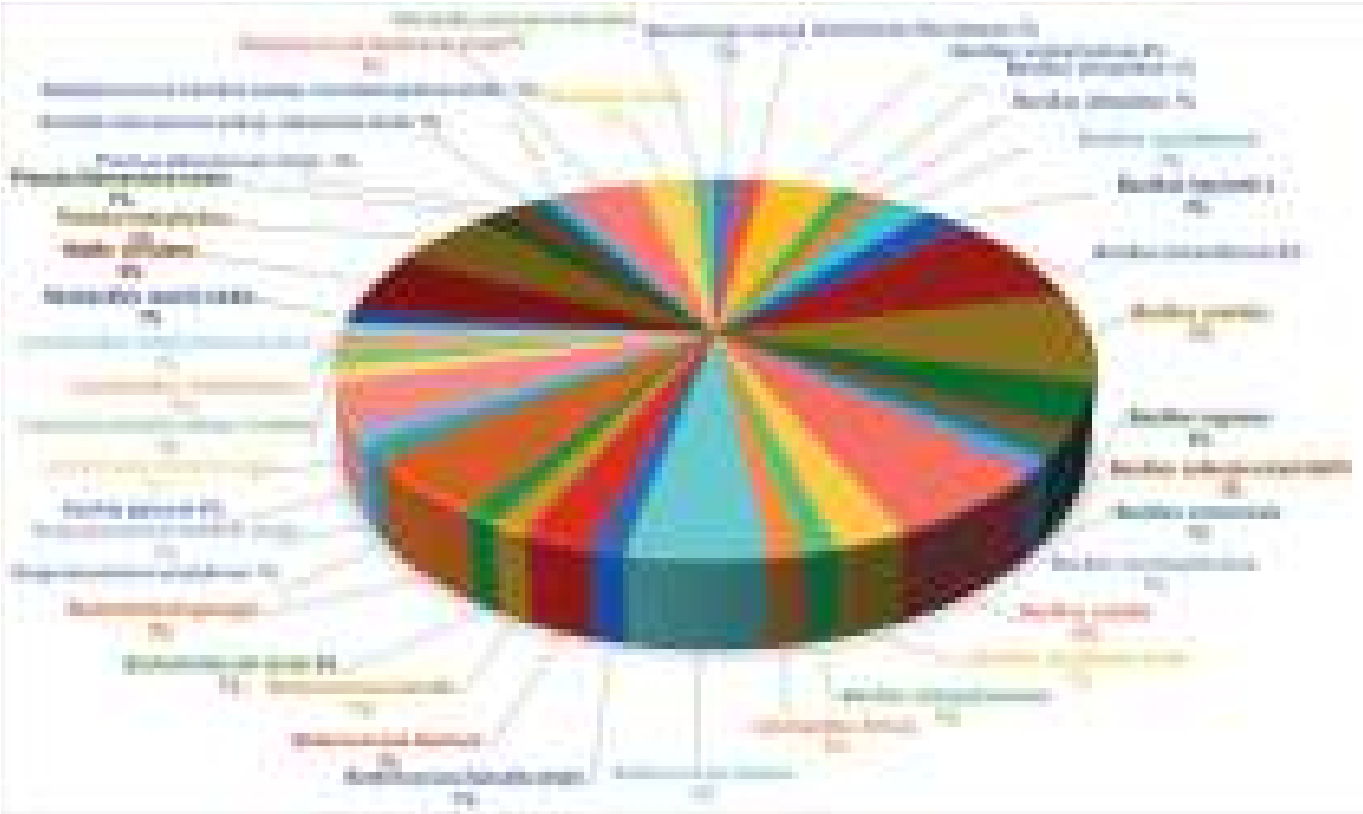


Figure 1: Pie chart depicting the total isolated and identified facultative anaerobic bacteria from the digesta of small ruminants.

Title of Project

Surveillance and molecular characterization of SARS-CoV-2 infection in non-human hosts in Gujarat, India

Funding Agency

Gujarat State Biotechnology Mission, Department of Science and Technology, Government of Gujarat, India

Grant

Total Sanctioned: 00 (Total Rs. 22,28,400/- is sanctioned to Dr. Arun Patel, KU)

Total Duration

1 Year

Objectives in Brief

- Surveillance of COVID-19 in non-human host
- Molecular characterization of SARS-CoV-2 of non-human host

Project Progress

- Nasal and/or rectal samples of 413 animals (Dog N=195, cattle N=64, horse N=42, goat N=41, buffalo N=39, sheep N=19, cat N=6, camel N=6 and monkey N=1) were collected from different places of Gujarat state of India. RNA was extracted from samples and subjected to RT-qPCR based quantification of target sequences in viral nucleoprotein (N), spike (S), and ORF1ab genes. A total of 95 (23.79%) animals were found positive, comprised of N=67 (34.35%) dogs, N=15 (23.43%) cattle, and N=13 (33.33%) buffaloes. Overall, nasal samples (N=80/412, 19.41%) gave more positive results than rectal samples (N=70/407, 17.19%) in RT-qPCR. The whole SRAS-CoV-2 genome sequencing was done from one sample (ID-A4N; from a dog) where 32 mutations, including 29 single nucleotide variations (SNV) and two deletions, were detected. Among them, nine mutations were located in the receptor binding domain of the spike (S) protein. The consequent changes in amino acid sequence revealed that T19R, G142D, E156-, F157-, A222V, L452R, T478K, D614G, P681R mutation in S protein and D63G, R203M and D377Y in N protein. The lineage as-signed to this SARS-CoV-2 sequence is B.1.617.2.

Key Outcomes

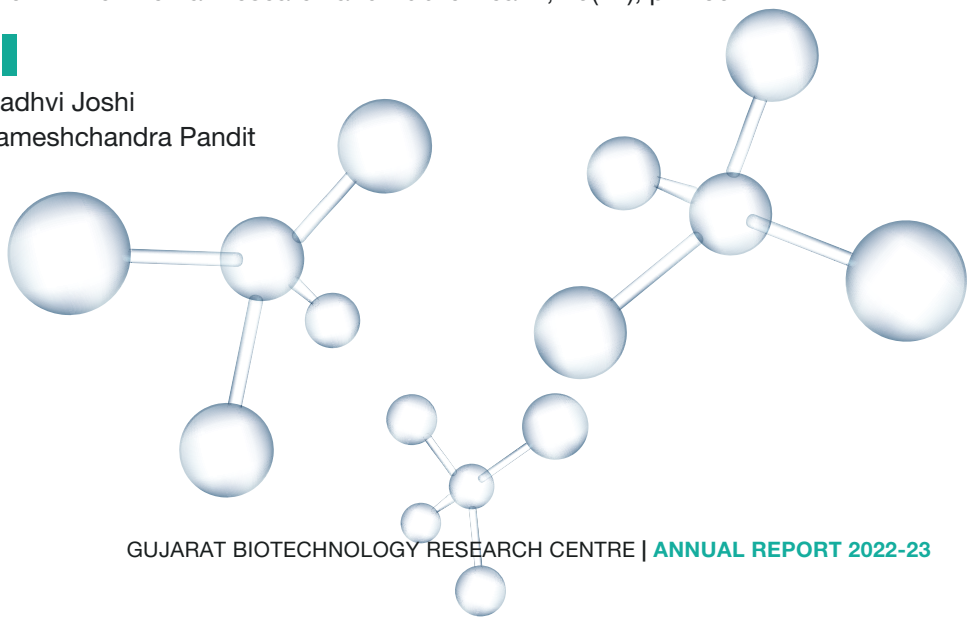
- Thus, the present study highlights the importance of SARS-CoV-2 surveillance in the non-human host.
- We also recovered entire SARS-CoV-2 genome from the one of the dog samples.

Publications / Patent

- Kumar, D., Antiya, S.P., Patel, S.S., Pandit, R., Joshi, M., Mishra, A.K., Joshi, C.G. and Patel, A.C., 2022. Surveillance and molecular characterization of SARS-CoV-2 infection in non-human hosts in Gujarat, India. International Journal of Environmental Research and Public Health, 19(21), p.14391

Manpower Detail

PI:	Dr. Madhvi Joshi
Scientist:	Dr. Rameshchandra Pandit



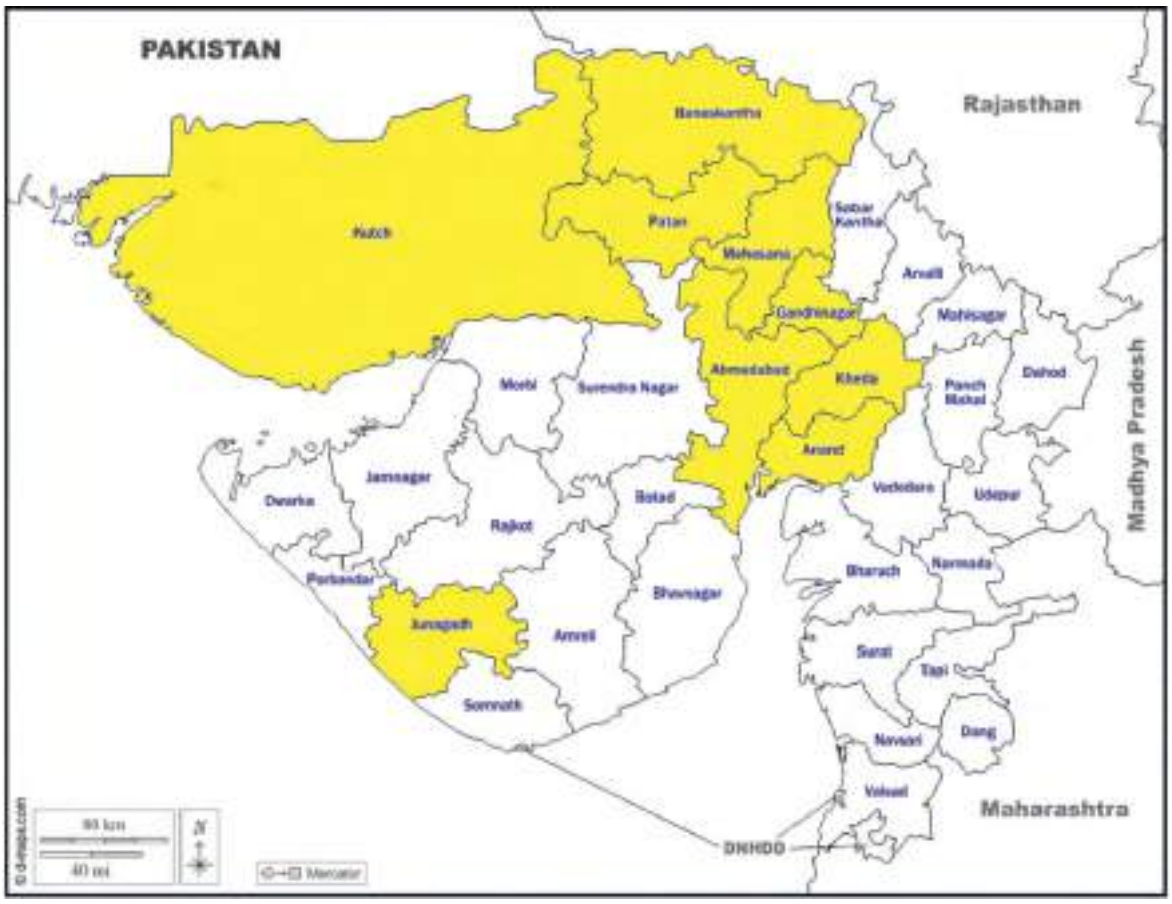


Figure 1: Map of Gujarat showing the locations of sample collections highlighted in yellow color.

Table 1: Maximum and minimum Ct values obtained in the positive samples of different species during the qPCR of SARS-CoV-2

Species (n = No. of Samples)	Type of Sample	N Gene (Ct)		ORF1ab (Ct)		S Gene (Ct)	
		Max–Min (±SD)	Mean	Max–Min (±SD)	Mean	Max–Min (±SD)	Mean
Dogs (n = 67)	Nasal	27.63–34.98 ± 2.25	32.05	28.40–34.96 ± 2.03	31.88	29.60–34.96 ± 1.39	32.9
	Rectal	27.89–34.97 ± 2.16	32.12	28.97–34.93 ± 1.64	32.51	30.68–34.96 ± 1.19	33.37
Cattle (n = 15)	Nasal	32.53–34.76 ± 0.72	34.13	32.26–34.94 ± 0.97	33.67	30.87–33.69 ± 0.92	32.4
	Rectal	33.78–35.00 ± 0.54	34.46	32.91–34.48 ± 0.57	33.8	30.30–34.95 ± 1.28	32.74
Buffaloes (n = 13)	Nasal	31.63–34.61 ± 1.05	33.16	31.74–34.84 ± 0.94	33.36	29.88–34.85 ± 1.59	32.78
	Rectal	29.00–34.93 ± 1.65	32.37	31.00–34.11 ± 2.16	32.92	29.79–34.35 ± 1.45	32.12

Title of Project

Development of pheromone based method for estrus detection in buffalo

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 45,90,000/-

Total Duration

3 Years

Objectives in Brief

- To standardize the method of detecting pheromones from urine of buffalo
- To develop a field application device for detecting estrus

Project Progress

- Buffalo is a silent heat animal, and it does not show obvious estrus signs like cattle. The detection of the estrus phase in buffalo becomes crucial as missing each ovulation cycle costs a significant amount of money to the farmer. The rate of success of artificial insemination is directly proportional to the estrus detection by the veterinarian. The current method of rectal palpation requires high technical expertise and becomes difficult for farmers. Hence the aim of the project is to develop a field level non-invasive diagnosis kit for the detection of estrus from buffalo.
- Buffalo urine samples were collected from animals coming to veterinary camps (n =130). Samples were subjected to urease treatment followed by extraction of metabolites in four different solvents (Acetonitrile, Dichloromethane, Hexane and Methanol). Samples extracted in all four solvents were derivatized using BSTFA:TMCS (99:1) and were subjected to GCMS analysis. MS-DIAL was used for identification and annotation of data obtained by GCMS after comparing the spectra with the NIST database. Samples extracted in ACN and Methanol were subjected to LCMS analysis. The annotation of compounds obtained in LCMS was done using TIDYMASS software. Statistical analysis of the identified compounds was performed using Metaboanalyst.

Key Outcomes

- Based on the metabolites identified by GCMS, significant upregulation and downregulation of the metabolites was observed in different solvent extracts. The volcano plots of the same are shown in figure 1. Solvent wise heatmaps of top 10 metabolites are shown in the figure 2. After removing outliers, the samples belonging to the estrus and anestrus groups formed separate clusters as seen from the oPLSDA plots in figure 3. This indicates a clear discrimination of the urine metabolic profile of buffaloes when it is in heat as compared to those which are not in heat.

Publication / Patent

NA

Manpower Detail

Project coordinator:	Prof. Chaitanya G. Joshi
PI:	Dr. Ishan Raval
Co-PI:	Dr. Amrutlal Patel
RA:	Dr. Pooja Doshi
TA:	Chetna Bhalaiya

A

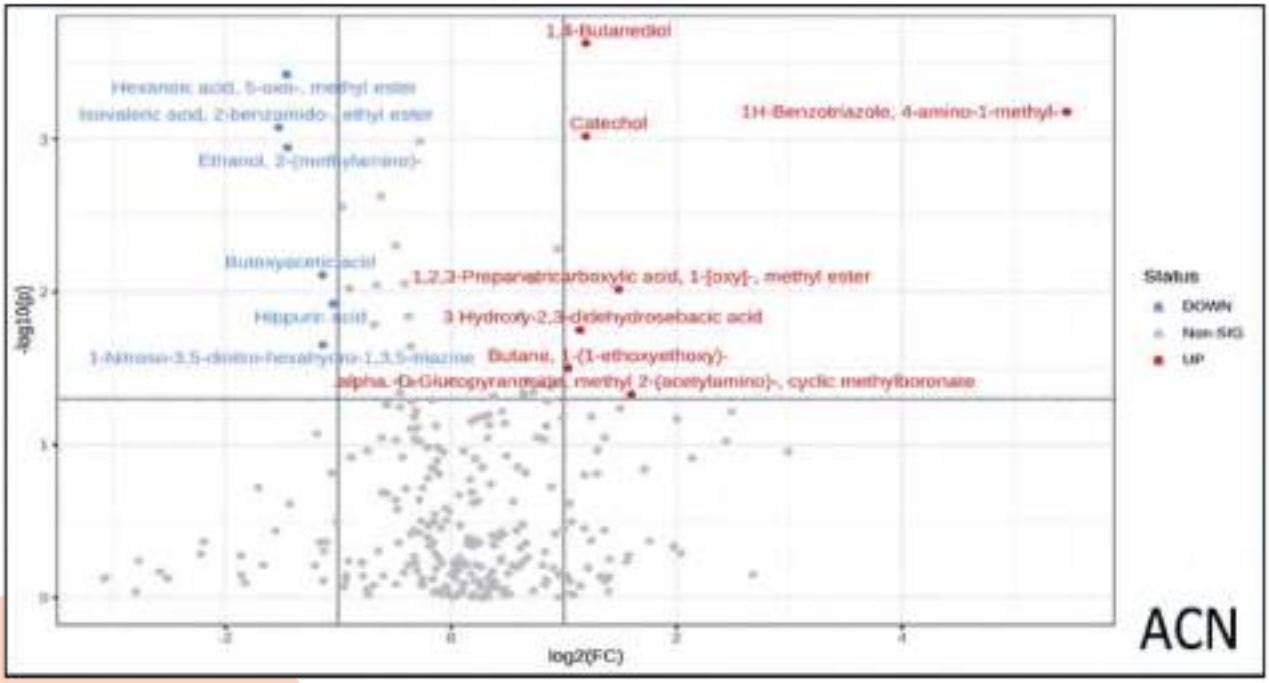


Figure 1 (A): Volcano plot of metabolites identified using acetonitrile.

B

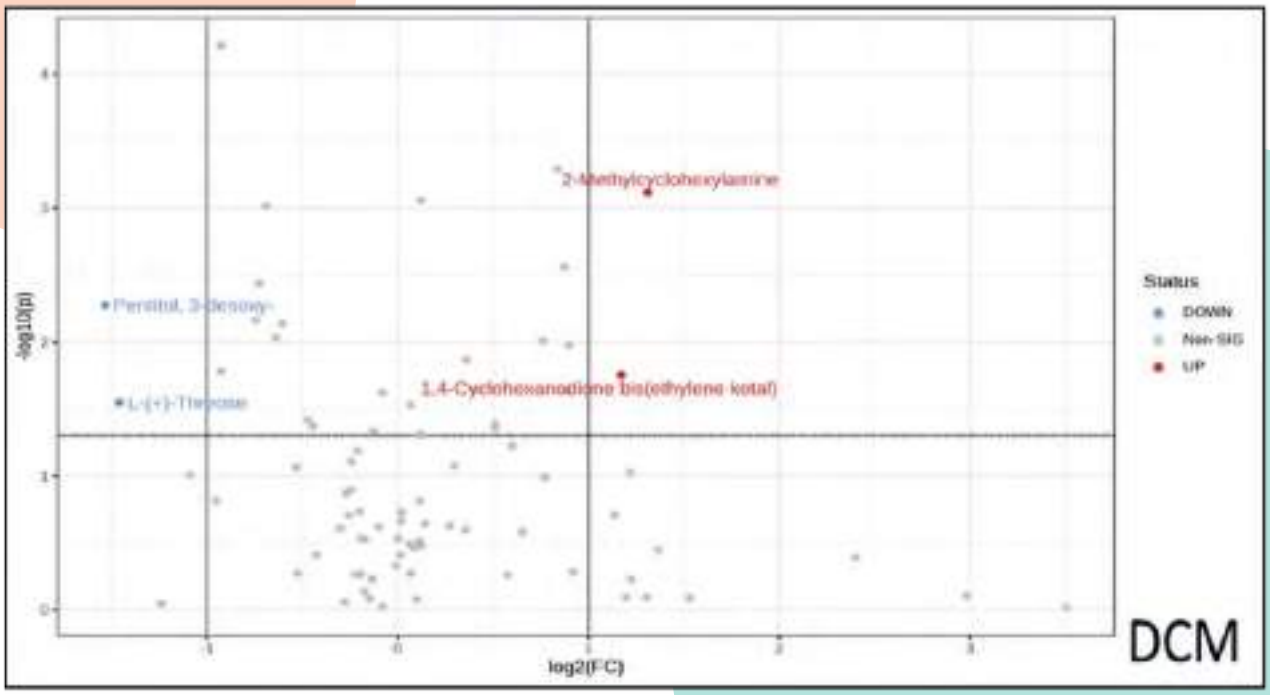


Figure 1 (B): Volcano plot of metabolites identified using dichloromethane.

C

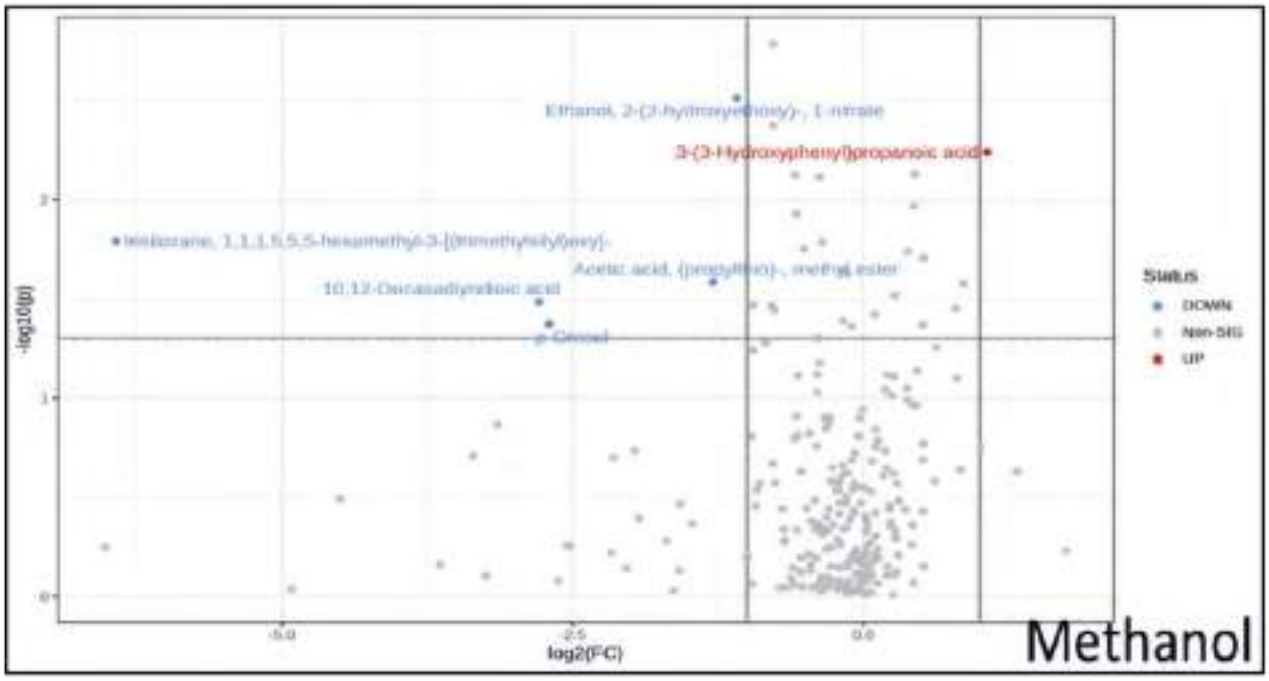


Figure 1 (C): Volcano plot of metabolites identified using methanol.

D

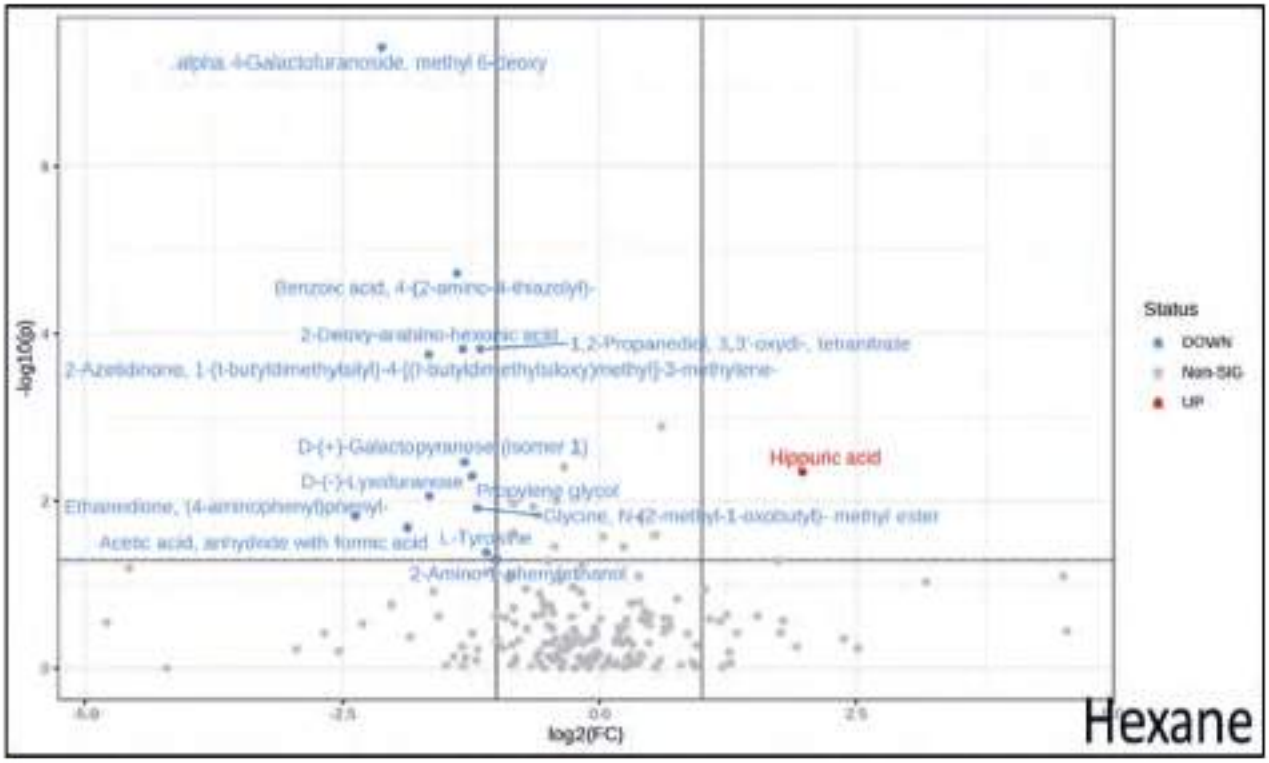


Figure 1 (D): Volcano plot of metabolites identified using hexane.

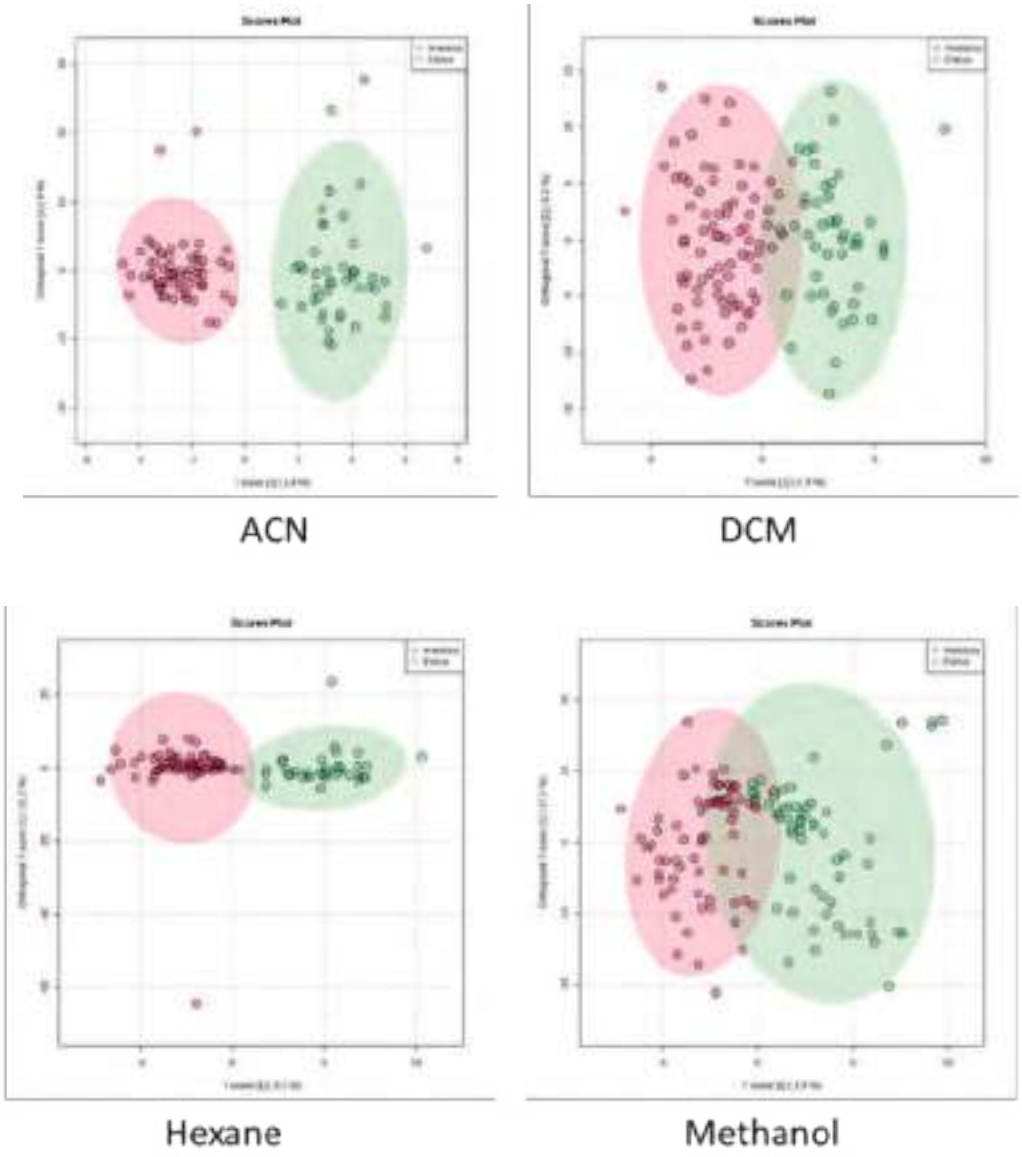


Figure 2: oPLSDA plots of different solvents. Different acids like 1-propanetricarboxylic acid, 3-Hydroxy-2,3-didehydrosebacic acid, methyl boronic acid, and hydroxyphenylpropenoic acid were found to be upregulated in urine of buffaloes in estrus phase as compared to those in anestrus phase. Catechol, Butanediol, 2-Methylcyclohexylamine were also found in higher concentrations in estrus samples.

Title of Project

One Health Poultry Hub

Funding Agency

Global Challenges Research Fund, UK

Grant

Rs. 2,16,50,000/-

Total Duration

5 Years

Objectives in Brief

- To achieve sustainable global intensification of poultry meat and egg production with reduction in risk to human and animal health as well as welfare
- To establish a specific causal connection between socio-economics; human behaviour, pathogen evaluation and disease transmission
- To evaluate host-pathogen interaction dynamics in relation to epidemic avian influenza, antimicrobial resistance and food borne zoonoses across various countries

Project Progress

- Isolation, biochemical characterization and molecular identification of important bacterial pathogens from human, chicken and environmental samples was completed. Total 83 *Campylobacter* and 77 *Escherichia coli* were isolated from the chicken ceca and cloaca samples, respectively. Nontyphoidal *Salmonella* was not detected from 150 samples processed from the poultry environment.
- Isolates were studied for the presence of antimicrobial resistance by disc diffusion method. One hundred fifty human faecal samples collected from chicken shop workers were screened for the presence of *Campylobacter* spp. and Nontyphoidal *Salmonella*. No samples were found positive for the target pathogens.
- The samples were also analysed for 16S amplicon based microbiome and antibiotic resistant genes (ARGs) from the human stool samples of Gujarat (n=150) and Tamil Nadu (n=132). WGS of 16 *Campylobacter coli*, two *C. jejuni* and six *E. coli* is completed. Data was analysed for the presence of AMR genes and phenotypic-genotypic correlation analysis. Important mutations for the novel antibiotic resistance genes were identified and its effect at protein structure level was studied.

Key Outcomes/Lead

- GBRC completed isolation and characterization of pathogenic organisms from various samples of live bird and chicken shops. One hundred fifty human samples from Gujarat and 132 samples from Tamil Nadu were studied for the 16S microbiome and ARG.

Publication / Patent

- Soni, T., Pandit, R., Blake, D., Joshi, C. and Joshi, M., 2022. Comparative analysis of two next-generation sequencing platforms for analysis of antimicrobial resistance genes. Journal of Global Antimicrobial Resistance, 31, pp.167-174.

Manpower Detail

PI:	Dr. Madhvi Joshi
Co-PI:	Prof. Chaitanya G. Joshi
Scientist:	Dr. Ramesh Pandit
	Dr. Satyamitra Shekh
SRF:	Sadik Dantroliya
JRF:	Monica Chavan
Project Assistant:	Khooshi Bhatt

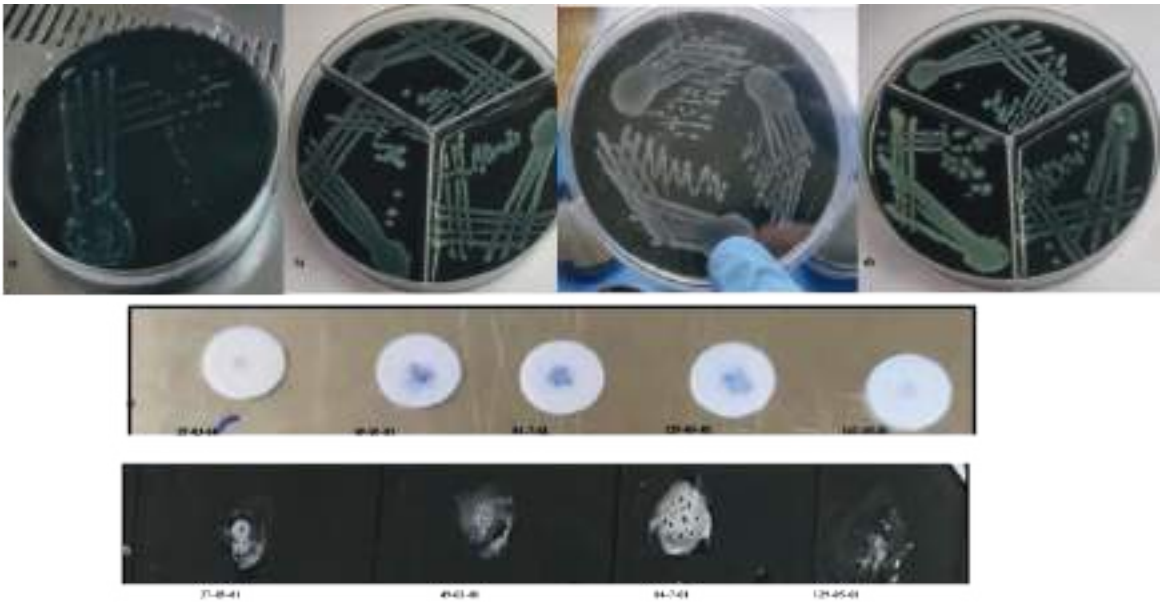


Figure 1: Chicken were dissected and cecum was collected for the bacterial isolation. Swabs from the internal lining of cecum were collected and streaked on mCCDA plates. a) After incubation at 42°C in 5% CO_2 incubator for 48 h, growth of isolates was observed on mCCDA agar plate and b) pure culture of *Campylobacter coli* was obtained from chicken cecum. c) and d) Pure cultures obtained from human faecal samples showing similar colony characteristics as *Campylobacter* species. e) oxidase test and (f) catalase test for biochemical characterization of cultures identified as *Campylobacter coli* and *C. jejuni* (catalase test, oxidase test). For culture isolate ID, first two or three digits represent the site ID (district from which the sample is collected), next two digits represent bird ID and last two digits represent sample type.

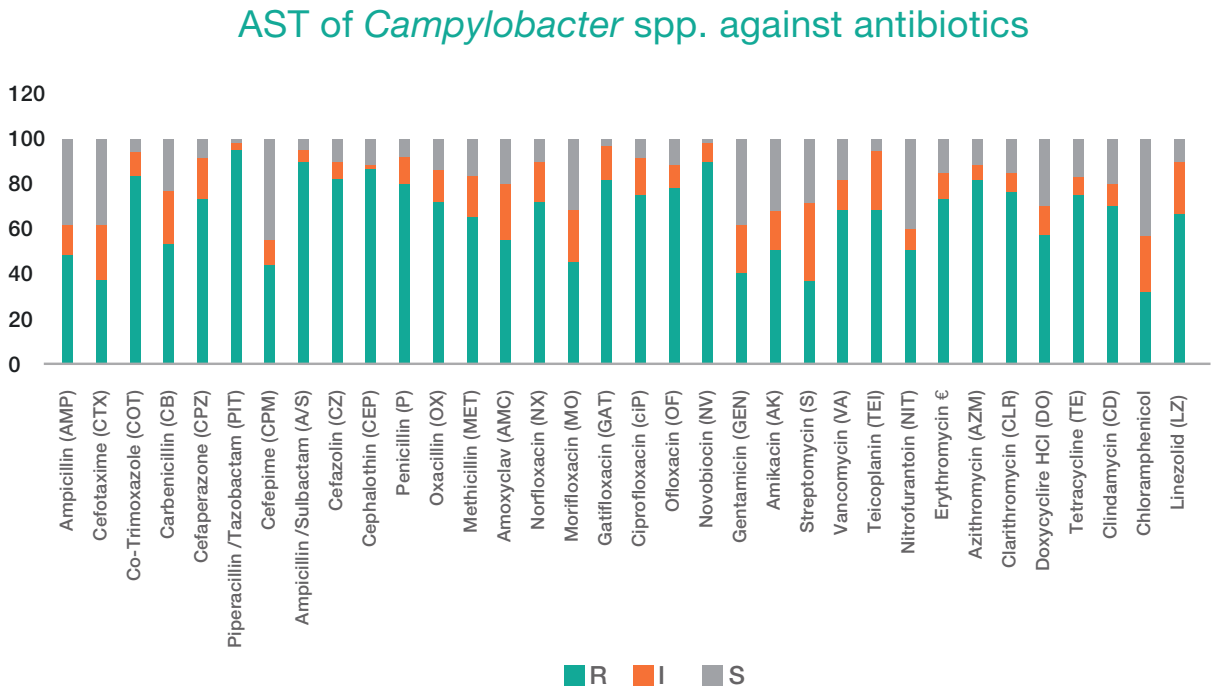


Figure 2: Antibiotic susceptibility test for the detection of AMR in *Campylobacter* spp., (n=61) by disc diffusion assay. Interpretation was done for the isolate as R-resistant, I-intermediate and S-susceptible as per CLSI guidelines.

Title of Project

Establishment of genomic selection network for dairy cattle and buffalo breeds of Gujarat

Funding Agency

Gujarat State Biotechnology Mission, Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 26,11,14,018/-

Total Duration

5 Years

Objectives in Brief

- Developing common performance recording systems in Gujarat
- Genotyping recorded females and bulls using INDUSCHIP and BUFFCHIP as a common platform
- Pooling performance records of animals collected following agreed standard procedure by all the parties for identified breeds in their respective specified areas of operation in the common format
- Suggesting modification in the procedure for estimating genomic breeding value to the breeding value estimation committee constituted by GOI for routine breeding value estimation
- Continual refinement of INDUSCHIP and BUFFCHIP developed by NDDB

Project Progress

- GBRC is working as a coordinating centre for this project. The details of performance recorded, and sample collected till 31/03/2023 is shown in Table 1.
- The genotyping data of Mehsana buffalo was analysed using BLUF90 for estimation of breeding values. The workflow for the data analysis is shown in Figure 1.

Key Outcomes/Lead

- Preliminary data analysis showed that caving period and season have significant effect on the breeding values estimated using kg fat/lactation as trait. Number of calving more than one and in seasons, summer and rainy yielded higher breeding values as compared to other effects (Table 2).

Publication / Patent

- NA

Manpower Detail

Project coordinator: Prof. Chaitanya G. Joshi
JRF: Kartik Deopujari

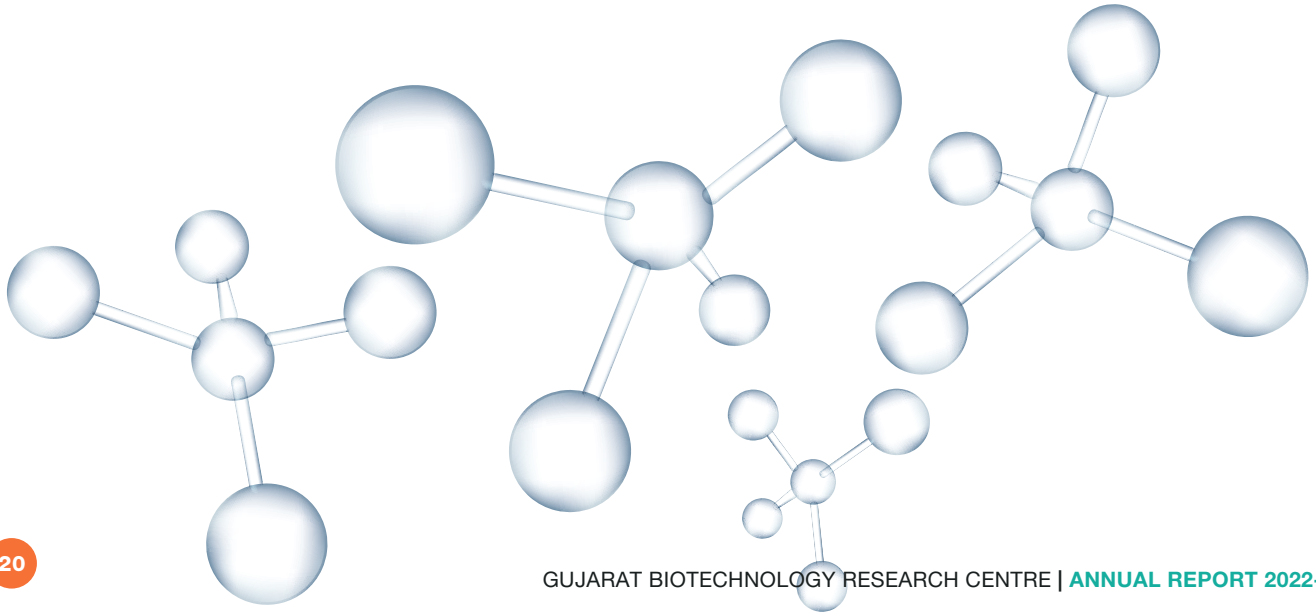


Table 1: Summary of samples collected till 31/03/2023.

	Cattle Kankrej		Buffalo Mehsana		Total	
Description	**Target**	**Achievement**	**Target**	**Achievement**	**Target**	**Achievement**
Performance Recording	3800	6397	14400	16254	18800	22651
Blood Samples Collected	3000	1651	13000	10705	16000	12356
DNA Isolated	3000	1594	13000	10305	16000	11899
Genotyped	3000	1054	13000	6856	16000	7910

Table 2: Effect of calving period and season on kg fat/lactation as a trait using BLUF90.

Effect of calving			
Effect	**Level**	**Solutions**	**Levels**
2	1	26.29099	One Calving
2	2	41.93535	Two Calving
2	3	42.02563	Three and more
Effect of season			
Effect	**Level**	**Solutions**	**Levels**
3	1	32.75756	Winter
3	2	37.73961	Summer
3	3	38.3963	Rainy

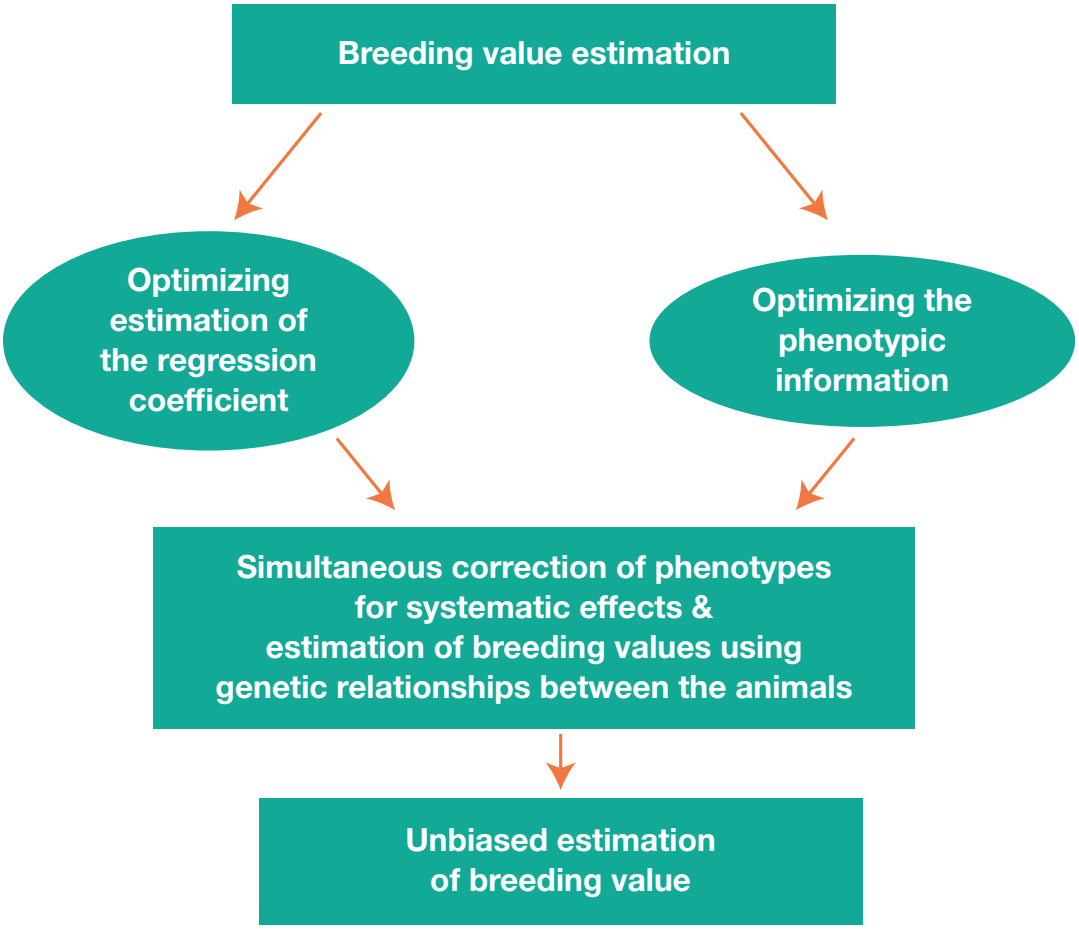


Figure 1: Overall workflow for breeding value estimation using BLUF90.

Title of Project

Ameliorating antimicrobial drug resistance and augmenting of fertility through probiotics microbiome intervention in postpartum bovine

Funding Agency

Gujarat State Biotechnology Mission, Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 28,48,274/-

Total Duration

3 Years

Objectives in Brief

- Identification of probiotic consortia for ameliorating antimicrobial drug resistance and augmentation of fertility in bovines
- To evaluate the potential of Lactic acid producing or species specific microbes/ probiotic to overcome uterine infection in bovines

Project Progress

- Isolation of *probiotics* in enhancing bovine reproductive health, focusing on endometritis treatment in buffaloes. The *in vitro* phase involved collecting vaginal swabs from 34 cows and 17 buffaloes to isolate and characterize bovine-vaginal probiotics genotypically and phenotypically. They identified 709 primary bacterial isolates with probiotic activity, of which two, *Lactiplantibacillus plantarum* KUGBRC (LPKUGBRC) and *Pediococcus pentosaceus* GBRCKU (PPGBRCKU), demonstrated optimum probiotic activities like acid production, antimicrobial activity, and absence of hemolytic activity.
- Genomic analysis confirmed the phenotypic capacities of these isolates, showing no virulence genes. The *in vivo* phase involved administering these probiotics to 92 buffaloes with clinical endometritis, where LPKUGBRC significantly reduced the time to healthy estrus induction, although no impact on pregnancy rates was noted. The study underscores the potential of LPKUGBRC and PPGBRCKU probiotics in treating endometritis, advocating for further clinical investigations.
- The *in vivo* phase of the study involved 92 buffaloes with clinical endometritis, where they were administered LPKUGBRC and PPGBRCKU probiotics. The results showed that LPKUGBRC significantly reduced the time taken to induce a healthy estrus, however, no effect on pregnancy rates was observed. This highlights the potential of these probiotics in addressing endometritis, warranting further clinical exploration of their applications.

Key Outcomes/Lead

- GBRC successfully isolated and characterized probiotic bacteria from healthy vaginal swabs of buffaloes and cows, encompassing *in vitro, in vivo,* and *in silico* analyses.
- *In vivo* administration of probiotic cultures was conducted on 92 buffaloes with endometritis.

Publication / Patent

- Gohil, P., Patel, K., Patel, S., Pandit, R., Suthar, V., Duggirala, S., Joshi, M., Patil, D. and Joshi, C., 2022. In-depth analysis of an obligate anaerobe *Paraclostridium bifermentans* isolated from uterus of *Bubalus bubalis*. Animals, 12(14), p.1765.
- Gohil, P., Nanavati, B., Patel, K., Suthar, V., Joshi, M., Patil, D.B. and Joshi, C.G., 2023. Assessing the efficacy of probiotics in augmenting bovine reproductive health: an integrated *in vitro, in silico,* and *in vivo* study. Frontiers in Microbiology, 14, p.1137611.

Manpower Detail

PI:	Dr. Madhvi Joshi
Co-PI:	Prof. Chaitanya G. Joshi
SRF:	Purva Gohil

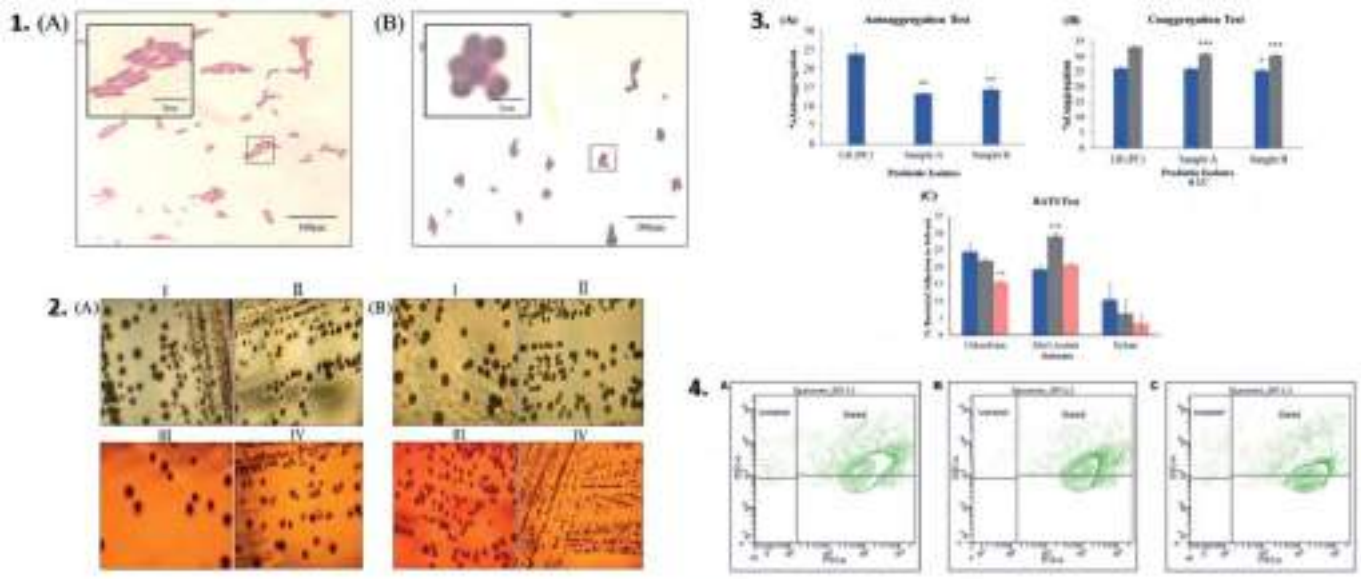


Figure 1: *In vitro* characterization of probiotic cultures 1) Gram Staining: Light microscopic examination at 100x magnification revealed Gram-positive rods in Sample A and Gram-positive cocci in Sample B. 2) Samples A and B displayed notable probiotic characteristics, with some variations when compared to the benchmark *Lacticaseibacillus rhamnosus* GG. 3) Exo-Polysaccharide Secretion: Observed around colonies of both samples under different MRS medium conditions, indicating distinctive responses to solvents and pathogens. 4) Cell Adhesion Assay: Utilized CFDA-SE labelling to analyse bacterial cell adherence to epithelia, showcasing the adherence capabilities of LPKUGBRC and PPGBRC alongside *Lacticaseibacillus rhamnosus* GG.

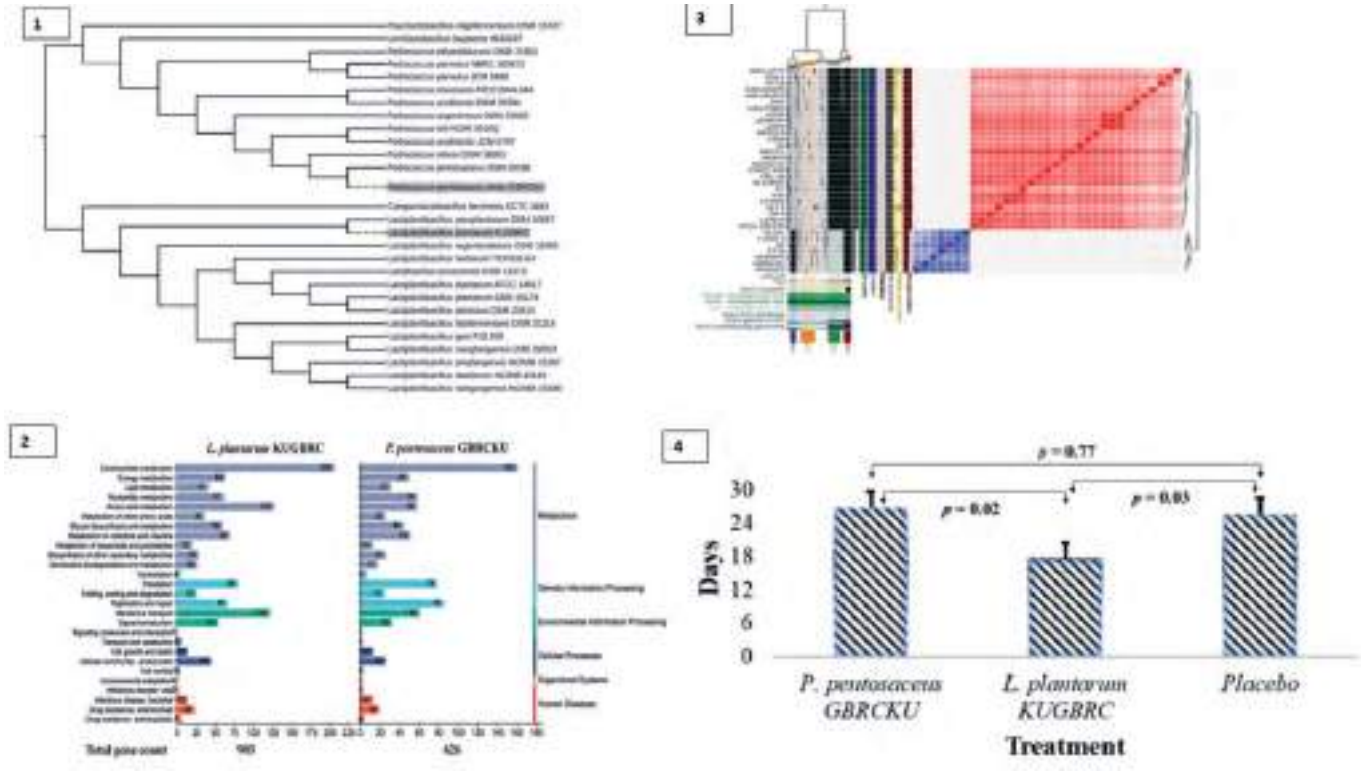


Figure 2: Genomic and invivio analysis studies dine Phylogenetic analysis 2) Pangenome analysis 3) KEGG analysis 4) *In vivo* Assay: Effect of *P. pentosaceus* GBRCKU (n= 23), *L. plantarum* GBRCKU (n =40) and placebo (n =29) treatment on duration between administration of probiotics to induction of estrus in endometritic buffaloes.

Title of Project

Gene editing facility - Embryo transfer technology

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 50,00,000/-

Total Duration

5 Years

Objectives in Brief

- To develop gene editing tools using synthetic biology to engineer microbes to perform novel functions for industrial benefits
- To develop gene editing tools related to agriculture and industrial biotechnology
- To establish gene editing facility which will serve as a shared facility

Project Progress

- In animals, we are targeting to knockout myostatin gene in mouse and goat using CRISPR/Cas9 tools and focusing on both NHEJ and HDR pathways. Myostatin regulates muscle growth, and therefore its knockout should result in excessive muscle growth.
- The HDR repair cassette for myostatin gene in mouse was prepared in pSiM24-eGFP vector by cloning of 5'and 3' homology arms.
- The mouse fibroblast cell line NIH3T3 and mouse myoblast cell line C2C12 were procured from NCCS, Pune. Expression of myostatin was checked in both; however, no significant expression of myostatin was confirmed by RT-PCR. Therefore, it was decided to perform the transfection studies in primary mouse myoblast cells.
- Meanwhile, the cloning work for targeting myostatin gene in *Capra hircus* (goat) was initiated. The guide RNA sequences targeting Exon 1 of myostatin in *Capra hircus* were designed and simultaneously cloned in two different vectors – pSpCas9(BB)-2A-GFP (pX458) and pSpCas9(BB)-2A-Puro (pX459). The clones are confirmed by PCR and needs to validated by sequencing yet.

Key Outcomes/Lead

- Construction of HDR cassette of myostatin for mouse
- Cloning of gRNAs targeting goat myostatin into px458 and px459 vectors

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Madhvi Joshi
	Dr. Amrutlal Patel
Scientist:	Dr. Dhwani Jhala
TA:	Dr. Ankur Sharma
JRF:	Animesh Singh
	Priyanka Panwar

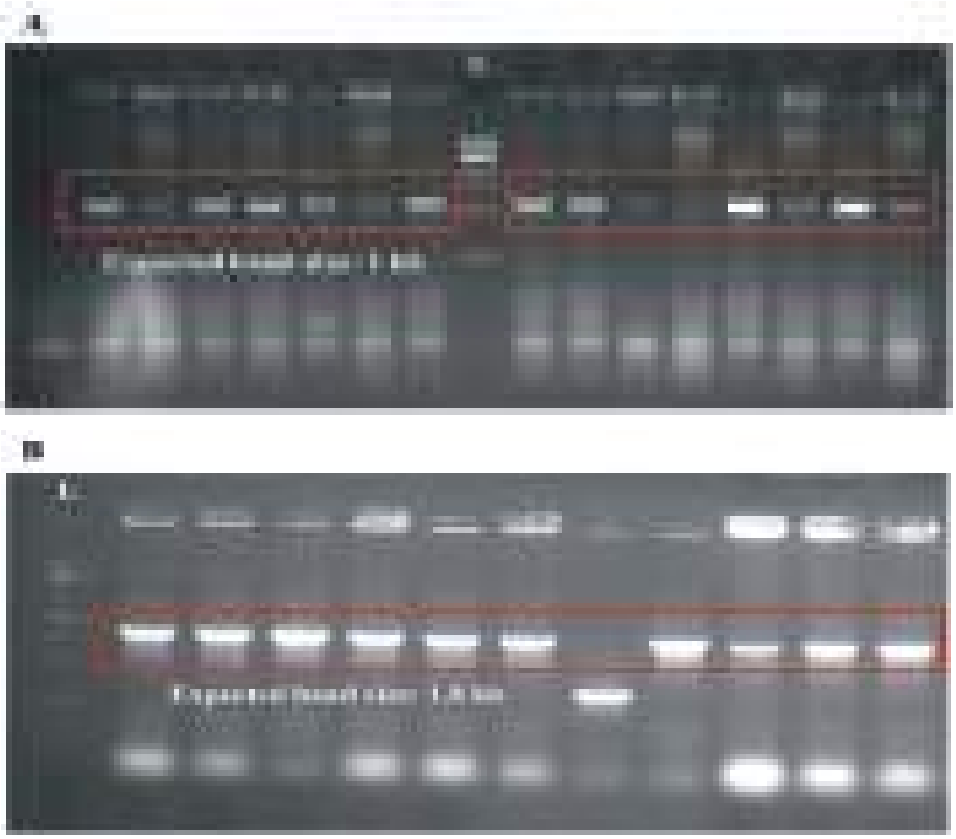


Figure 1: (A) Confirmation of 5' arm in pSim24-eGFP vector by colony PCR and (B) Confirmation of 3' arm in pSim24-eGFP/5' arm vector

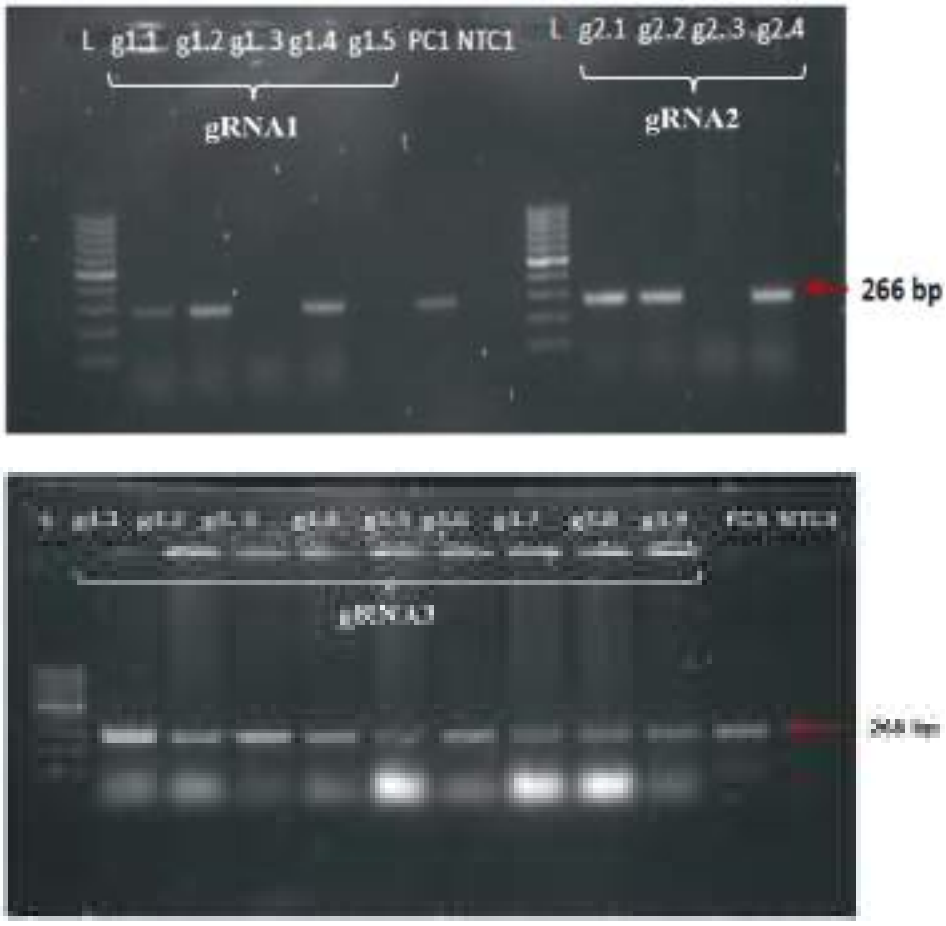


Figure 2: Confirmation of cloning of gRNA1, gRNA2 and gRNA3 targeting goat myostatin in px458 vector through colony PCR.

Title of Project

Development of inactivated Canine Distemper Virus vaccine of strain isolated from Asiatic lions of Gujarat, India

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 54,26,000/-

Total Duration

2 Years

Objectives in Brief

- CDV isolation and propagation from infected tissues of Gir lions
- Development of CDV inactivated vaccine
- Safety, efficacy and potency testing of CDV vaccine

Project Progress

- As per the objectives of the project, CDV was isolated from infected samples of Gir lions and was adapted in MDCK and Vero/dSLAM cells. Virus propagation was performed and inactivated virus vaccine was developed. However, due to several disadvantages of inactivated virus vaccine such as lack of robust and long-lasting immune response, Adenovirus vector based vaccine approach was adapted for developing vaccine against CDV.
- For developing vaccines against CDV, adenovirus vector based approach has been adapted. pCMV-shuttle vector and pAdEasy-1 vector were used for making recombinant adenovirus plasmids targeting two genes of CDV – Hemagglutinin (HA) and Fusion (F) gene. Hemagglutinin is responsible for binding to cell receptors and initiating infection, while the fusion gene is responsible for fusion between the viral and host membrane and enables the virus to insert its genetic material into the host cell. The recombinant adenovirus plasmids containing HA and FW were prepared and confirmed by restriction digestion profile and sequencing (Figure 1).
- The recombinant adenovirus plasmids are now being propagated and evaluated *in vitro*. They were transfected in the HEK293T cell line using Lipofectamine 3000 and incubated until cytopathic effect was observed. After around 7 days, the cells along with media were collected and freeze-thawed 3-4 times to release virus particles from the cells. The cell lysate was then used to give infection to a new batch of HEK293T cells, and this was repeated till passage 4 to increase the viral titre (Figure 2). The presence of virus was confirmed in the infected cell lysate through PCR (Figure 3), copy number of virus was calculated through digital PCR and protein was confirmed by Western blotting.
- Currently, optimization studies to increase the virus titre are being carried out, after which vaccines will be proceeded for animal trials.

Key Outcomes/Lead

- Preparation of recombinant adenovirus plasmids containing Hemagglutinin and Fusion genes of CDV
- Transfection and subsequent infection of recombinant adenoviruses in HEK293T cells to increase virus titre
- Confirmation of recombinant adenoviruses by sequencing and digital PCR

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Madhvi Joshi
	Dr. Amrutlal Patel
Scientist:	Dr. Dhwani Jhala
JRF:	Chinmay Gadkari
	Harshita Sharma

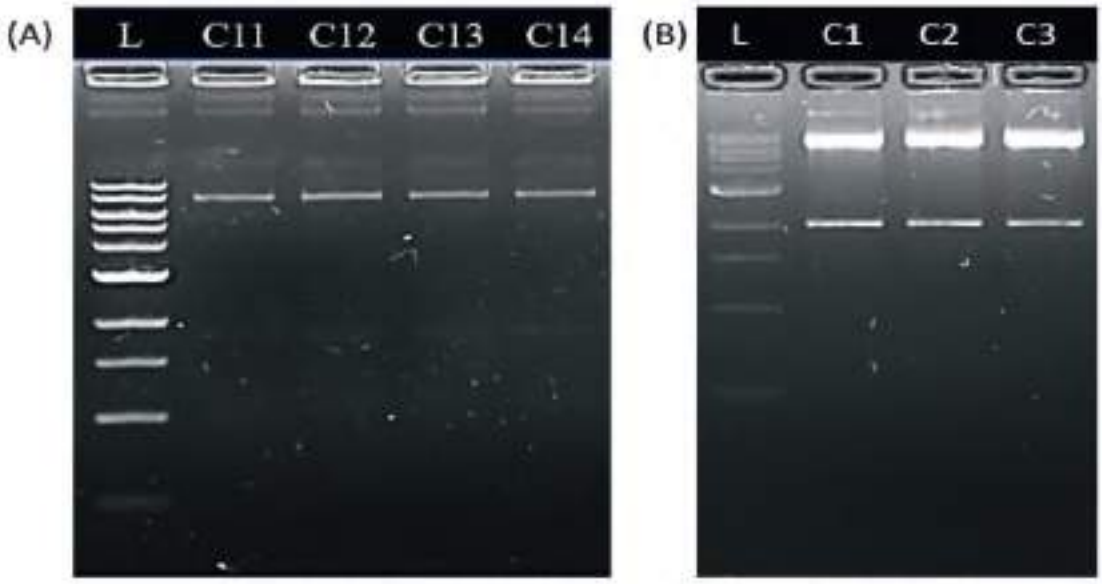
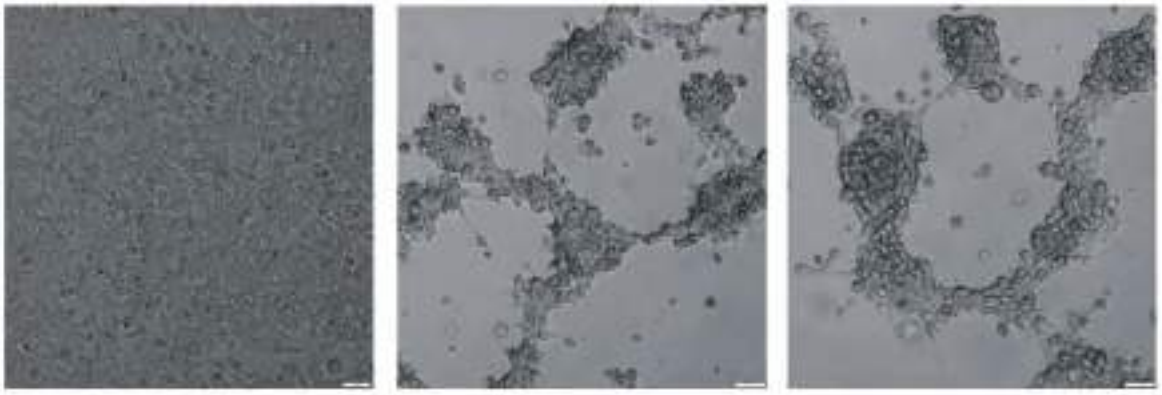


Figure 1: Confirmation of recombinant pShuttle-CMV plasmids through restriction digestion. (A) Gel image of digested pCMV/HA with KpnI and NotI showing expected bands of 7 kb and 1.9 kb. (B) Gel image of digested pCMV/Fusion with KpnI and NotI showing expected bands of 7 kb and 2.1 kb.



Control Day 7 | Recombinant Ad5/HA Day 7 | Recombinant Ad5/FW Day 7

Figure 2: Microscopic images of control HEK293T cells (left), cells infected with recombinant Ad5/CDV-HA (middle) and cells infected with recombinant Ad5/Fusion (right). Cells are showing cytopathic effect at day 7.2.1 kb.

Figure 3: Confirmation of CDV-HA and Fusion (FW) genes by PCR of the infected cell lysate.

Environmental
Biotechnology

Title of Project

Development of bioremediation technology for solid waste degradation: A case study on Pirana MSW dumping site

Funding Agency

Gujarat State Biotechnology Mission, Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 77,25,000/-

Total Duration

3 Years

Objectives in Brief

- Understanding microbes and their functional potential for waste degrading enzymes via metagenomics
- Biocatalyst based formulations for waste bioremediation
- Development of a microbial consortia for organic waste degradation

Project Progress

- In the last year, we studied the molecular mechanism of LDPE degradation by one of our isolate i.e. PNA1. We identified several genes with potential roles in plastic degradation. For control vs. test system, significantly upregulated genes on day 1 were majorly ribosomal proteins such as rpsA, ssrA, rplC, and rplA expressed with a significant fold change, genes such as pilQ, pilO, pilp, and fimV expressed belonged to pilus protein biogenesis and assembly, along with pilA for fimbrial assembly and chemotaxis protein CheA.
- A shift in the expression profile was observed on day 3, where the upregulated genes such as fadE, fadB, fadA, fadR, fadN, mmgC, mmgB were significantly expressed and are integral in pathways responsible for fatty acid degradation. Genes involved in the TCA cycle such as icd, iolA, mdh, and citZ were also expressed along with other genes involved in carbon metabolism.
- On day 7, another change in the gene profile was observed where the number of downregulated genes were more than the number of upregulated genes. The upregulated genes belonged to spore germination such as germ, gerE, general stress protein 13, spore coat protein, cotS, bacterial capsule synthesis protein PGA cap and endospore coat-associated protein yheD indicating stress and starving conditions the biological system.
- For control vs. test system upregulated genes were placed in 19 and downregulated genes were grouped in 21 COG categories for three sampling days. Most of the upregulated genes had unknown functions, followed by COG categories for translation, energy production-conversion, and cell wall/membrane/envelope biogenesis. Other important COG categories of interest included carbohydrate metabolism, lipid metabolism, intracellular trafficking and secretion, and amino acid metabolism and transport (Figure 1).
- Genes are mostly upregulated in the initial incubation period for the control vs. test system whereas, for test vs. test system, the number of upregulated genes were higher with respect to the test system of initial incubation days. On day 3 of the control vs. test system, all three pathways showed a maximum number of upregulated expressions of genes which were mostly downregulated on day 7 of the control vs. test system. On day 3 of control vs. test, most of the upregulated genes were involved in carbon metabolism, fatty acid degradation and TCA cycle altogether.
- Based on the results we propose a metabolic pathway of PN(A)1 for LDPE biodegradation (Figure 2).

Key Outcomes/Lead

- The dynamics of transcriptome during different days of incubation of the isolate with LDPE might help to screen and develop an engineered microbial system to further increase the efficiency and rate of biodegradation of LDPE. This study will establish mapping of the genetic framework expressed during LDPE biodegradation supporting microbial biodegradation as a sustainable method to reduce plastic waste pollution.

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Madhvi Joshi
Scientist:	Dr. Rameshchandra Pandit
RA:	Dr. Paritosh Parmar
SRF:	Sadik Dantroliya
	Zarna Patel
JRF:	Roshani K. Mishra
TA:	Priyank Chavda

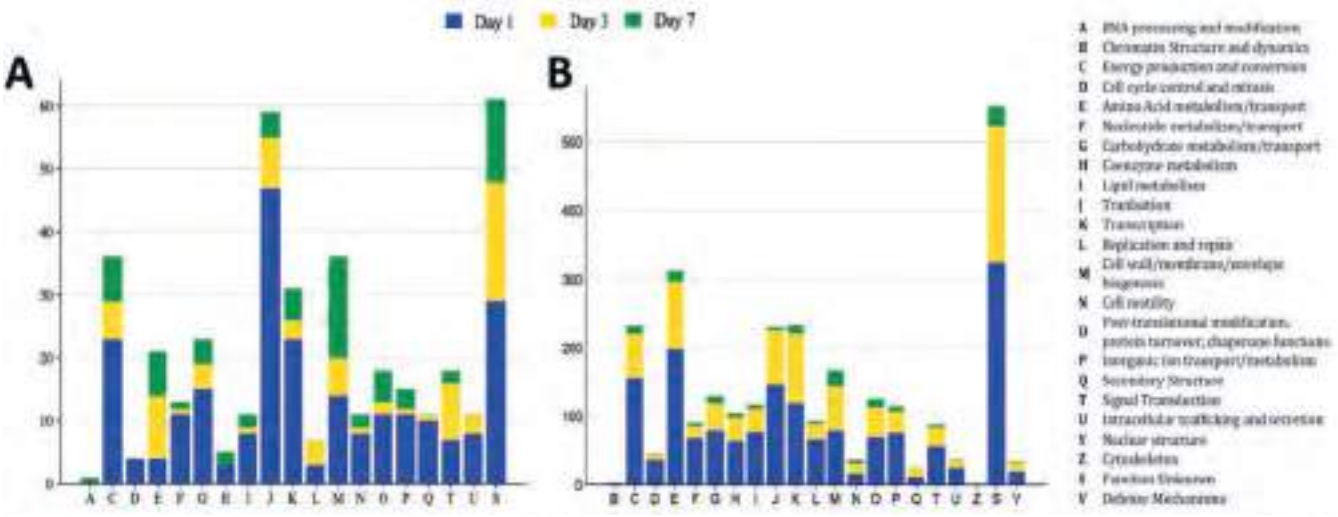


Figure 1: eggNOG categorization of upregulated DEGs into respective COG groups for analysis carried out between control vs. test system of day 1, day 3 and day 7 individually represented by colour coded stacked bars in the graph. Y-axis represents gene count of DEGs, and X-axis denotes abbreviations for COG categories defined in the legend. Graph A signifies COG categorization of upregulated genes and Graph B represents downregulated genes.

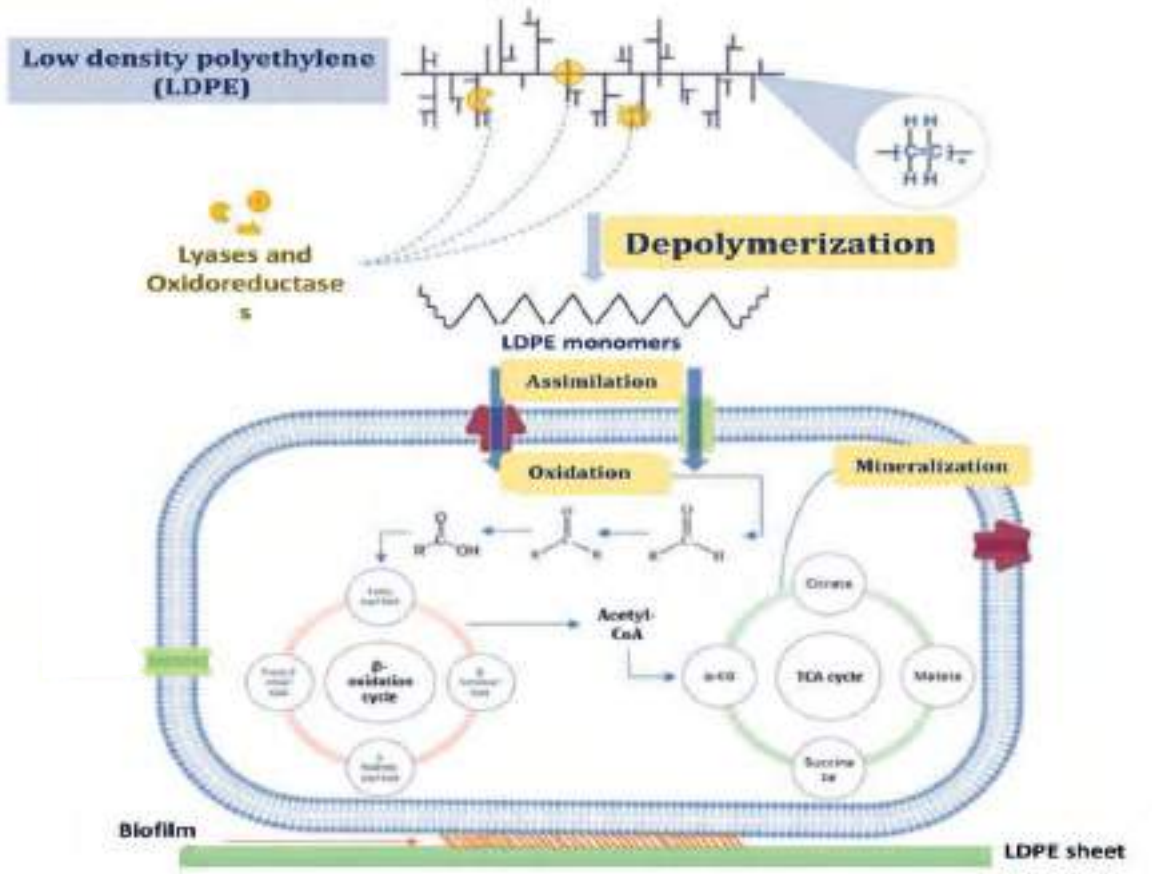


Figure 2: Proposed schematic representation of metabolic pathways of PN(A)1 for LDPE biodegradation. The figure represents three major biodegradation steps of depolymerization, assimilation and mineralization through fatty acid oxidation and TCA cycle.

Title of Project

Development of neural network models by innovatively expanding conventional WBE dataset for the monitoring of variability of COVID-19, variants of SARS-CoV-2, and anti-drug resistance in four major cities of India

Funding Agency

Science and Engineering Research Board, Government of India

Grant

Rs. 14,21,000/-

Total Duration

1 Year

Objectives in Brief

- To establish the methodology of WBE with good sensitivity and reliability
- To apply the developed approach for comparison of prevalent SARS-CoV-2 variants among different (four) cities of India
- To produce long-term monitoring database on the spatial and temporal variability of COVID-19, variants of SARS-CoV-2 and ADR

Project Progress

- The wastewater-based SARS-CoV-2 surveillance has been carried out in Ahmedabad city since initiation of the project i.e. July, 2022 onwards. The wastewater samples from seven different sewage sites of Ahmedabad such as i.e. Maninagar SPS, Jamalpur SPS, Pirana SPS, Ambawadi SPS, Vasana SPS, Vinzol STP and Vasna STP were collected on a weekly once basis at early morning hours.
- The SARS-CoV-2 surveillance using wastewater samples of Ahmedabad city has suggested the sharp increase in the average viral RNA copies per litre of the wastewater samples in the month of March, 2023 with highest average RNA copies of around 35,000 per litre in sewage samples of 16th March, 2023.
- Accordingly, the active COVID-19 cases in the city were also observed to be increased from initiation of the March, 2023 with highest active cases reported on 2nd April, 2023. Thus, wastewater based surveillance could give an early intimation of the COVID-19 cases with a lead period of around 15 days. Currently, the viral RNA load has shown to be decreased after mid-April, 2023, which was also correlated with the continuously decreasing active cases in the Ahmedabad city. (https://gujcovid19.gujarat.gov.in/).
- The whole genome sequencing of the positive samples was processed and obtained data were analysed using the Freyja pipeline for identifying novel variants. In the month of February, lineage B.A.2.37 has showed more prevalence while the samples of April, 2023 have shown major dominance of XBB.1.16 lineages i.e. XBB.1.16.4 and XBB.1.16.5 which are correlated with clinical case scenarios for particular locations.

Key Outcomes/Lead

- The 220 wastewater samples of Ahmedabad city were processed for sample concentration and virus quantification by dPCR assay.
- WBE based surveillance has shown around 12-14 days of lead period in detection of COVID-19 clinical cases in the city.
- WGS analysis of the SARS-CoV-2 from wastewater samples have shown correlation in the genomic variants compared to clinical cases for Ahmedabad city.

Publication / Patent

- NA

Manpower Detail

PI: Dr. Madhvi Joshi
Co-PI: Dr. Bhumika Prajapati

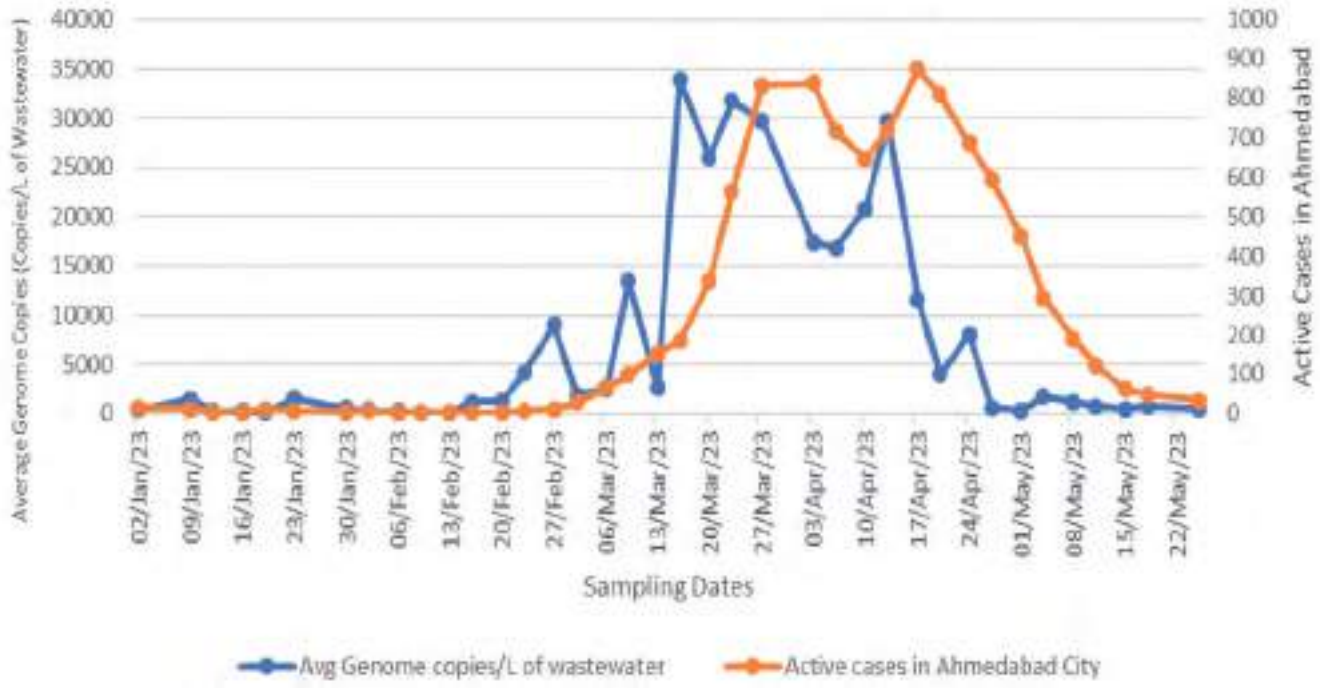


Figure 1: The correlation graph of average viral genome copies of all sampling locations to active clinical cases of the Ahmedabad city. The viral copies in sewage samples have shown 12-14 days of lead period ahead of peak in the clinical cases of the city.

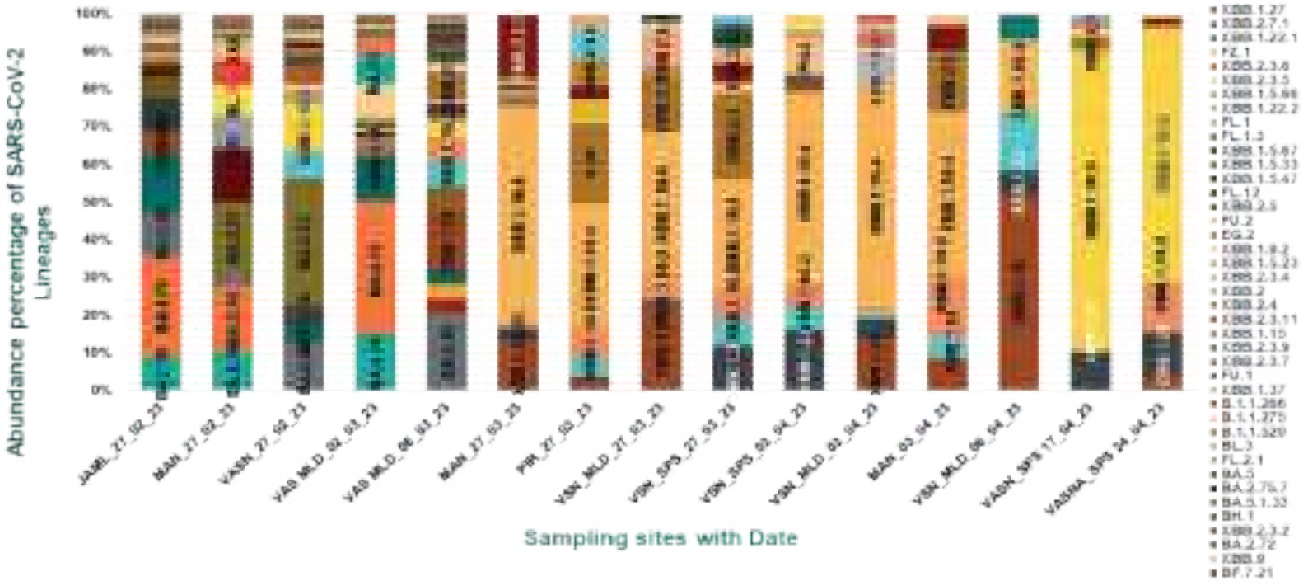


Figure 2: SARS-CoV-2 genome variant analysis in various sampling sites of Ahmedabad city from the start of February-2023. In February, BA.2.74 was prevalent while in March and April, the highest frequency of XBB.1.16 was observed in the city.

Title of Project

Genomic surveillance of SARS-CoV-2 in India: Indian SARS-CoV-2 genomics Consortium (INSACOG)-Phase II for sewage surveillance

Funding Agency

Department of Biotechnology, Government of India, India

Grant

Rs. 69,31,000/-

Total Duration

1 Year

Objectives in Brief

- To access the SARS-CoV-2 viral load in wastewater samples from sewage treatment plants (STPs) using RT-qPCR
- Whole genome sequencing and analysis of RT-qPCR positive samples for analysing new genomic variants
- Sequence informatics: identification and reporting of new genomic variants of SARS-CoV-2

Project Progress

- The wastewater-based SARS-CoV-2 surveillance has been carried out in major cities of Gujarat state i.e. Gandhinagar, Vadodara, Rajkot as a part of INSACOG surveillance. The wastewater samples have been collected from seven different sewage sites which are mentioned as below:

City	Collection Sites
Gandhinagar	Kudasan SPS, Raysan SPS, Sargasan SPS, Vavol SPS and Jaspur STP
Vadodara	Twelve Different STPs named Atladra new, Atladra old, Bhayli, Chhani 21 MLD, Chhani 50 MLD, Gajarawadi, Kapurai 45 MLD, Kapurai 60 MLD, Rajivnagar, Sayaji Garden, Tarsali and Vemali
Rajkot	Six different STPs named Raiyadhar, Raiya Village, Gauriwad, Kothariya, Madhapar 80 MLD and Madhapar 44.5 MLD
Junagadh	Lodhiyawadi, Wadla Fatak, Zanzarda, Dolatpara and Khalilpur Chowkdi
Jamnagar	One SPS Navagam

- The environmental surveillance of SARS-CoV-2 from wastewater samples of Gandhinagar city has suggested the spike in the average viral RNA copies in the month of March, 2023 with highest viral copies of around 65000 per litre of wastewater on 16th March, 2023. Accordingly, weekly active cases in the city were also increased gradually with highest cases reported on 7th April, 2023. The samples of Vadodara have also shown an increase in the viral RNA copies of the wastewater samples since March, 2023 with highest viral copies of 1,00,000 per litre on 3rd April, 2023 (Gujcovid19.gujarat.gov.in). According to the viral copies, active cases of the city have also shown to be increased with highest cases reported on 22nd April, 2023. In the Rajkot city, samples of March, 2023 have shown significant increase in the viral RNA copies per litre of the wastewater samples since March, 2023 with highest viral copies of 18,000 on 9th March, 2023. According to the viral copies, active cases of the city have also shown to be increased with highest cases reported on 6th April, 2023.

Key Outcomes/Lead

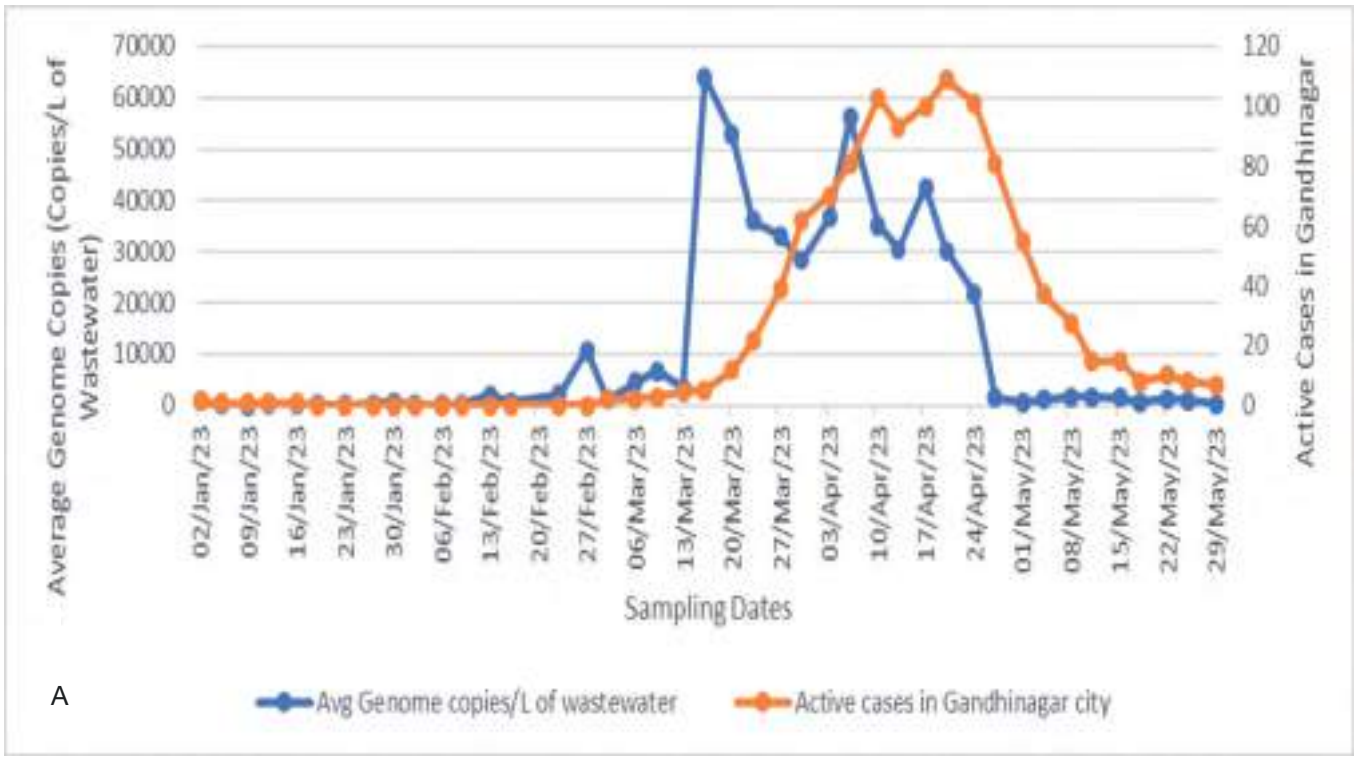
- The wastewater samples of Gandhinagar, Vadodara and Rajkot city were processed for sample concentration and virus quantification by quantitative PCR assay.
- WBE based surveillance has shown around 12-14 days of lead period in detection of COVID-19 clinical cases in all three major cities of Gujarat studied in the present project.
- WGS analysis of the SARS-CoV-2 from wastewater samples have shown correlation in the genomic variants compared to clinical cases for Gandhinagar and Vadodara city.

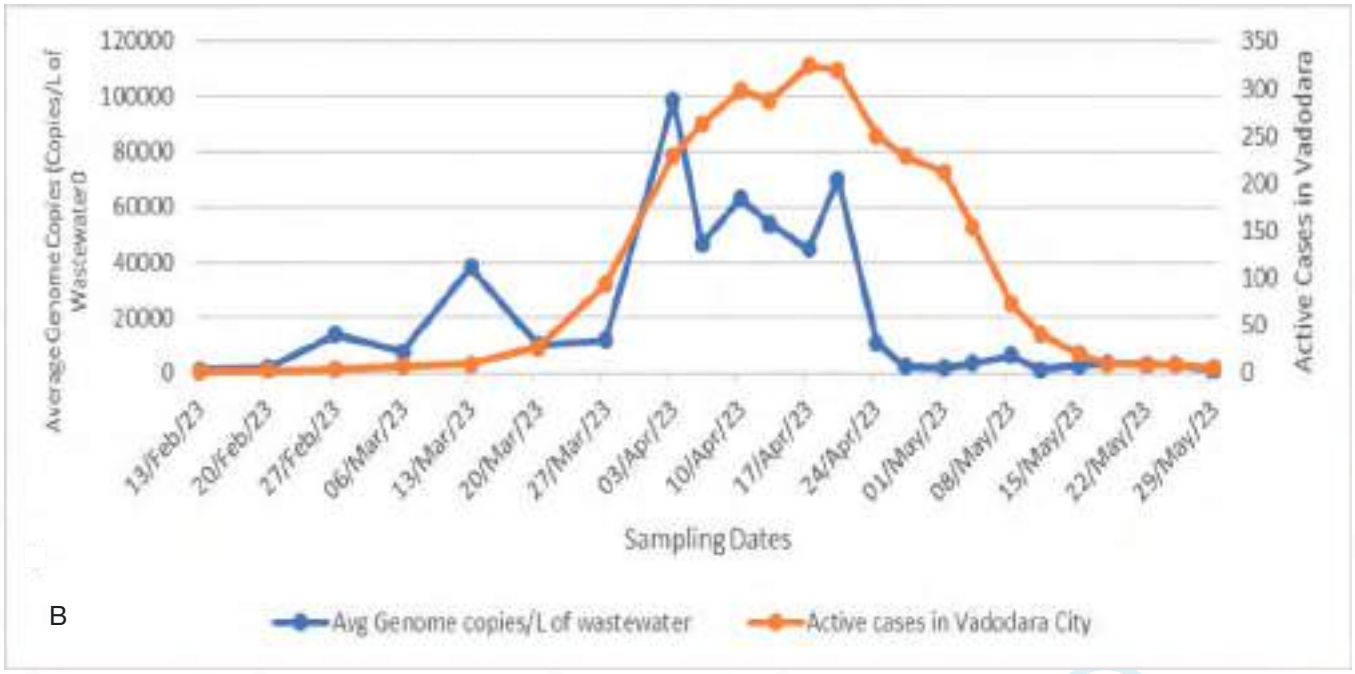
Publication / Patent

- NA

Manpower Detail

PI:	Dr. Madhvi Joshi
Scientist:	Dr. Bhumika Prajapati
Project Associate:	Jill Gada
	Janki Pandya
	Mitul Mali
Project Assistant:	Harshal Purohit


Average Genome Copies (Copies/L of Wastewater)
70000
60000
50000
40000
30000
20000
10000
0
120
100
80
60
40
20
0
Active Cases in Gandhinagar
02/Jan/23
09/Jan/23
16/Jan/23
23/Jan/23
30/Jan/23
06/Feb/23
13/Feb/23
20/Feb/23
27/Feb/23
06/Mar/23
13/Mar/23
20/Mar/23
27/Mar/23
03/Apr/23
10/Apr/23
17/Apr/23
24/Apr/23
01/May/23
08/May/23
15/May/23
22/May/23
29/May/23
Sampling Dates
A
Avg Genome copies/L of wastewater
Active cases in Gandhinagar city


Average Genome Copies (Copies/L of Wastewater0
120000
100000
80000
60000
40000
20000
0
350
300
250
200
150
100
50
0
Active Cases in Vadodara
13/Feb/23
20/Feb/23
27/Feb/23
06/Mar/23
13/Mar/23
20/Mar/23
27/Mar/23
03/Apr/23
10/Apr/23
17/Apr/23
24/Apr/23
01/May/23
08/May/23
15/May/23
22/May/23
29/May/23
Sampling Dates
B
Avg Genome copies/L of wastewater
Active cases in Vadodara City

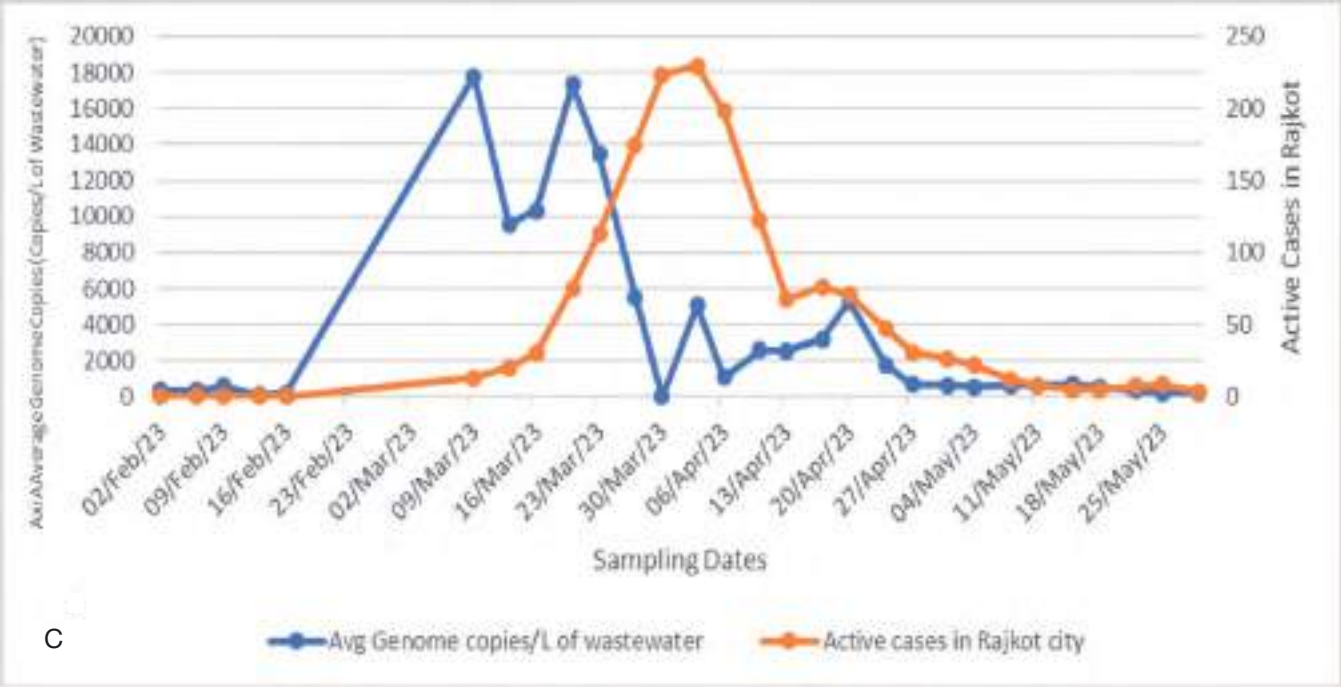


Figure 1: The correlation graph of average viral genome copies of all sampling locations to active clinical cases A) Gandhinagar; B) Vadodara and C) Rajkot city. The viral copies in sewage samples have shown 12-14 days of lead period ahead of peak in the clinical cases of the city.

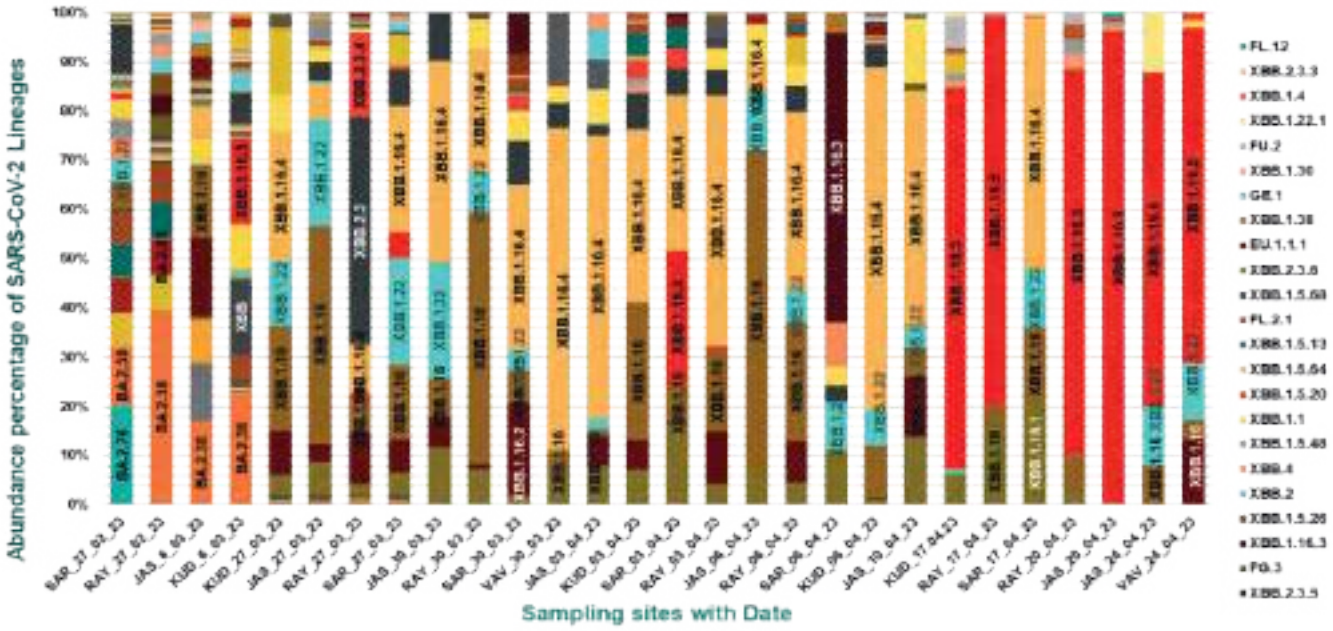


Figure 2: SARS-CoV-2 genome variant analysis in various sampling sites of Ahmedabad city from the start of February-2023. In February, BA.2.74 was prevalent while in March and April, the highest frequency of XBB.1.16 was observed in the city.


GUJARAT BIOTECHNOLOGY
RESEARCH CENTRE
GBRC
TRANSLATING
INDUSTRIAL
BIOTECHNOLOGY

Title of Project

Scale up production of important biopharmaceuticals: Recombinant tissue plasminogen activator (tPA) and hyaluronidase

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 32,00,000/-

Total Duration

3 Years

Objectives in Brief

- Development of important biopharmaceuticals like tPA and hyaluronidase enzymes
- Cloning of tPA and hyaluronidase gene constructs in pET28a expression vector
- Expression, purification and activity studies
- Media optimization studies
- Optimization of scale up for bioreactor level production of recombinant tPA and Hyaluronidase
- Optimization of downstream processing for tPA and hyaluronidase purification from bulk pellet

Project Progress

- The project has made significant progress in the preparation and cloning of the tissue plasminogen activator (tPA) gene. Initially, tPA cDNA was prepared from the mRNA of placental epithelial cells, which are known to have a high concentration of tPA mRNA.
- The tPA gene was then amplified using gene-specific primers. Subsequently, the tPA gene was cloned into two different vectors: the cloning vector pDRIVE using TA cloning and the pET28a expression vector using conventional cloning methods. For the conventional cloning, primers were designed with specific restriction sites to enable directional cloning into the pET28a vector. These primers were then transformed into the cloning host, *E. coli* Top10.
- Plasmid was isolated from the cloning host and transformed into an expression host Rosetta gami2 cells for overproduction.

Key Outcomes/Lead

- Recombinant tissue plasminogen activator protein has been successfully expressed and purified.
- The activity of the recombinant protein has been confirmed.

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Niraj Kumar Singh
Co-PI:	Dr. Amrutlal Patel
Scientist:	Dr. Haidar Abbas Masi
JRF:	Meha Bhatt
	Bhoomi Italiya

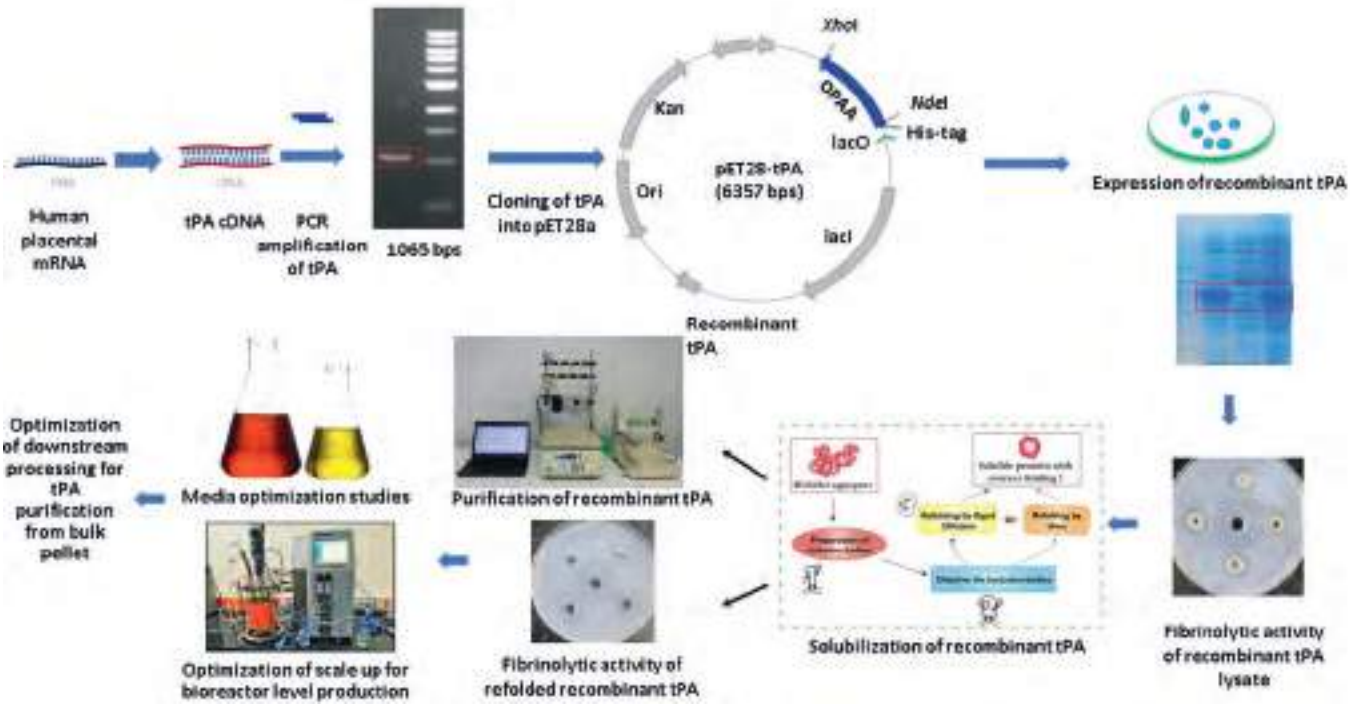


Figure 1: Experimental procedure to produce recombinant tPA.

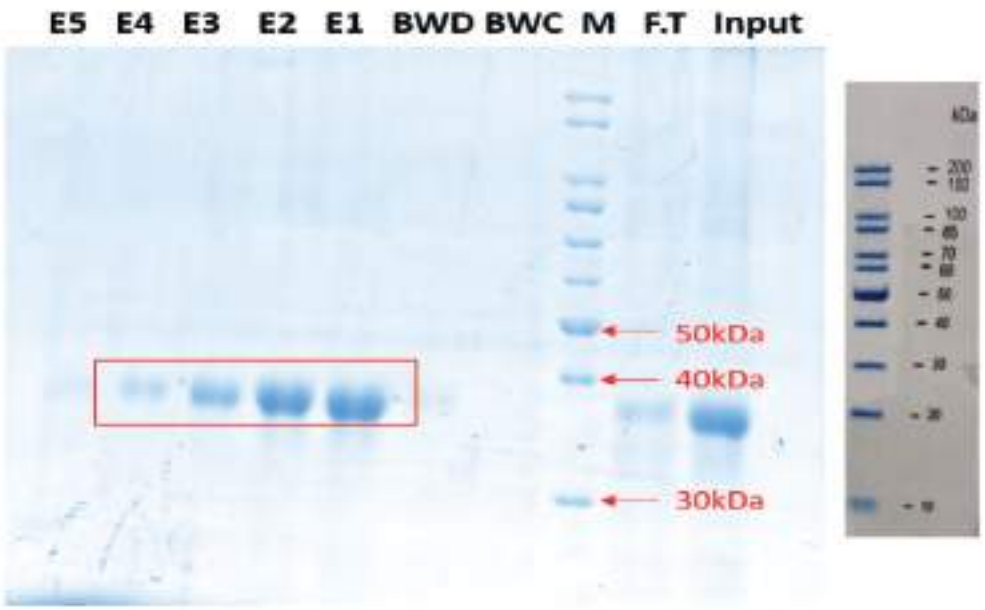


Figure 2: Expression of recombinant tPA, post IPTG induction, in Rosetta gami2 cells andPurification of recombinant tPA, using Ni-NTA resin and gravity flow columns.

Title of Project

Technology development for Nattokinase production

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 32,00,000/-

Total Duration

3 Years

Objectives in Brief

- Screening and amplification of Nattokinase gene from host bacterium
- Cloning of Nattokinase in expression vector and expression host
- Experiments of protein expression and protein purification protocols
- Protein purification using Ni-NTA affinity chromatography
- Protein activity assays
- CCD and RSM for media optimization for the overproduction of recombinant protein

Project Progress

- The protein purification protocol was optimized using Fast Protein Liquid Chromatography (FPLC) to achieve optimal stability. Fibrinolytic activity assessment was conducted to assess the protein's ability to dissolve fibrin clots.
- Media components were optimized using the Response Surface Methodology (RSM) to increase protein production. Physiological parameters like pH, temperature, incubation time and IPTG concentration were systematically varied for enhanced protein yield.
- Large-scale production was conducted using a 5-liter bioreactor allowing for increased capacity and scalability.

Key Outcomes/Lead

- Recombinant Nattokinase was produced using a 5-liter bioreactor, enhancing capacity and scalability.
- Optimized purification protocol, activity assessment and media components were employed for large-scale production.

Publication / Patent

- Modi, A., Raval, I., Doshi, P., Joshi, M., Joshi, C. and Patel, A.K., 2023. Heterologous expression of recombinant Nattokinase in *Escherichia coli* BL21 (DE3) and media optimization for overproduction of Nattokinase using RSM. Protein expression and purification, 203, p.106198.

Manpower Detail

PI:	Dr. Amrutlal K Patel
Scientist:	Dr. Ishan Raval
RA:	Akhilesh Modi

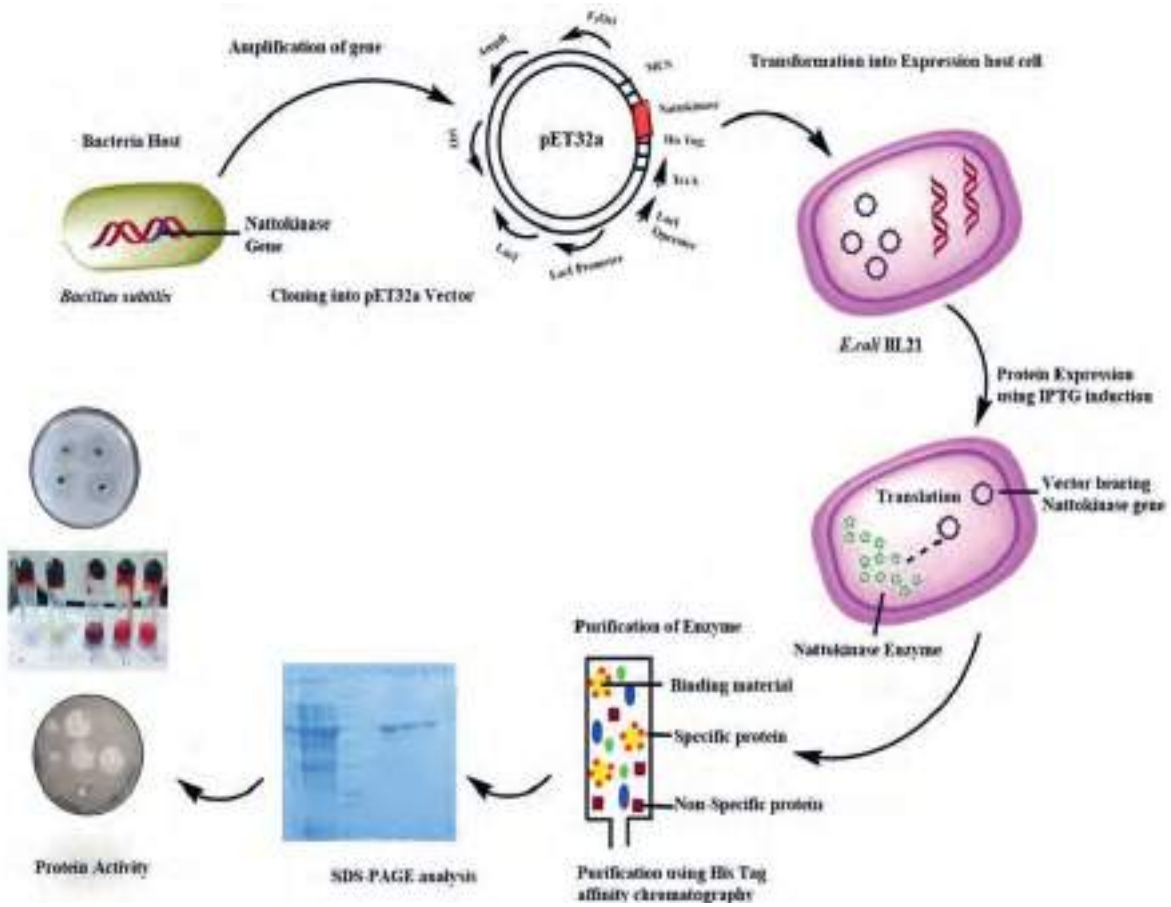


Figure 1: Process for production of Nattokinase.

Title of Project

MetaXtreme: Discovery of 10 hyper-thermostable enzymes

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 55,00,000/-

Total Duration

3 Years

Objectives in Brief

- Microbiological exploration of hot spring at Tuva Timba by culturable and non-culturable approaches
- Metagenomic analysis exploring taxonomic and functional diversity of soil and water microbial communities in hot spring
- Isolation and screening of bacteria for the production of hyper thermostable enzymes

Project Progress

- Cloning of rm-α-amylase, Alpha-glucosidase, Beta-glucosidase and Alpha- xylosidase was done in vector pET32a obtained from Tuwa hot spring metagenome. Optimization for protein expression in *E. coli* BL21 was completed for all four enzymes. In detail study for characterization of rm-α-amylase was carried out and the enzyme was multifunctional with agarase, cellulase, xylanase, alginate lyase and pectinase activities.
- 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. This is the first report of a new, multifunctional, thermostable amylase that was discovered from the hot-spring metagenomes.
- Owing to their multi-functionality, 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. Isolates MX23- Brevibacillus agri and MX26- Bacillus safensis were characterized by phenotypic and genotypic correlation for metabolite degradation pathway using Biolog and WGS sequencing analysis.

Key Outcomes/Lead

- Identification, cloning and characterization of multifunctional rm-α-amylase from Tuwa hot spring metagenome
- Genotypic and phenotypic correlation of isolates for the important enzymes

Publication / Patent

- Vora, D., Shekh, S., Joshi, M., Patel, A. and Joshi, C.G., 2023. Taxonomic and functional metagenomics profiling of Tuwa and Unnai hot springs microbial communities. Ecological Genetics and Genomics, 26, p.100160.

Manpower Detail

PI:	Prof. Chaitanya G. Joshi
Co-PI:	Dr. Niraj Kumar Singh
Scientist:	Dr. Satyamitra Shekh
RA:	Dr. Krishna Bharwad
JRF:	Aditi Dube
	Zeba Jiva Khan

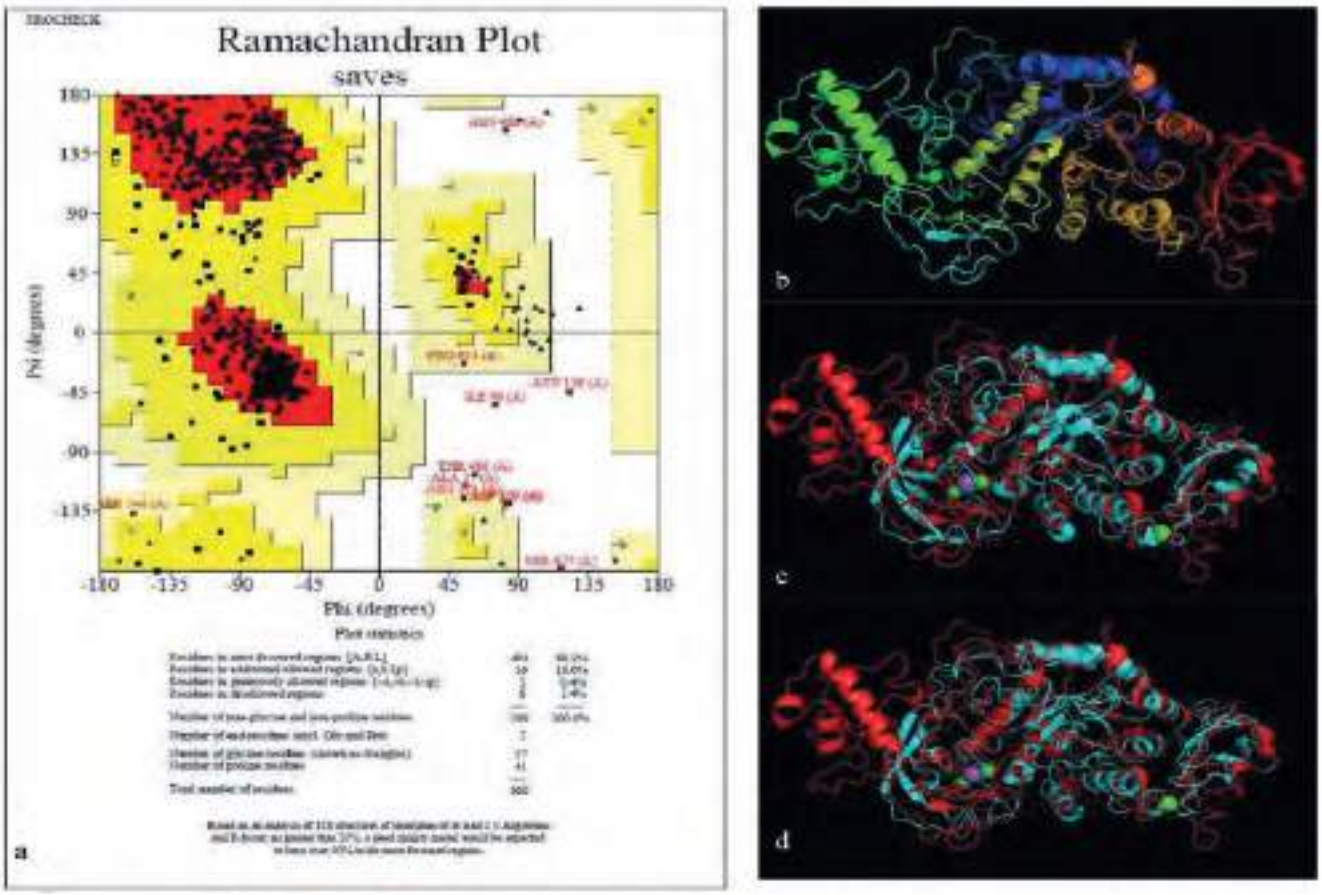


Figure 1: Structure of r-a-amylase predicted using SWISS PROT, refined using Galaxy Web Refine server, analyzed using PROCHECK for: a. Ramchandran plot. b. Protein structure visualization was done using PyMol for rm-a-amylase. Superimposed structure of rm-a-amylase with a-amylase from c. *Geoacillus stearothermaphilus* and d. *Bacillus licheniformis* is shown.

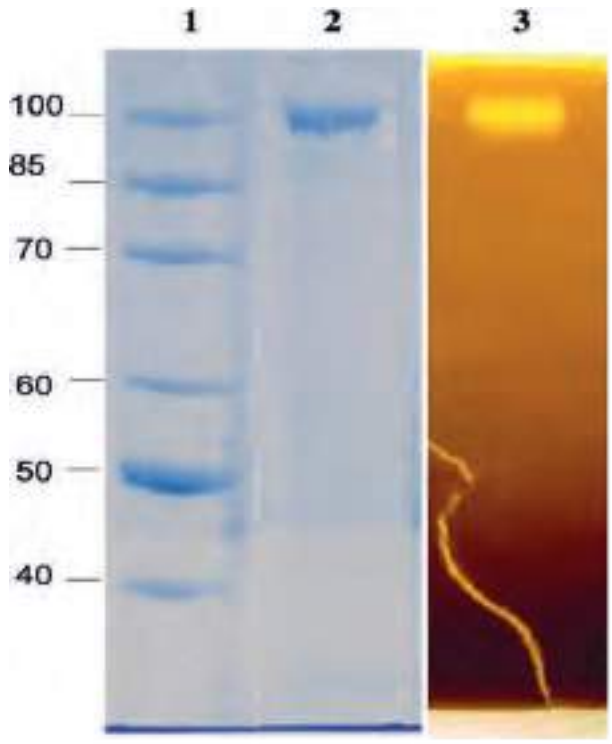


Figure 2: SDS PAGE for induction of protein expression: Purification of recombinant rm-α-amylase.
Lane 1 - Marker
Lane 2 - Elution using Imidazole containing buffer
Lane 3 - Zymography on starch SDS-PAGE.

Title of Project

Gujarat repository of biomolecules

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 55,00,000/-

Total Duration

5 Years

Objectives in Brief

- Screening of the microbial resource for Biomolecules
- Extraction, purification, and characterization of biomolecules
- Isolation of fungi causing dermatophytosis
- Antifungal activity of metabolites of microbial origin against dermatophytes

Project Progress

- Pigment from the bacterium *Serratia marcescens* was extracted from the culture biomass using acidified methanol and purified using chloroform. The pigment was identified using HPLC and characterized for various applications.
- Antimicrobial activity against *Escherichia coli, Staphylococcus aureus and Candida albicans* was performed by well diffusion method. Antioxidative properties, cell line inhibition assay and staining property of the extracted pigment were also studied. Prodigiosin was able to scavenge DPPH radicals and ascorbate autoxidation inhibition thereby can reduce oxidative damage caused by free radicals.
- Prodigiosin pigment exert cell line inhibition as observed by MTT assay. Solid state fermentation experiments were carried out to produce the pigment using industrial waste products as a substrate.
- Different factors affecting pigment production such as temperature, incubation time, initial moisture content and surface area are under study.

Key Outcomes/Lead

- Pigment from *Serratia marcescens* was extracted and identified using HPLC. Characterization of the pigment Prodigiosin was done for antimicrobial activity, antioxidative activity and anticancer activity.

Publication / Patent

- NA

Manpower Detail

PI:	Prof. Chaitanya G. Joshi
Co-PI:	Dr. Niraj Kumar Singh
Scientist:	Dr. Satyamitra Shekh
	Dr. Bhumika Prajapati
TA:	Dr. Dalipsingh Rathore

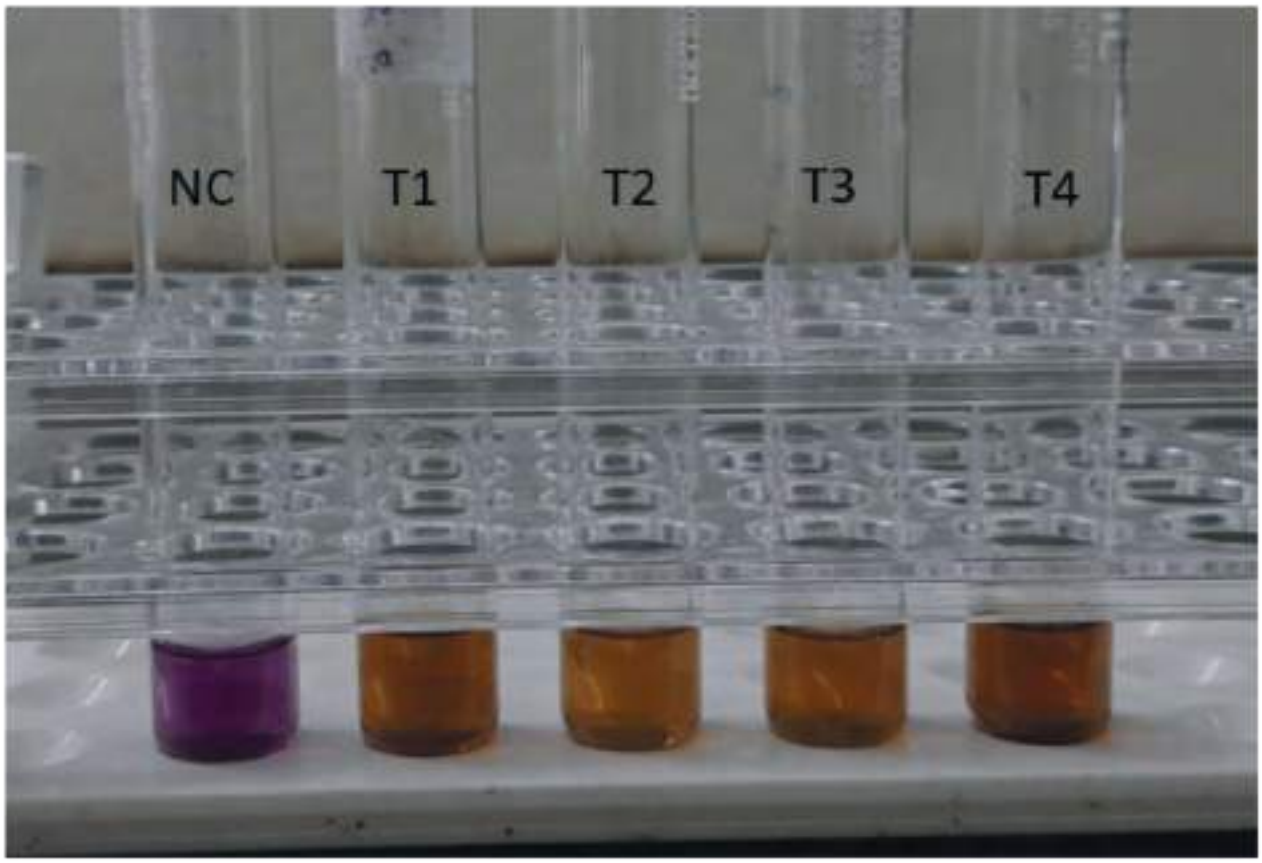


Figure 1: Antioxidative activity of pigment Prodigiosin by DPPH radical scavenging assay (NC-Negative control; and test samples 1 to 4 includes Prodigiosin pigment).

HEALTHCARE
Biotechnology

Title of Project

Genomic Surveillance for SARS-CoV-2 In India (Indian SARS-CoV-2 Genomics Consortium) INSACOG phase-I

Funding Agency

Department of Biotechnology, Government of India, India

Grant

Rs. 2,51,70,430/-

Total Duration

1 Year

Objectives in Brief

- Surveillance of SARS-CoV-2 variants
- To understand the impact of SARS-CoV-2 mutations with relevance to its transmissibility, immune escape, disease severity and diagnosis

Project Progress

- As part of this consortium, GBRC has processed total 15,866 (39.55%) COVID-19 positive samples out of total 40,111 samples received. Out of 15,866 total samples processed, 6,117 samples could pass the QC parameters and sequencing result of same has been updated on the NCBI as SRA, and the SARS-CoV-2 genome sequences on GISAID. The mutation details and lineage information has been updated on IHIP portal. Time to time, the data was also share with Gujarat State Health department. We also developed a dashboard available at https://covid.gbrc.res.in/ where one can access all the information.
- We developed a simple and quick one-step duplex polymerase chain reaction (PCR) assay for detection of Omicron variants of SARS-CoV-2. This low cost, and rapid assay can be used for the timely monitoring of the Omicron variant of SARS-CoV-2. If developed further, on a commercial scale, this form of assay has a huge commercial value.

Key Outcomes/Lead

- GBRC was the first in India to report Omicron variant of SARS-CoV-2.
- We developed a low cost, and rapid PCR assay for the detection of Omicron variant of SARS-CoV-2.

Publication / Patent

- Chaudhari, A.M., Singh, I., Joshi, M., Patel, A. and Joshi, C., 2023. Defective ORF8 dimerization in SARS-CoV-2 delta variant leads to a better adaptive immune response due to abrogation of ORF8-MHC1 interaction. Molecular Diversity, 27(1), pp.45-57.
- Kumar, D., Pandit, R., Sharma, S., Raval, J., Patel, Z., Joshi, M. and Joshi, C.G., 2022. Nasopharyngeal microbiome of COVID-19 patients revealed a distinct bacterial profile in deceased and recovered individuals. Microbial Pathogenesis, 173, p.105829.
- Kumar, D., Antiya, S.P., Patel, S.S., Pandit, R., Joshi, M., Mishra, A.K., Joshi, C.G. and Patel, A.C., 2022. Surveillance and molecular characterization of SARS-CoV-2 infection in non-human hosts in Gujarat, India. International Journal of Environmental Research and Public Health, 19(21), p.14391.
- Joshi, C., Chaudhari, A., Joshi, C., Joshi, M. and Bagatharia, S., 2022. Repurposing of the herbal formulations: molecular docking and molecular dynamics simulation studies to validate the efficacy of phytocompounds against SARS-CoV-2 proteins. Journal of Biomolecular Structure and Dynamics, 40(18), pp.8405-8419
- Joshi, M., Kumar, M., Srivastava, V., Kumar, D., Rathore, D.S., Pandit, R., Graham, D.W. and Joshi, C.G., 2022. Genetic sequencing detected the SARS-CoV-2 delta variant in wastewater a month prior to the first COVID-19 case in Ahmedabad (India). Environmental Pollution, 310, p.119757.
- Pandit, R., Singh, I., Ansari, A., Raval, J., Patel, Z., Dixit, R., Shah, P., Upadhyay, K., Chauhan, N., Desai, K. and Shah, M., 2022. First report on genome wide association study in western Indian

population reveals host genetic factors for COVID-19 severity and outcome. Genomics, 114(4), p.110399.
- Kumar, M., Joshi, M., Jiang, G., Yamada, R., Honda, R., Srivastava, V., Mahlknecht, J., Barcelo, D., Chidambram, S., Khursheed, A. and Graham, D.W., 2023. Response of wastewater-based epidemiology predictor for the second wave of COVID-19 in Ahmedabad, India: A long-term data Perspective. Environmental Pollution, 337, p.122471.
- Raghwani, J., Du Plessis, L., McCrone, J.T., Hill, S.C., Parag, K.V., Thézé, J., Kumar, D., Puvar, A., Pandit, R., Pybus, O.G. and Fournié, G., 2022. Genomic epidemiology of early SARS-CoV-2 transmission dynamics, Gujarat, India. Emerging Infectious Diseases, 28(4), p.751.
- Loney, T., Khansaheb, H., Ramaswamy, S., Harilal, D., Deesi, Z.O., Varghese, R.M., Belal Al Ali, A., Khadeeja, A., Al Suwaidi, H., Alkhajeh, A. and Mohamed AlDabal, L., 2022. Genotype-phenotype correlation identified a novel SARS-CoV-2 variant possibly linked to severe disease. Transboundary and Emerging Diseases, 69(2), pp.465-476.
- Chaudhari, A.M., Joshi, M., Kumar, D., Patel, A., Lokhande, K.B., Krishnan, A., Hanack, K., Filipek, S., Liepmann, D., Renugopalakrishnan, V. and Paulmurugan, R., 2022. Evaluation of immune evasion in SARS-CoV-2 Delta and Omicron variants. Computational and Structural Biotechnology Journal, 20, pp.4501-4516.

Manpower Detail

PI:	Dr. Madhvi Joshi
Scientist:	Dr. Rameshchandra Pandit
Project Associate-II:	Jinal Thakor
	Unnati Panchal

Figure 1: Results of Omicron specific duplex PCR assay. Conclusive image showing detecting of omicron and other SARS-CoV-2 variants. Sample having Omicron will show specific ~250 bp band amplified because of omicron specific primer set while other variants will amplify only ~450 bp band. PC stands for positive control (known template of omicron and non-omicron variants), NC stands for negative control showing COVID-19 positive but other than Omicron and NTC stands for no-template control.

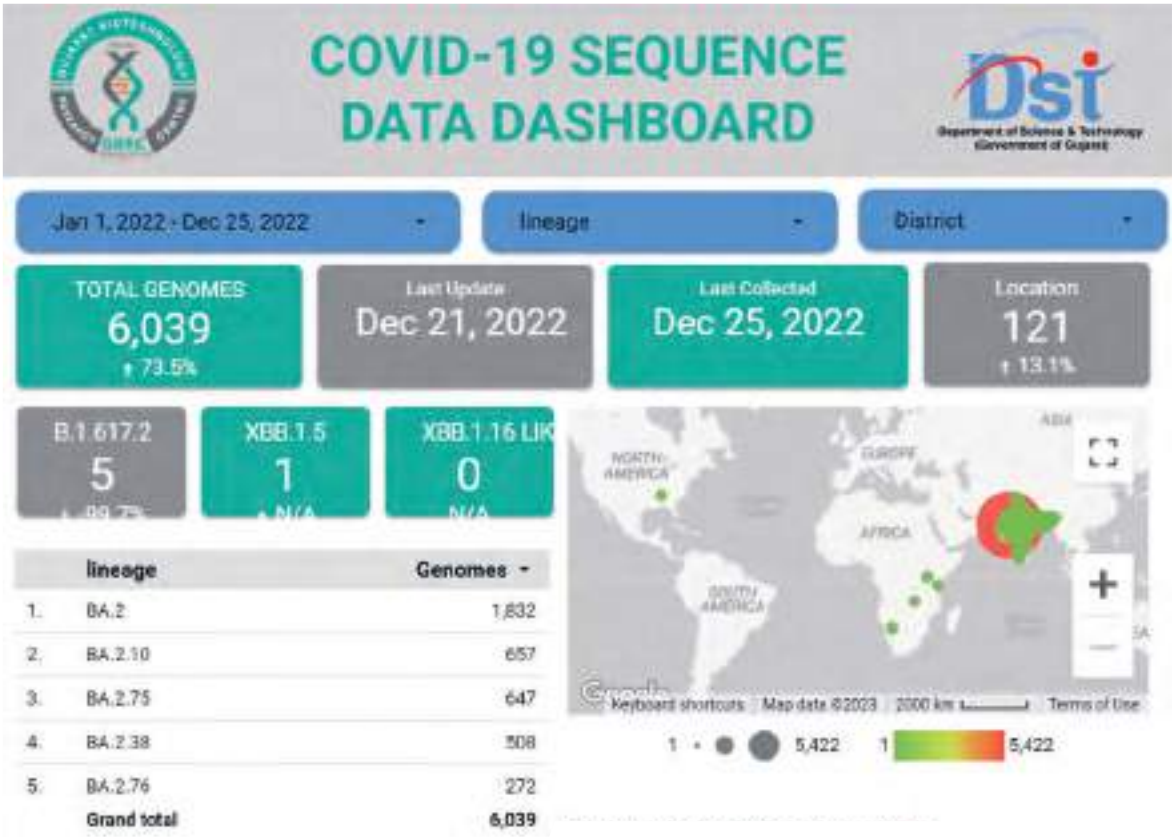


Figure 2: GBRC COVID dashboard available at https://covid.gbrc.res.in/.

Title of Project

Genomic Surveillance for SARS-CoV-2 in India (Indian SARS-CoV-2 Genomics Consortium) INSACOG phase-II

Funding Agency

Department of Biotechnology, Government of India, India

Grant

Rs. 18,61,600/- + Rs. 5000/- per SARS-CoV-2 genome sequenced

Total Duration

1 Year

Objectives in Brief

- Surveillance of SARS-CoV-2 variants
- To understand the impact of SARS-CoV-2 mutations with relevance to its transmissibility, immune escape, disease severity and diagnosis

Project Progress

- As part of this consortium, during last 10 months, GBRC has processed total 1,927 (24.72%) COVID-19 positive samples out of total 7,795 samples received. Out of 1,927 total samples processed, 1,810 samples could pass the QC parameters and sequencing result of same has been updated on the NCBI as SRA, and the SARS-CoV-2 genome sequences on GISAID. The mutation details and lineage information has been updated on IHIP portal. Time to time, the data was also share with Gujarat State Health Department. We also developed a dashboard available at https://covid.gbrc.res.in/ where one can access all the information. During this period, we identified around 38 different SARS-CoV-2 lineages (Table 1). Among these, top 10 are shown in Figure 1.
- Sequencing of SARS-CoV-2 genomes will help in identifying the novel emerging variants of concern (VOC) or variant of significance (VOS) viral strains. This will help in deciding COVID-19 management strategies and policies. Further, the information about the novel mutations will be helpful in developing new vaccines and therapeutics. Multi-epitope vaccine design has significant potential in the development of effective and safe vaccines against COVID-19, which can provide broad protection, stimulate a strong immune response, reduce side effects, and enable faster development and global access.
- Multi-epitope vaccine construct of COVID-19 major VOCs and VOIs: Multiepitope vaccine design for COVID-19 has the potential to provide several advantages such as broader protection, enhanced immune response, faster development, improved global access: A multi-epitope vaccine can be tailored to different regions, making it accessible to diverse populations.

Key Outcomes/Lead

- Using *in silico* approach, we have developed a multiepitope vaccine for the SARS-CoV-2.

Publication / Patent

- NA

Manpower Detail

Project coordinator/PI:	Dr. Madhvi Joshi
Scientist:	Dr. Rameshchandra Pandit
	Dr. Apurvasinh Puvar
Project Associate-II:	Jinal Thakor
	Unnati Panchal

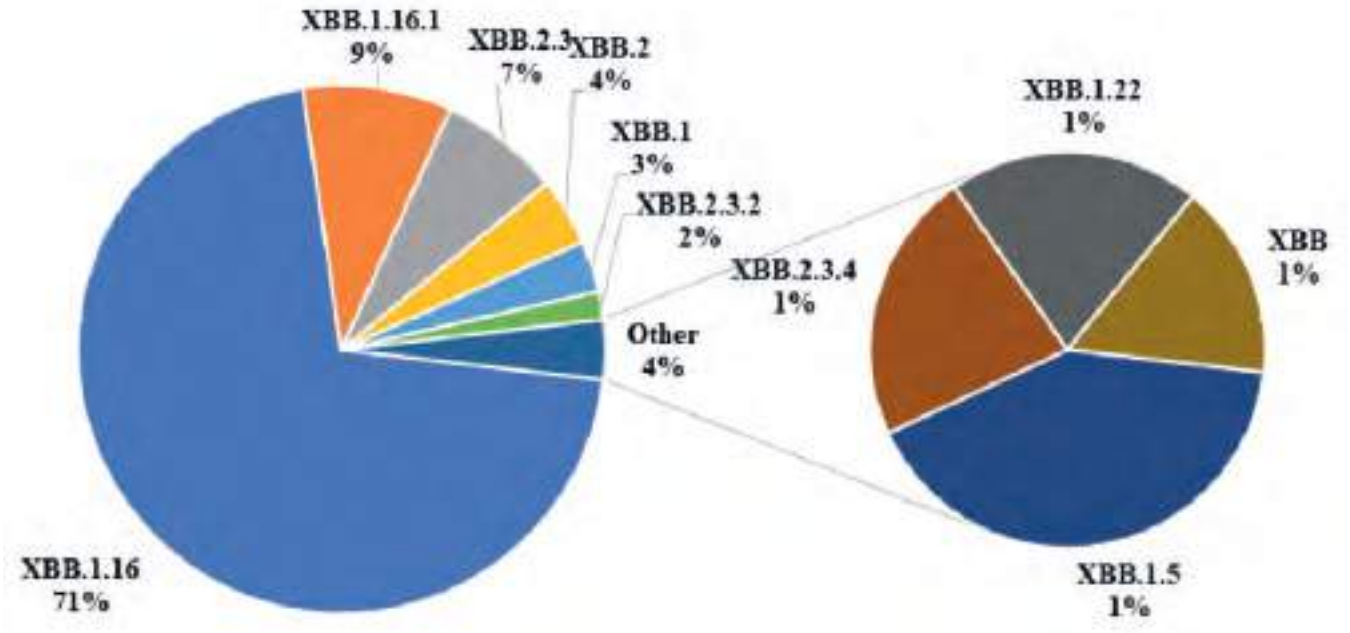


Figure 1: TOP 10 Lineage prevalence in INSACOG Phase-II (28.12.2023-12.10.2023).

Table 1: SARS-CoV-2 lineages identified in the samples.

Lineage	No. of Cases	Lineage	No. of Cases	Lineage	No. of Cases	Lineage	No. of Cases
XBB.1.16	1235	XBB.1.16.2	8	GE.1	1	FU.2	1
XBB.1.16.1	159	XBB.1.9.1	6	EG.5.2	1	FU.1	1
XBB.2.3	129	XBB.2.3.3	4	HK.2	1	XBB.1.9	1
XBB.2	72	XBB.1.16.5	4	FY.3.1	1	XBB.1.5.31	1
XBB.1	55	XBB.1.9.2	4	HH.1	1	XBB.1.16.1.	1
XBB.2.3.2	30	XBB.1.16.3	3	XBB.1.16.17	1	XBB.1.5.3	1
XBB.1.5	26	EG.5.1.1	2	XBB.1.16.13	1	XBB.1.16	1
XBB.2.3.4	14	XBB.1.16.11	2	EG.5.1	1	UNASSIGNED	13
XBB.1.22	13	XBB.2.3.5	2	BL.1	1		
XBB	10	XBB.1.5.45	2	EK.3	1	TOTAL-1810	

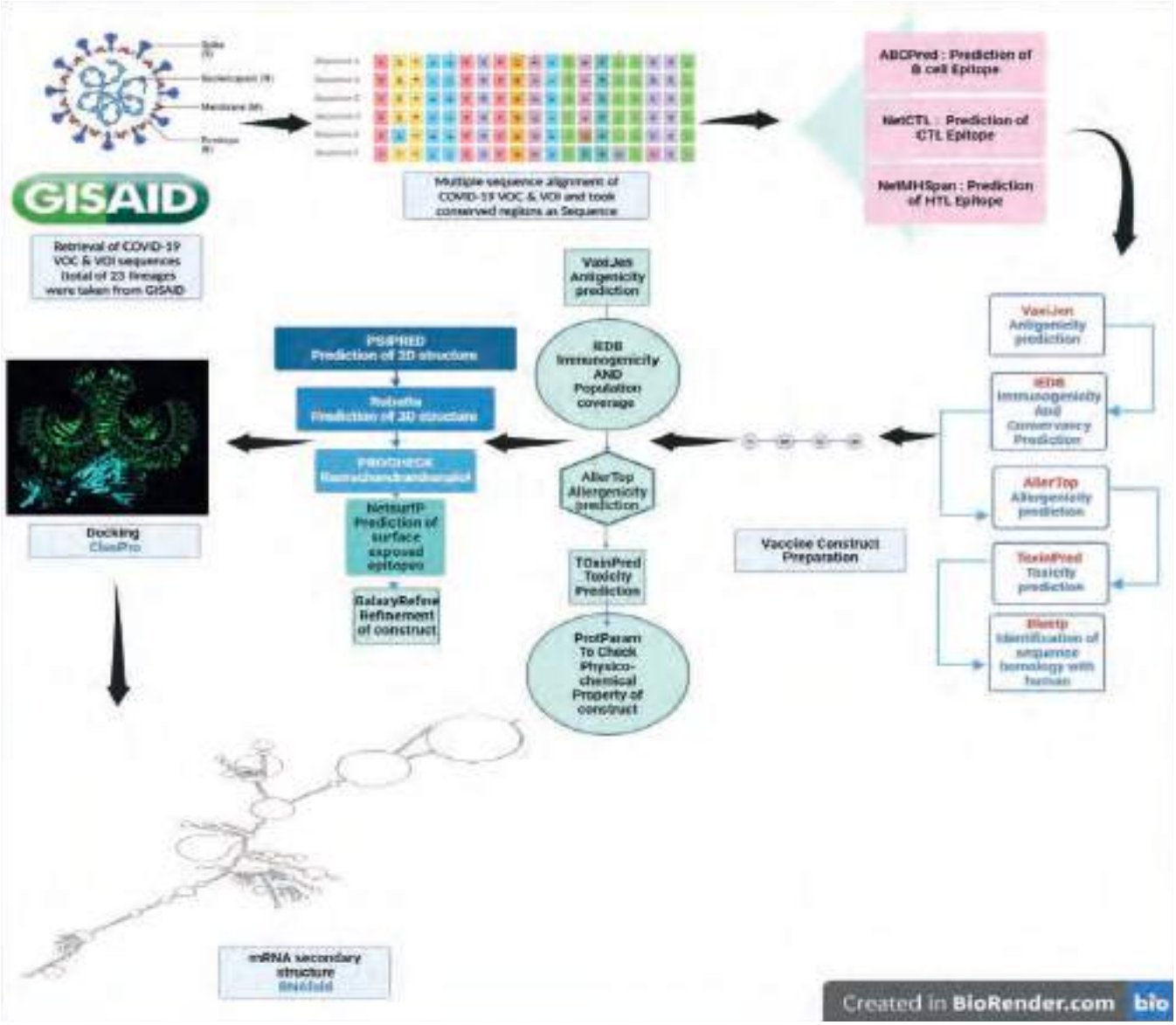


Figure 2: The overall workflow for constructing an *in silico* multiepitope vaccine for SARS-CoV-2 and its further validation by immunoinformatic analyses.

Table 2: Number of epitopes predicted for S, N, E and M genes of COVID-19 major VOC & VOI.

	S GENE	N GENE	E GENE	M GENE
HTL	4445	1715	357	1015
CTL	9648	3528	588	2100
B CELL	14	12	03	16

Title of Project

Network program on AMR, superbugs and one health

Funding Agency

Gujarat State Biotechnology Mission, Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 3,79,24,800/-

Total Duration

3 Years

Objectives in Brief

- To initiate genome sequencing, molecular studies for identification and characterization of drug-resistant pathogens
- To develop a database and information portal for AMR in Gujarat
- To identify and screen priority pathogens and initiate biobanking of reference strains and novel strains
- Training on Bioinformatics tools for AMR analysis
- To develop panel of genes responsible for AMR in various categories such as humans, poultry, cattle, fisheries, wildlife, food and environment

Project Progress

- GBRC is working as a sequencing node in the Network program on AMR. Twenty different institutes from Healthcare, Veterinary and Fisheries and Environment have sent 3647 bacterial samples and 96 metagenome samples to GBRC. Out of these received samples, 3,109 samples were identified using MALDI; DNA isolation for 1,653 samples; WGS of 960 isolates; and metagenome sequencing for 96 samples were completed. Out of these received samples, 53% from healthcare; 28% from Veterinary and Fisheries; and 19% were from environment nodes. Data analysis for the presence of AMR genes was done using different databases and mutations in the identified AMR genes were observed. Phenotypic and genotypic correlation for AMR genes was performed for the *Escherichia coli* and other important isolates.

Key Outcomes/Lead

- WGS of 960 bacterial isolates and 96 metagenome samples was performed. Data analysis for phenotypic and genotypic correlation for the AST profiling and gene mutation was studied for potential isolates.

Publication / Patent

- NA

Manpower Detail

Project coordinator:	Prof. Chaitanya G. Joshi
Scientist:	Dr. Pritesh Sabara
	Dr. Satyamitra Shekh
JRF:	Gufran Siddiqui
	Malaika Baddela
	Urmi Vyas
Apprentice:	Shreya Sharma

Figure 1: Dashboard of network program on AMR

Title of Project

Multiomic analysis to identify biomarkers to demarcate oral cancer and healthy tissue for margin clearance

Funding Agency

Gujarat State Biotechnology Mission, Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 52,90,000/-

Total Duration

3 Years

Objectives in Brief

- Omics data analysis for establishing molecular signatures to differentiate between healthy and cancer tissue
- Development of tools and methods - machine learning tools for various regulatory network inference
- Creation of an India specific omics database as well as open source tools for integrated pipeline analysis for oral cancer
- Establishing molecular signatures for clear demarcation of healthy and cancerous tissue in patients with oral cancer for developing new techniques for surgery

Project Progress

- A total of 56 samples were utilized for transcriptome analysis, out of which 52 samples were sequenced during the current year. The analysis was conducted using GRCh.38.p13 as a reference. The DEseq2 pipeline was employed to analyze all the samples, aiming to identify up and down regulated genes within the tumor tissue and normal tissue of the patient. Differential counts were utilized for GO annotation, allowing the identification of genes associated with the plasma membrane that could potentially serve as biomarkers in the study. To validate the potential biomarkers, key plasma membrane genes were cross-referenced with public databases such as TCGA, employing the GEPIA2 tool. Finally, a PPI network was generated for the selected significant genes to examine gene clustering.

Key Outcomes/Lead

- Total 704 genes were found to be significantly upregulated, out of which 123 genes were located in the plasma membrane. From these 123 genes, 23 genes were found to be present in HNSCC (verified using TCGA database through GEPIA2 tool), out of which 12 were present in the top 50 genes when sorted based on log2 fold change. These genes are as follows: **CA9, ADAM12, LAMC2, PDPN, BST2, COL1A1, FAP, SERPINE1, LY6K, CDH3, PLAU, SULF1,** TREM2, TNC, SERPINH1, MYO1B, CDKN2A, FSCN1, COL1A2, PLEK2, MMP9, GPR176, PTK7 (the ones in bold are the 12 genes present in top 50 as mentioned above).
- Some matrix metalloproteinase (MMPs) genes were also upregulated such as MMP1, MMP10, MMP13, and MMP3.

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Madhvi Joshi
Scientist:	Dr. Apurvasinh Puvar
	Dr. Ishan Raval
RA:	Dr. Krunal Patel
JRF:	Kashish Gupta

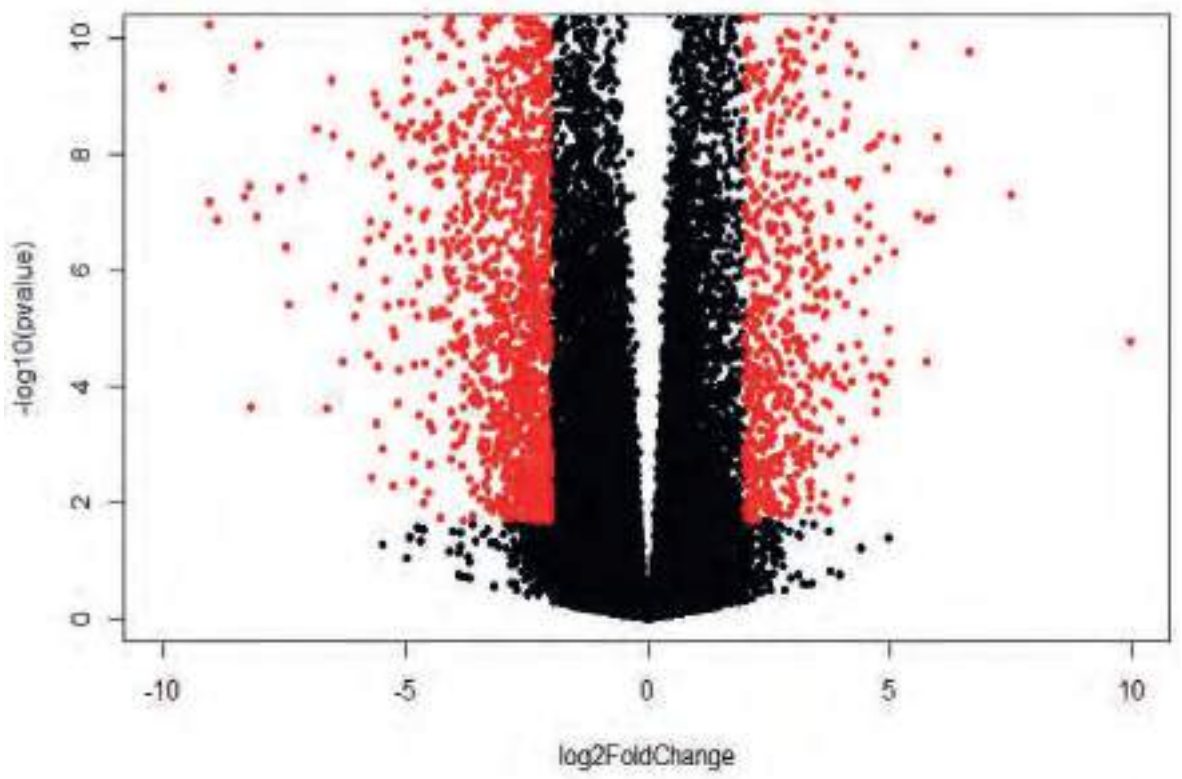


Figure 1: Volcano plot deciphering upregulated and downregulated genes between tumor and normal tissue. Red dots represent significantly up/down regulated genes with ≥ log2fold change and p value <0.0.5.

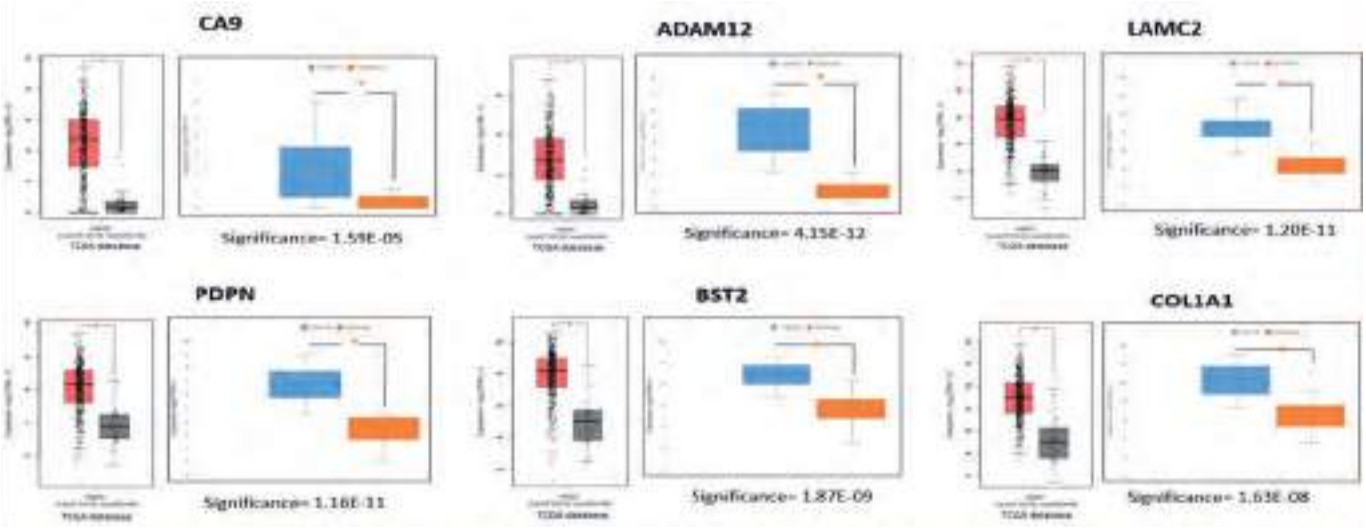


Figure 2: Comparison between public database TCGA and sample dataset for certain significantly altered genes. In each tile the leftside boxplot is generated based on the TCGA database and the right side boxplot is generated based on patient dataset.

Title of Project

Genome wide association study to decipher the host genetic factors associated with resistance toward Cisplatin therapy in oral cancers

Funding Agency

Gujarat State Biotechnology Mission, Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 66,01,129/-

Total Duration

3 Years

Objectives in Brief

- To identify genetic markers as an index of response to cisplatin therapy
- Identification of the somatic mutational landscape between primary tumor and relapsed tumor

Project Progress

- We have collected three types of samples (cancer tissue, normal adjacent tissue and blood) from a total of 204 oral cancer patients recruited at Kailash Cancer Hospital & Research Centre (KCHRC), Muni Seva Ashram Goraj, Waghodia, Gujarat. The majority of the patients are of age between 36-45 years followed by 56-65 years. Moreover, samples for the recurrent and relapse tumor as well as few samples in the surgery + radiation + chemotherapy are yet to be collected.
- We have also completed HPV genotyping of the 75 samples and only one sample was found to be positive for HPV68. Rest all were negative for HPV and 96 patient's samples (total 192 samples) were sent for genotyping.

Key Outcomes/Lead

- GWAS analysis was performed for the 48 sample pairs using PLINK 1.9. IBS analysis was performed using PLINK 1.9 and GRAF softwares. Both tools yielded similar results. Further, preliminary data indicates that the number of ROH and the length of ROH region in cancer tissues was higher as compared to the normal tissues. However, further validation is required to confirm this observation.

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Rameshchandra Pandit
Co-PI:	Dr. Madhvi Joshi
JRF:	Kartik Deopujari

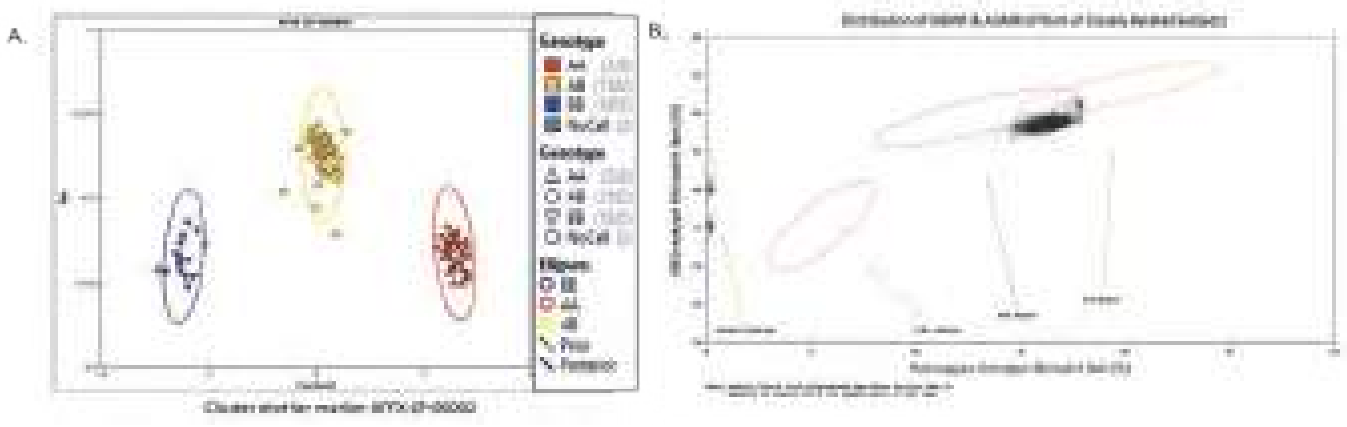


Figure 1: Cluster plot for marker quality control and relatedness prediction contours to represent relatedness between samples. A) Cluster plot for marker AFFX-SP-00002, samples homozygous for allele A are represented with red triangles, homozygous samples for alternate homozygous allele B are represented with blue color triangles, samples with heterozygous genotypes are represented with yellow circles. The Cluster Plot displays the Probe-set calls for selected samples as a set of points in the clustering space used for making the calls. B) Distribution of homozygous genotype mismatch rate (HGMR) and all genotype mismatch rate (AGMR) of closely related subjects. Contour represents each relationship type (Parent-offspring, Full sibling, 2nd degree relatives & 3rd degree relatives). Contour line of each relationship type shows the area that is expected to contain 95% of the subject pairs of that particular type. This prediction assumes the genotyping of all 10,000 fingerprinting SNPs for every subject within a sizable, homogeneous, random mating population.

Table 1: Represents runs of homozygosity analysis for individual samples (healthy and tumor tissue). Phenotype value 2 indicates tumor tissue sample and phenotype value 1 indicates healthy tissue samples.

Family ID	Ind ID	Phenotype Value	Number of runs of homozygosity	Total length of runs (kb)	Average length of runs (kb)
FID	IID	PHE	NSEG	KB	KBAVG
106N	106N	1	38	55177.1	1452.03
106T	106T	2	46	102513	2228.53
111N	111N	1	34	46398.8	1364.67
111T	111T	2	37	49893.2	1348.46
112N	112N	1	29	46923.5	1618.05
112T	112T	2	30	48014.3	1600.48
113N	113N	1	39	51245.3	1313.98
113T	113T	2	64	162782	2543.47
135N	135N	1	32	49865	1558.28
135T	135T	2	44	71573.4	1626.67
136N	136N	1	44	68577.7	1558.58
136T	136T	2	35	57499	1642.83
138N	138N	1	37	51326.6	1387.21
138T	138T	2	52	50139.9	2109.86
139N	139N	1	34	50139.9	1474.7
139T	139T	2	37	51231.6	1384.64

Title of Project

Evaluating the success of Panchkarma, an ancient ayurvedic treatment in Rheumatoid arthritis through biotechnology

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 1,91,92,800/-

Total Duration

3 Years

Objectives in Brief

- To elucidate the effect of Virechana and Basti Karma on Amvata (RA) subjects
- To expound the effect of Virechana and Basti Karma on the gut microbiome of Amvata (RA) subjects
- To study the blood metabolome signature for Virechana and Basti Karma in RA patients for the assessment of the treatment
- To identify the host-genetic factors associated with Amvata (RA)

Project Progress

- For the pilot study of metagenome analysis of the gut microbiome, the fecal samples of patients receiving Panchakarma treatment (Basti and Virechana) for various diseases were collected from the State Model Institute of Ayurveda Sciences, Kolavada, Gandhinagar.
- Since the fecal samples are having irregular consistency (watery/runny/fluid) along with presence of herbal medicine & oil, optimization was carried out to isolate bacterial DNA and further amplify the 16S rRNA region of DNA. All the samples were collected in a stool collection kit. To optimize the DNA isolation protocol, different kits and manual isolation protocols were tried: (i) QIAamp Fast DNA Stool Mini Kit (QIAGEN) following manufacturer's instructions, (ii) MagMax Microbiome Ultra kit (Thermo fisher Scientific), (iii) Manual purification of the microbial pellet and subsequent DNA isolation from the pellet, (iv) To pellet down debris using centrifugation followed by isolation with QIAamp Fast DNA Stool Mini Kit (QIAGEN) with the incorporation of Cetyltrimethylammonium bromide (CTAB) (1% w/v) for extensive lysis. Bacterial DNA was successfully isolated using the protocol IV with more PCR positive success (Table 1).
- Owing to the challenges faced for fixation and transportation of fecal samples, different stool collection kits/fixatives were utilized to examine their microbial community preservation capacity at room temperature. The different stool collection kits/fixatives used were RNAprotect Bacteria Reagent (Qiagen) (R), Stool Nucleic Acid Isolation Kit (Norgen) (N), MagStable Stool Collection Kit (MagGenome) (M) and in-house DNA stabilization reagent (D). DNA was isolated from these samples using optimized protocol at specified intervals from 7 samples out of which 4 were from patients undergoing Panchkarma treatment (1,2,3,4) while 3 were untreated (5,6,7). A & B depicts their replicates. The 16S metagenomic library has been prepared and data is yet to be generated (Figure 1).
- For capturing blood metabolome signatures from serum samples, two major protocol optimizations were initiated: Metabolite extraction followed by separation and identification using LC-MS QTOF system. A C18 column was used in all the experiments.
- Sample preparation methods to extract metabolites from serum includes use of different solvents to extract metabolites from serum followed by concentrating them using lyophilization, solvent evaporation, etc. Different solvent systems as mobile phases were investigated for LC-MS optimisation, and gradients of these mobile phases were then designed to most effectively separate and identify metabolites from the prepared mixtures.
- The optimized protocol includes precipitation of proteins and extraction of metabolites in a mixture of acetonitrile, methanol and water (7:2:1). Separation was carried out in positive mode using acetonitrile and water with 1% formic acid as mobile phase. A gradient of the mobile phase was designed such that a range of metabolites from polar to nonpolar were screened. A library of metabolites obtained from 46 healthy individuals was prepared. Open Source tools like Metaboanalyst, mzMINE, MS-DIAL, MAIT and Tidymass aided in screening of metabolites.

Key Outcomes/Lead

- A protocol to isolate bacterial DNA and amplify 16S rRNA and V3-V4 region via PCR with Universal and Illumina primers, respectively was optimized. A library of metabolites was obtained from 46 healthy individuals using the LC-MS-QTOF system.

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Madhvi Joshi
Co-PI:	Dr. Apurvasinh Puvar
RA:	Dr. Rushika Patel
JRF:	Priyal Visavadiya
	Shreya Johnson

Table 1: Summary of DNA isolation and 16S PCR optimization using different DNA isolation protocols

Protocol	Protocol 1	Protocol 2	Protocol 3	Protocol 4
Total samples	10	5	6	7
No. of samples with successful DNA isolation	6	3	1	5
No. of samples with successful PCR amplification	6	2	1	7

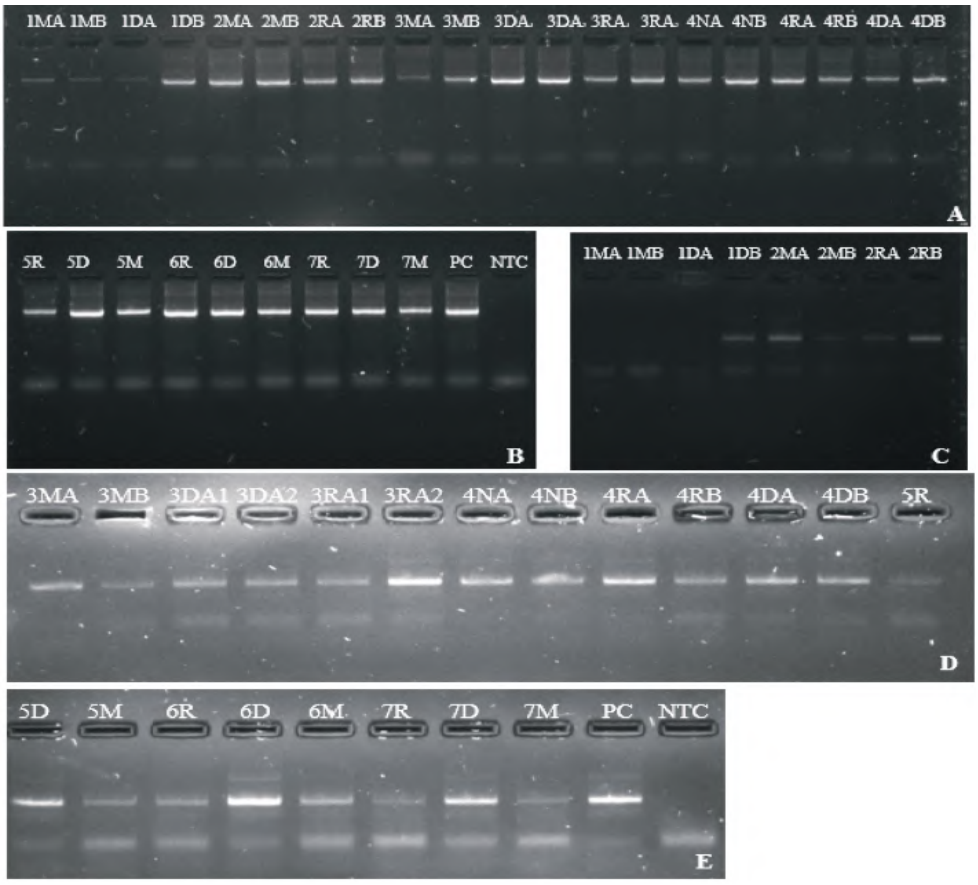


Figure 1: A, B showing the PCR products of the samples by 16S Universal primers. C, D, E showing the PCR products of the samples by 16S Illumina primers.

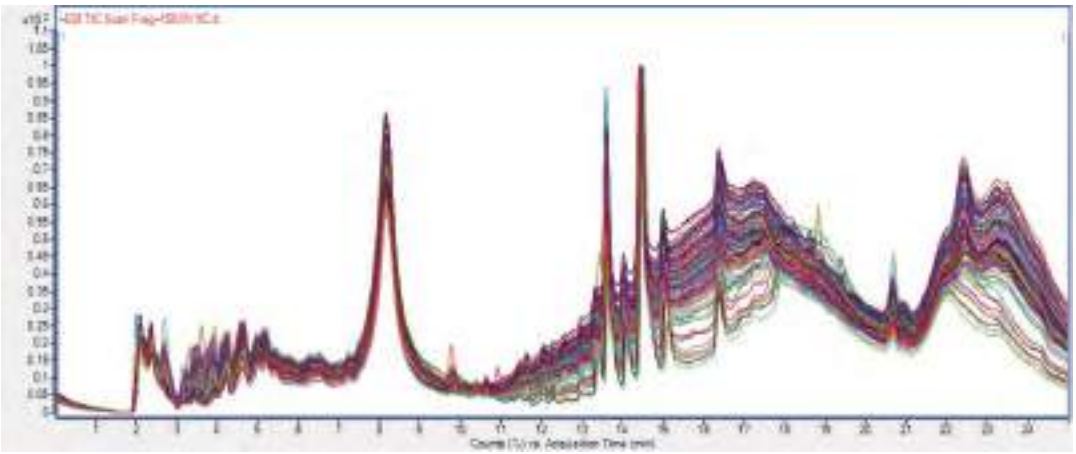


Figure 2: Total Ion Chromatogram (TIC) of 46 healthy individuals in triplicates.

Title of Project

Probiotics and antimicrobial peptides for the treatment of metabolic and infectious diseases

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 45,90,000/-

Total Duration

3 Years

Objectives in Brief

- Isolation of Lactic Acid bacteria (LAB) from various food and human sources and screening of isolates for antimicrobial peptide production and other probiotic functionality tests
- Screening of various compounds that enhance biofilm formation ability of probiotics
- *In vivo* studies in mouse model
- Isolation of *Candida* spp. from patients
- Characterization of bacteriocin(s) for potential antifungal property against drug resistant *Candida* spp.

Project Progress

- Various food and human sources were screened for the prevailing lactic acid bacteria and more than 350 cultures were isolated. Bacterial isolates were identified using MALDI and Sanger sequencing. Isolates were screened for the probiotic functionality by different tests including survival in stress conditions like low pH, salt, bile salts and phenol; mucin adhesion property; and safety aspects.
- Eleven potential candidates were observed to inhibit the pathogenic strains of *Candida* species. Potential probiotic isolates like, Gram positive *Limosilactobacillus fermentum, Lactobacillus brevis, Lactobacillus paracasei,* and *Lactobacillus plantarum* were obtained from food sources and healthy human vaginal sources, respectively.
- Protein and metabolites extracted in different solvents from various probiotic strains demonstrated anti-bacterial and anti-fungal activity to target pathogens. Further, identification of the proteins and other metabolites is ongoing.

Key Outcomes/Lead

- The isolated probiotics cultures were screened for various probiotics characteristics. Potent probiotic cultures with anti-microbial and anti-fungal activities against target pathogens were identified. Protein and non-protein metabolites with antimicrobial activity were isolated from potential probiotic strains.

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Satyamitra Shekh
Co-PI:	Dr. Bhumika Prajapati
TA:	Kajal Patel
JRF:	Dixsha Jamkhandi
	Krutarth Raval

Figure 1: Work flow for isolation of lactic acid bacteria from different sources.

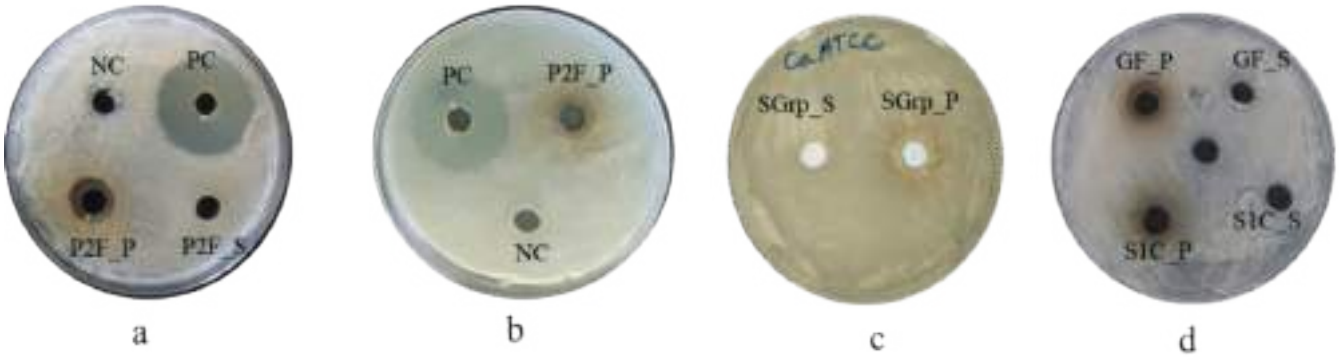


Figure 2: Anti-Candida activity of cell free supernatant (P2F_S; a) and protein samples (P2F_P; a, b) from *L. fermentum* P2F isolate; supernatant (SGrp_S; c) and protein samples (SGrp_P; c) from *L. mesenteroides* SGrp from *L. fermentum* P2F isolate; cell free supernatant (GF_S; d) and protein samples (GF_P; d) from *L. plantarum* GF isolate; cell free supernatant (S1C_S; d) and protein samples (S1C_P; d) from *L. plantarum* S1C isolate. PC – positive control (Nystatin, 1 mg/ml); NC – Negative control (Acetate buffer, pH 5).

Title of Project

Pilot study on clinical metagenome: Approach to detect causative agent for infectious disease in human clinical sample through NGS

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 17,75,000/-

Total Duration

3 Years

Objectives in Brief

- Identification of control (healthy) and test (diseased) clinical samples and determining population size required for the test
- Formulation of methodology to prepare NGS library from multiple specimen types i.e., blood plasma, stool, nasopharyngeal-oropharyngeal swab or BAL fluid or CSF
- Development of bioinformatics pipeline to identify pathogens and their abundance with clinical correlation

Project Progress

- In this project so far, we have developed an in-house full length 16S rRNA database, V3-V4 region specific database and pathogenic bacteria databases for the taxonomic classification of bacteria in clinical samples. These databases are validated using Mock community and compared with other publicly available databases. Figure 1 shows the comparison of in-house full length 16S rRNA database with SILVA and RDP databases. We also developed ITS region specific databases for identification and classification of fungal species. We aimed to design a NGS panel targeting 100 different human pathogenic viruses. For this, so far we have *in silico* validated panel for 81 viruses (Table 1).
- Primers and probes are also designed for the detection of sepsis-causing five different *Candida* species (*C. albicans, C. glabrata, C. krusei, C. parapsilosis* and *C. tropicalis*) using qPCR.
- Further, method for cell free DNA extraction is also optimized for the clinical samples. In order to do DNA extraction, library preparation, NGS sequencing and data analysis pipeline.
- Mock community was prepared using two approaches: (a) colony count using culture plate method and (b) cell count using a flow cytometer.
- We have analysed different clinical samples and reported presence of pathogenic species in the same. For example, in one of the sample with eye infection, we performed 16S rRNA and ITS amplification metagenomic sequencing using the MiSeq platform and reported *Candida* [sake], and *Aspergillus versicolor* (Figure 2) which is a common pathogen causing Endophthalmitis.

Key Outcomes/Lead

- We prepared in-house 16S and ITS database for better annotation and classification of 16S and ITS amplicon data. We also prepared and *in silico* validated 81 virus panel. Couple of samples have been analysed using the metagenomics approach and identified the causative agent.

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Apurvasinh Puvar
RA:	Dr. Deepak Kumar Prasad
JRF:	Nikita Dalal

Figure 1: Comparison of in-house database (16S Full length) with SILVA and RDP database at genus and species level.

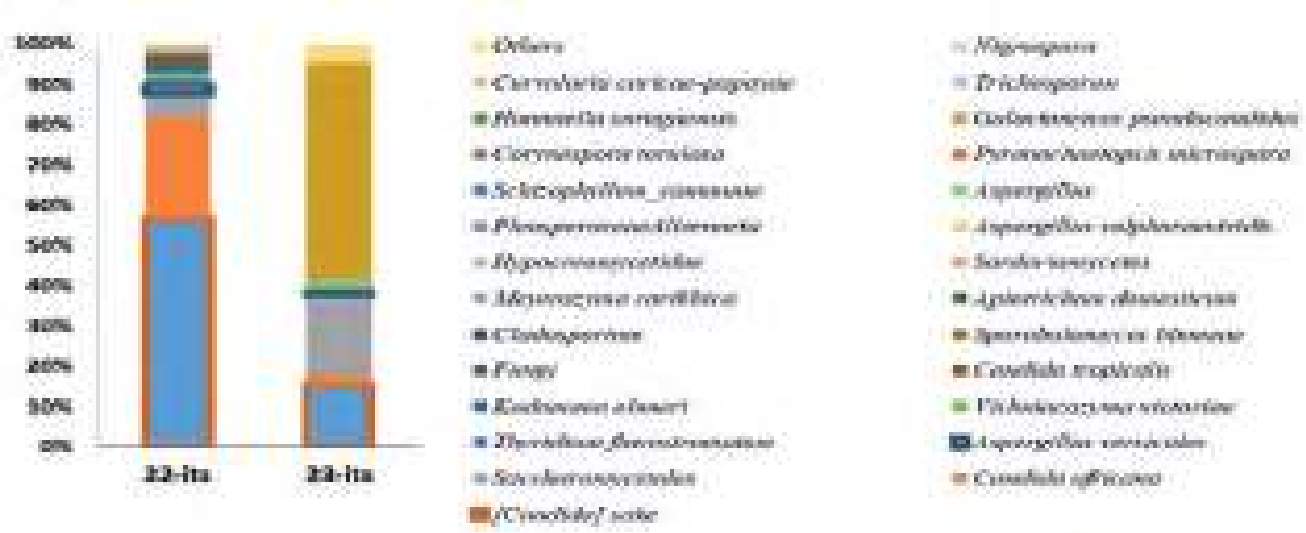


Figure 2: Taxonomic classification of ITS amplicon metagenome sequencing data for human eye infection. 22-its is ocular fluid and 23-its is lens sample.

Title of Project

Development of DNA based diagnostic kit and universal vaccine candidate for Leptospirosis

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 55,00,000/-

Total Duration

3 Years

Objectives in Brief

- Mining and analysis of genomes and proteomes of Leptospira spp.
- Isolation and molecular characterization of Leptospira strains of Gujarat
- Identification and validation of potential genes/protein targets
- Development of onsite DNA based diagnostic kit for Leptospirosis
- Identification of universal vaccines candidates

Project Progress

- Two vaccine constructs i.e. Lepto_Human (LH) and Lepto_E. coli (LE) were designed using immunoinformatics approach for expression in eukaryotic and bacterial systems, respectively. Amino-acid sequences of Outer membrane protein (OMPL) 1, LipL 32, 41 and 46 from ten pathogenic serovars of Leptospira were selected to obtain epitopes that induce CD4+ and CD8+ T cell responses by binding to the MHC molecules. These B cell and T cell epitopes were used to design multi-epitope vaccine to which an adjuvant sequence was added at the N-terminal end and appropriate linkers were used to join the different epitopes to increase the efficiency of the vaccine constructs.
- Using an immuno-informatics approach, constructs were analyzed for the physiochemical properties, secondary and tertiary structure and its validation, docking with different receptors and prediction of binding affinity for each docked complex, followed by molecular dynamics simulation and immune simulation.
- Cloning of LH construct in pVAX1 and pShuttle-CMV vectors followed by recombination of pShuttle-CMV vector with pAdEasy-1 vector in *Escherichia coli* BJ518 was performed. Three vaccine constructs namely HBHA, CTB and TLR4 were cloned in pET30a vector and expression studies were carried out. Protein expression was optimized at 1 mM IPTG concentration at 37 °C for 18 h. All expressed proteins were purified using Ni-NTA column chromatography. Further, *in vivo* experiments are to be performed for the immunogenicity study in mouse model.

Key Outcomes/Lead

- Two new potential vaccine candidates were constructed using immuno-informatics approach
- Cloning of synthesised vaccine genes into host specific vectors, confirmation of clones and expression studies in bacterial and cell line systems

Publication / Patent

- NA

Manpower Detail

PI:	Prof. Chaitanya G. Joshi
Co-PI:	Dr. Amrutlal Patel
Scientist:	Dr. Satyamitra Shekh
JRF:	Anita Chauhan
	Ritik Thumar

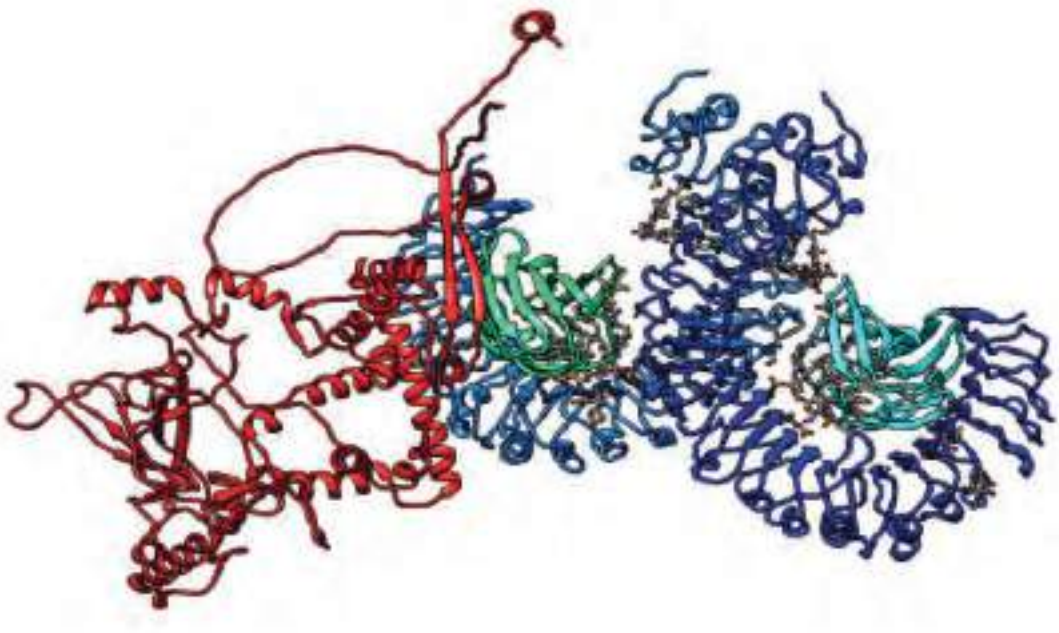


Figure 1: Docked complex (vaccine construct with receptor TLR 4) visualized in chimera. Vaccine construct (red colour) is docked with chain B of receptor TLR4 (blue colour).

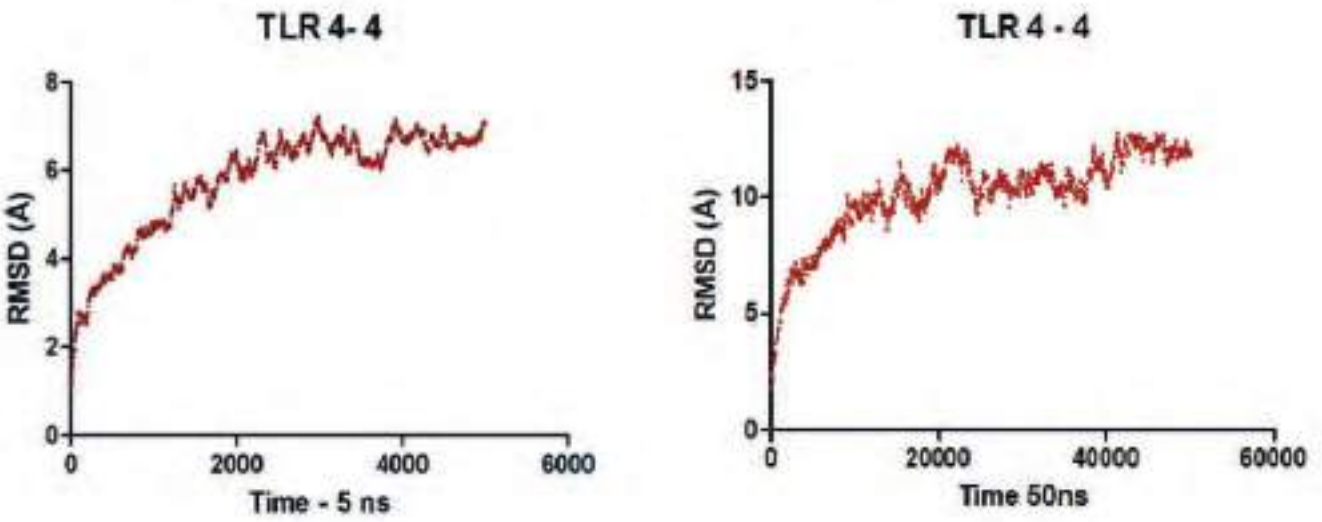


Figure 2: A) RMSD graph obtained at 5 ns for vaccine construct with receptor TLR 4.
B) RMSD graph obtained at 50 ns for vaccine construct with receptor TLR 4.

Title of Project

Development of Adenovirus based vector vaccine platform against life threatening infectious diseases

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 70,00,000/-

Total Duration

3 Years

Objectives in Brief

- To develop recombinant Adenovirus vector vaccine expressing immunogens from life threatening pathogens
- To assess recombinant Adenovirus based vaccines in vitro
- To assess safety & immunogenicity of recombinant Adenovirus based vaccines *in vivo*

Project Progress

- In this project, we are attempting to build a platform for adenovirus-based viral vector vaccines against a variety of life-threatening pathogens. We use *in vivo* recombination method between the pShuttle-CMV- vector containing the immunogenic gene and the pAdEasy-1 vector containing the adenoviral genome for production of recombinant adenovirus plasmids. The recombinant adenovirus plasmids containing native spike S1 gene of 617.2 and codon-optimized spike S1 gene of 617.2 and Omicron were prepared and confirmed by restriction digestion profile and sequencing. Similarly, the recombinant adenovirus plasmids containing codon-optimized sequence of hemagglutinin gene of H5N1 avian influenza was also prepared and confirmed by restriction digestion analysis.
- The recombinant adenovirus plasmids were then transfected in HEK293T cell line using Lipofectamine 3000 and incubated until cytopathic effect was observed. After around 7 days, the cells along with media were collected and freeze-thawed 3-4 times to release virus particles from the cells. The cell lysate was then used to give infection to a new batch of HEK293T cells, and this was repeated till passage 4 to increase the viral titre. The infection time got shortened in each passage as the recombinant adenovirus was concentrated in number in the HEK293T cells. The digital PCR and TCID50 were used to determine the virus titre. Transmission electron microscopy (TEM) was used to validate the structure of the recombinant Adenovirus. Studies are ongoing to confirm the expression of genes of interest through RT-PCR and Western blotting.

Key Outcomes/Lead

- Preparation of recombinant adenovirus plasmids containing native spike S1 gene of 617.2, codon-optimized spike S1 gene of 617.2 and Omicron, and hemagglutinin gene of H5N1
- Transfection and subsequent infection of recombinant adenoviruses in HEK293T cells to increase virus titre
- Preliminary confirmation of recombinant adenoviruses by sequencing, RT-PCR, digital PCR, and western blotting

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Amrutlal Patel
Co-PI:	Dr. Dhwani Jhala
RA:	Dr. Durga Bethala
JRF:	Rupesh Thorat
	Nikhil Mehra

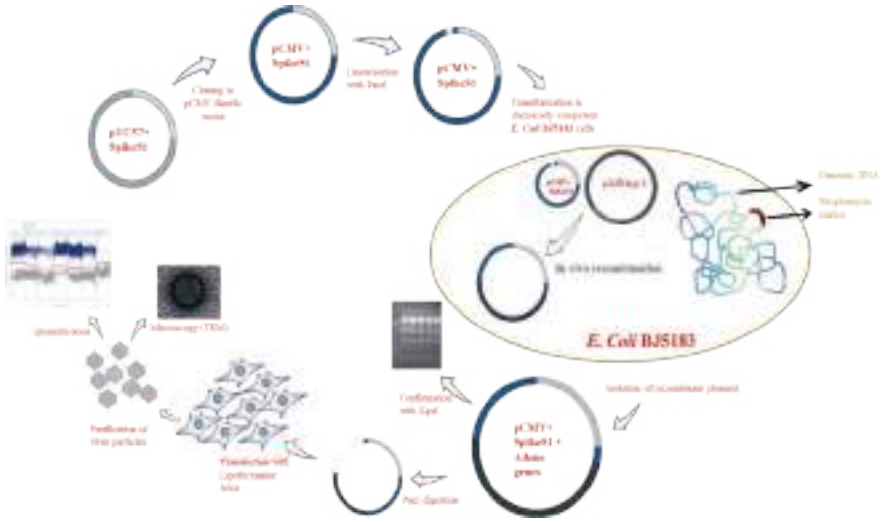


Figure 1: Graphical representation of methodology.

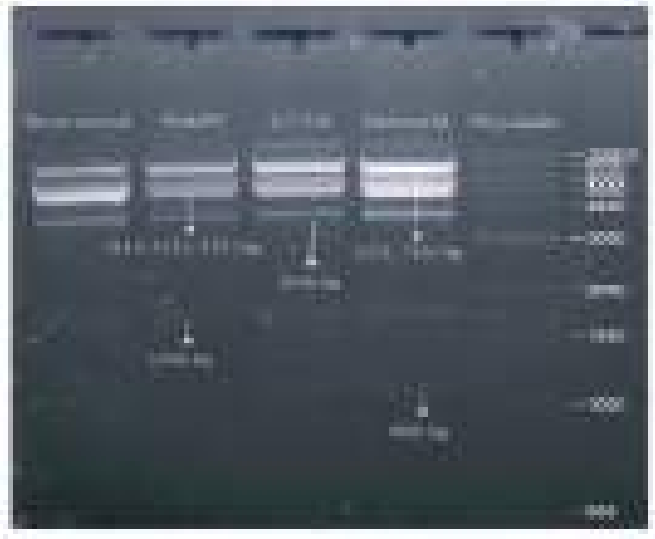


Figure 2: RE analysis of recombinant plasmids (pAdEasy1 / pShuttle-CMV / Spike S1) with *Kpn*I (Lane 1- pAdEasy1 / pShuttle-CMV vector only, Lane 2- pAdEasy1 / pShuttle-CMV / GBRC Native Spike S1(B1.617.2), Lane 3- pAdEasy1 / pShuttle-CMV / Spike S1(B1.617.2), Lane 4- pAdEasy1 / pShuttle-CMV / SpikeS1(Omicron), Lane 5- NEB 1 Kbp DNA ladder) (White arrows represent the bands after digestion.)

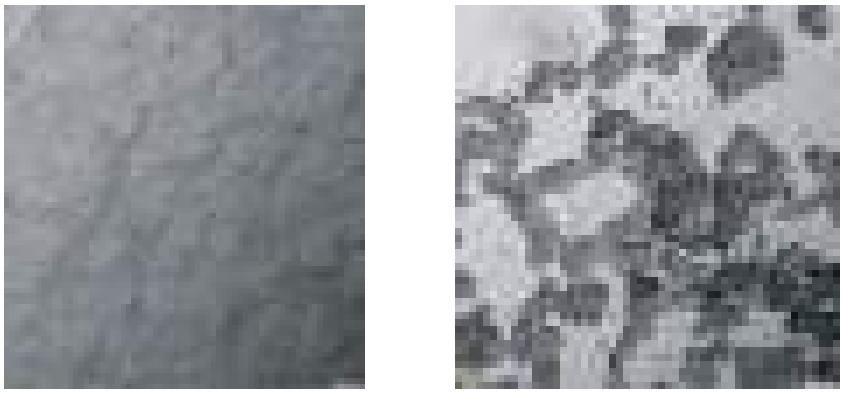


Figure 3: Representative microscopic images of control cells (left) and cells infected with recombinant adenovirus (Native Spike S1(B1.617.2) after 48 hours (Scale bar = 100 µm).

Title of Project

Development of Camelid single domain antibodies (SdAb) against life threatening pathogens

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 50,00,000/-

Total Duration

3 Years

Objectives in Brief

- Development of Phage display library of Camelid nanobodies
- Affinity screening of Phage display library against neutralizing epitopes from H5N1 and CCHF
- Bacterial expression and purification of nanobodies targeting neutralizing epitopes from H5N1 and CCHF

Project Progress

- Cloning of VHH regions (single domain antibody genes) in pADL-23C Phagemid vector to generate phage display library: To prepare the naïve phage display library, lymphocytes were isolated from Camel blood (Figure 1). Total RNA was isolated using RNeasy Qiagen plus mini kit from PBMCs, followed by cDNA synthesis using Ion Torrent™ NGS Reverse Transcription Kit. Series of PCRs were performed on cDNA to amplify VHH regions. First PCR amplified VH and VHH regions using CALL001 and CALL002 primers. Subsequently, nested PCR was performed on the 700 bp product of the first PCR to amplify ≈ 400 bp product of VHH genes (Figure 2). The VHH PCR product was ligated into a pADL-23C vector. The ligation was confirmed and it was electroporated in TG1 electrocompetent cells. Colony PCR was performed on electroporated TG1 colonies to check 400 bp VHHs insertion.
- HA (H5N1 avian influenza) gene cloning, Bacterial expression of HA gene and its purification: Simultaneously, cloning, expression and purification studies of one of the target immunogens – hemagglutinin protein of avian influenza H5N1 was started. For that, HA gene from H5N1 avian influenza virus was codon optimized for E. Coli bacterial expression. Synthetic gene of HA was cloned into pET21b vector, transformed into TOP10 strain of E. Coli and confirmed by colony PCR.
- DNA sequencing was performed to confirm proper insertion of HA gene (Table 1). Purified pET21b/HA plasmid was further transformed into BL21 E. coli cells and confirmed using colony PCR. IPTG induction was given to pET21b/HA/BL21 colony to get expression of HA protein. Induced colonies were subjected to lysis, solubilisation, affinity purification and dialysis to get specific 65 kDa HA protein. HA protein was further confirmed by western blotting (Figure 3) and MALDI analysis.

Key Outcomes/Lead

- Optimization of protocols for naive phage display library preparation
- Cloning, expression and purification of hemagglutinin protein of avian influenza H5N1

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Amrutlal Patel
Co-PI:	Dr. Dhwani Jhala
RA:	Dr. Maitri Trivedi
JRF:	Priyanka Panwar

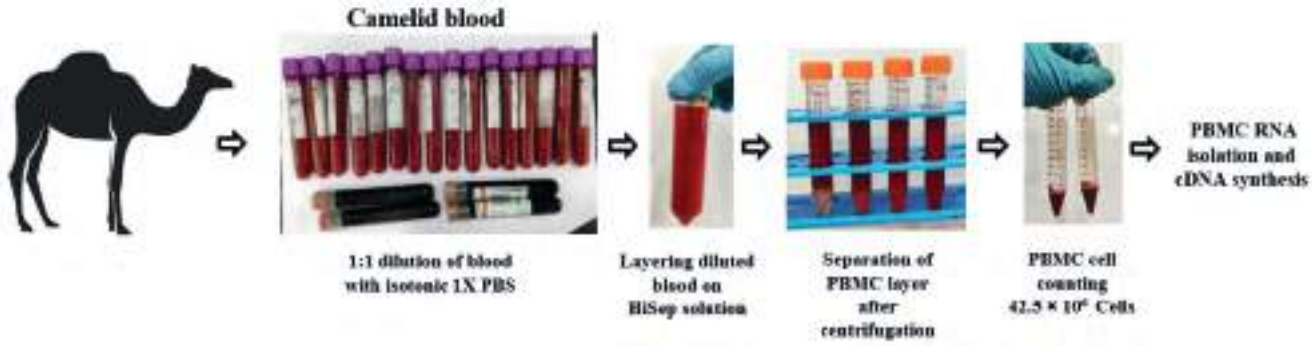


Figure 1: Lymphocyte isolation from Camel blood.

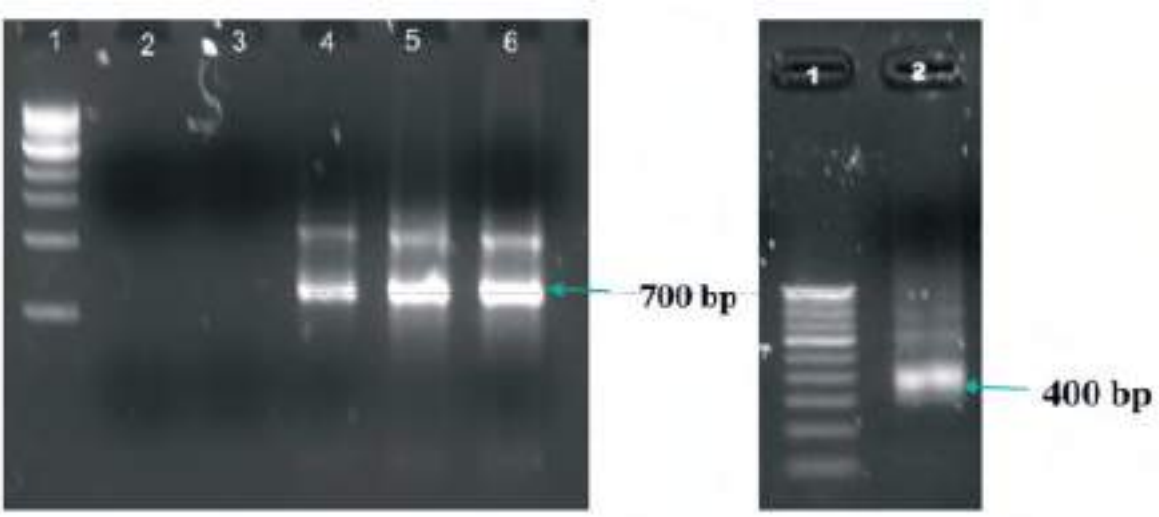


Figure 2: Confirmation of VH and VHH genes (1100 bp & 700 bp) with outer CALL001 & CALL002 primers and VHH genes (400 bp) through nested PCR.

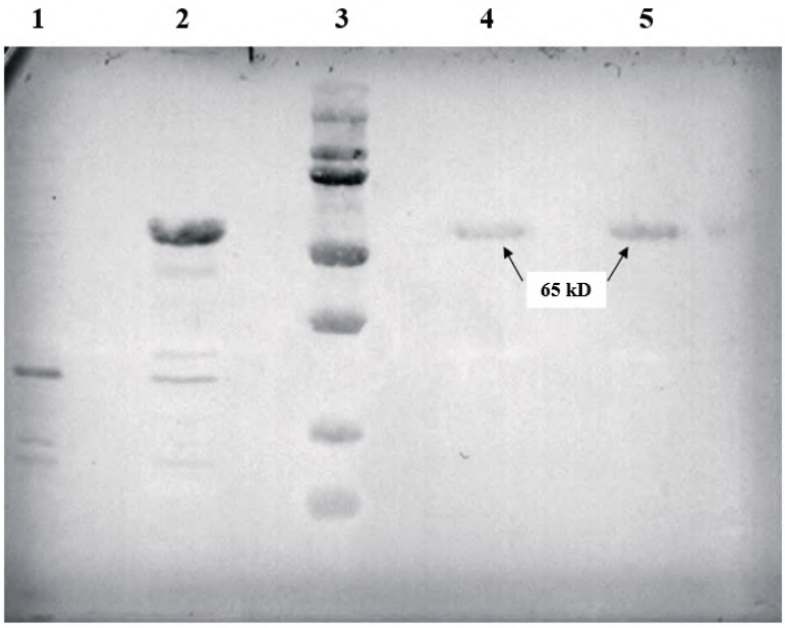


Figure 3: Confirmation of purified hemagglutinin after dialysis by Western blotting using anti-His tag antibody. Lane 1 - uninduced culture, lane 2 - induced culture, lane 3 – marker, lane 4 and 5 – purified protein.

Title of Project

Mutation profiling of Hemoglobinopathies in Gujarat

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 50,60,000/-

Total Duration

3 Years

Objectives in Brief

- To study the mutation profile of hemoglobinopathies in the population of Gujarat
- To understand the population specific genetic variations associated with β-thalassemia
- To develop the genetic database for hemoglobinopathies for the tribal population of Gujarat
- To conduct genetic counselling sessions for spreading the awareness regarding the prevention of genetic diseases

Project Progress

- Total of 583 self-declared healthy individuals including male and female from four different tribal populations such as Dongri bhil, Kol (tribe), Sahariya and Korku from various districts of Gujarat and Madhya Pradesh were screened for the presence of sickle cell mutations. We have optimized two molecular methods such as ARMS-PCR and PCR-RFLP for screening the sickle cell homozygous / heterozygous status from tribal samples.
- Screening of the tribal population using PCR-RFLP and ARMS PCR methods revealed the existence of sickle cell anaemia in the Dongri bhil, Korku, and Kol castes, however no sickle cell positive samples were found in the Sahariya tribe during current investigation. The samples were confirmed as SCT by the presence of the Heterozygosity at the mutation site with the presence of both A and T allele. The samples were confirmed as Sickle cell disease SCD by the presence of T at the mutation site instead of A present in the wild-type sample.
- Both PCR-RFLP and ARMS PCR revealed the existence of Sickle cell trait (SCT) in the Korku and Kol tribes, with prevalence rates of 9.33% (14/150) and 4.67% (7/150), respectively. However, RFLP predicted a prevalence of 16.41% (22/134) SCT in the Dongri tribe, but ARMS PCR predicted a prevalence of 18.65% (25/134). Throughout the entire study, only one Sickle cell disease (SCD) sample was found in the Dongri tribe. The results of both molecular methods i.e. ARMS-PCR and PCR-RFLP were validated using the Sanger sequencing method.

Key Outcomes/Lead

- Total of 568 samples from four different tribal communities have been screened for sickle cell anaemia and highest prevalence was found in Dongri Bhil community of Gujarat.
- Out of two tested molecular methods - PCR-RFLP and ARMS-PCR, PCR-RFLP has shown good sensitivity and specificity.
- The custom amplicon panel for detecting various genes of hemoglobinopathies has been successfully designed and synthesized.

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Madhvi Joshi
Co-PI:	Dr. Bhumika Prajapati
RA:	Dr. Amisha Kushwaha
JRF:	Urvi Budhbhatti
	Krisha Thakkar

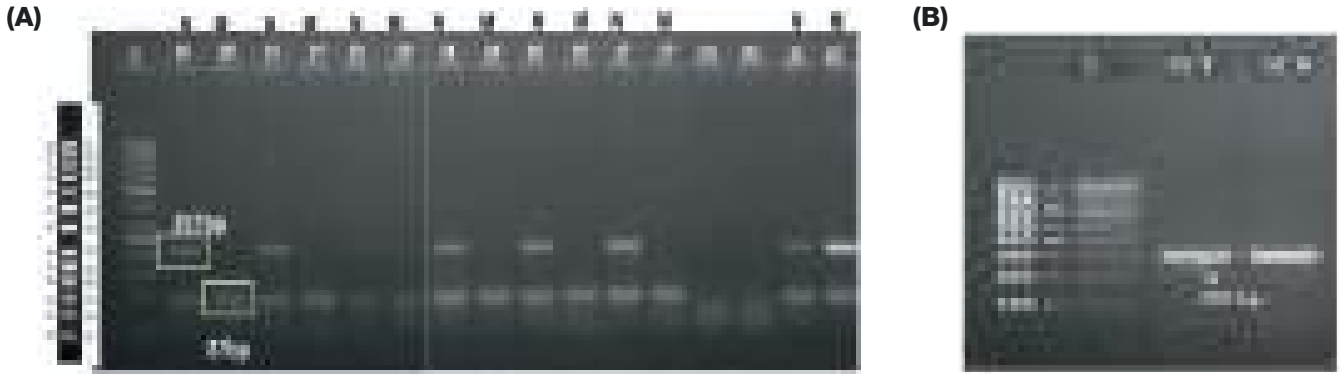


Figure 1: (A) Development of the ARMS-PCR assay for screening of the sickle cell anaemia. 87 bp amplicon indicates GAPDH, while 207 bp indicates mutant/wild type amplicon (B) Development of PCR-RFLP method for sickle cell anaemia by PCR amplification of SNP site followed by RE digestion.

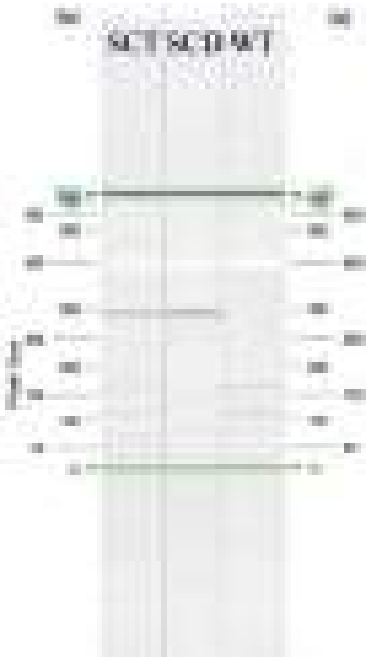


Figure 2: PCR-RFLP results after restriction digestion with DdeI restriction enzyme.
SCT: Sickle Cell Trait
SCD: Sickle Cell Disease
WT: Wild Type

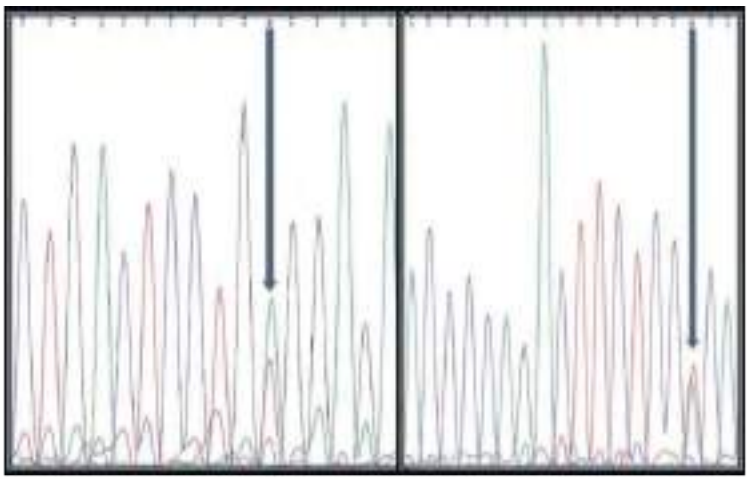


Figure 3: Validation of the sickle cell mutation using sanger sequencing method. Left arrow indicates two mixed peak indicating heterozygous condition, while right arrow is positive control for the same.

Title of Project

Genome India: Cataloguing the genetic variation in Indians

Funding Agency

Department of Biotechnology, Government of India, India

Grant

Rs. 1,32,00,000/-

Total Duration

3 Years

Objectives in Brief

- To create an exhaustive catalogue of genetic variation
- To construct a reference genome for the Indian population
- Design genome wide assets for undertaking diagnostics and basic or clinical research at affordable cost
- Create a biobank for DNA and plasma samples collected from these individuals for future use in research

Project Progress

- As per the work distribution among participating institutions in this multi-institute project, GBRC is involved in the first step of the project which is sample collection of allotted ethnic groups from different geographical areas, performing blood biochemistry and isolation of DNA from those samples.
- In current phase, we have completed the collection of samples of three tribal groups i.e. korku (n=150), Sahariya (n=6) and kol (n=150) from various trial districts of Madhya Pradesh. From Gujarat, we have completed the sample collection from communities like Rajput (n=17), Patidar (n=72), Koli (n=11), Vankar (n=50) and Audichya Sahashtra (n=27).
- We have collected a total of 483 samples as per the given target, thus completing 96% of the total sample collection target.
- All collected samples were processed for blood biochemical analysis and genomic DNA extraction. Samples were sent to Centre for Brain Research (CBR), IISc Bangalore and CSIR-Centre for Cellular & Molecular Biology (CCMB), Hyderabad for further processing. Nucleo-cards were also prepared for biobanking at GBRC.

Key Outcomes/Lead

- The samples of 10 different ethnic groups of India have been collected and completed the overall target of the sample collection.
- The collected samples were subjected to blood biochemical analysis and genomic DNA extraction process.
- The samples were sent to CCMB and CBR for sequencing and bio-banking analysis.

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Madhvi Joshi
Scientist:	Dr. Bhumika Prajapati
Lab technician:	Bhagirath Dave
Field Assistant:	Aman Tripathi

Figure 1: Sample collection: The trained phlebotomist collects the whole blood sample from participants of different ethnic groups for various biochemical, haematological and genetic analysis.

Title of Project

Networking Program on Ayurvedic Formulations for COVID-19 through BT interventions

Funding Agency

Gujarat State Biotechnology Mission, Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 10,00,000/-

Total Duration

1 Years

Objectives in Brief

- Coordination for collection and sourcing of herbs and formulations, clinical trial, herbal formulation, collection and sourcing of herbs and formulations (Directorate of AYUSH, Govt. of Gujarat, Govt. Ayurveda College, Vadodara)
- Herbal formulation, collection and sourcing of herbs and formulations (M. S. University)
- Chemical analysis and modification of active ingredients of herbs and compound formulations (Saurashtra University)
- Cell line based studies and Bioinformatics analysis, Clinical Trials (Gujarat University)
- Bioinformatics analysis, Clinical Trials (Veer Narmad South Gujarat University)
- Barcoding and Metabarcoding of herbs and compound herbal formulations (GBRC)

Key Outcomes/Lead

- Successfully submitted sequences of following barcodes on NCBI GenBank and BankIt; rbcL barcode- 32 sequences submitted; ITS barcode- 11 sequences submitted; matK barcode- 12 sequences submitted
- Submitted 26 sequences on BOLD Database with specimen and voucher details
- Study revealed that compounds from one plant Taverniera cuneifolia compounds especially, Licoricesaponin E2 Momordicinin; Abrusoside A, and Cucurbitacin E can be developed as the new leads for treating SARS-CoV-2.

Publication / Patent

- NA

Manpower Detail

Project Coordinator:	Prof. Chaitanya G. Joshi
PI:	Dr. Sonal Sharma
JRF:	Yesha Upadhayay
	Meha Bhatt

Fraction S8

Figure 1: Binding energies of the compounds in fraction S8 obtained in docking studies with 6LU7 and 7TOB. GC376 and N3 was taken as the known inhibitor of the compounds. GC376 showing binding energies -8.2 and -7.2 with 6LU7 and 7TOB respectively whereas - 6.8 and -7.5 was obtained when docked with N3.

Fraction S7

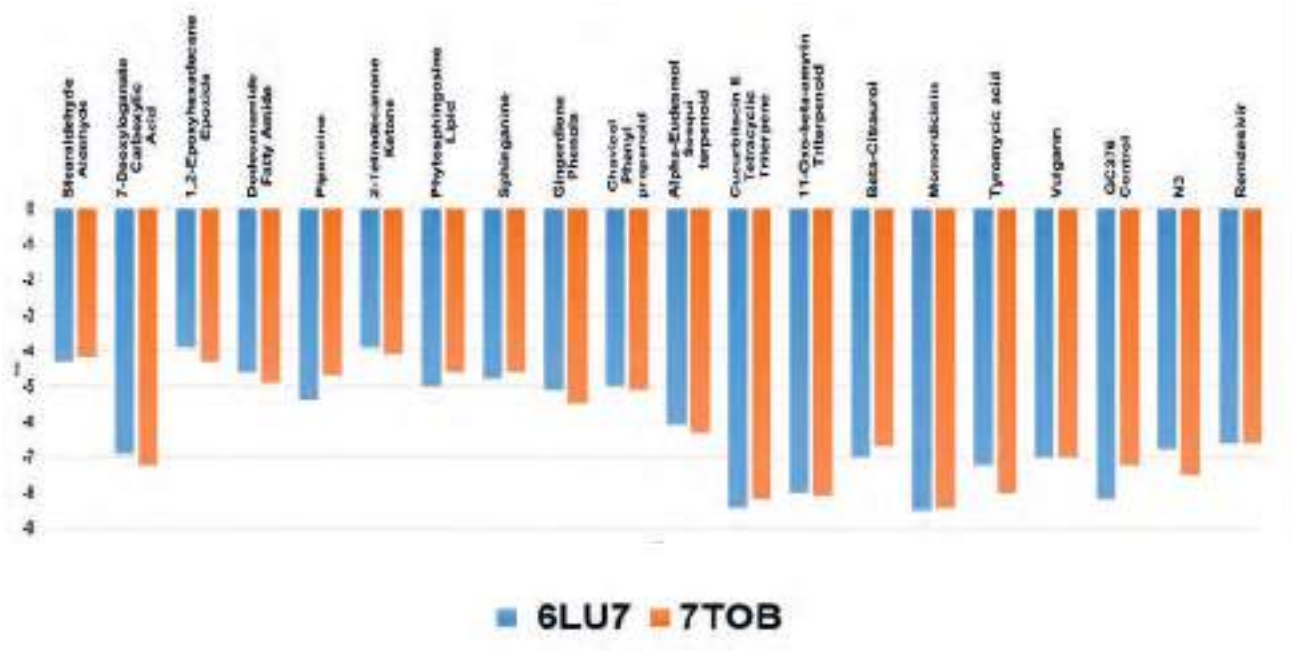


Figure 2: Binding energies of the compounds in fraction S7 obtained in docking studies with 6LU7 and 7TOB. GC376 and N3 was taken as the known inhibitor of the compounds. GC376 showing binding energies -8.2 and -7.2 with 6LU7 and 7TOB respectively whereas - 6.8 and -7.5 was obtained when docked with N3.

GUJARAT BIOTECHNOLOGY RESEARCH CENTRE

GBRC

TRANSLATING BRIGHTER BIO FUTURE

PLANT BIOTECHNOLOGY

Title of Project

Development of cell culture protocols for Guggulsterone production in *Commiphora wightii* (Arnott) Bhandari

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 32,00,000/-

Total Duration

3 Years

Objectives in Brief

- Optimization of method for Guggul callus and embryogenic culture production and its multiplication
- Collection of Guggul plants from different parts of Gujarat and their characterization
- Identification of plants containing high Guggulsterone contents and their establishment at GBRC
- Development of protocols for Guggul cell cultures for *in vitro* production of Guggulsterone

Project Progress

- Guggul leaf and shoot samples were collected from Lekawada for callus initiation. These samples are processed for callus initiation in various media combinations to find the best media for callus initiation and multiplication.
- We evaluated various methods for extraction and determination of Guggulsterone content among the samples.
- Various solvents were used for optimizing Guggulsterone extraction. It includes methanol, acetonitrile,
- toluene, combination of solvents etc.
- Various samples such as callus, leaf, stem, guggul gum were analysed to check content of Guggulsterone.
- We had also analysed three different drying methods viz. hot-air drying, shade drying and freeze-drying (lyophilization) for qualitative experiments of Guggulsterone detection. Among which, freeze drying (lyophilization) was found to be the best method.
- We have confirmed the presence of Guggulsterone in leaf, stem, fruit, resin and callus samples of *C. wightii* using this optimized UPLC-MS/MS method.
- Four different extraction protocols were used. (1) maceration, (2) sonication (20 min, 40 min, 60 min), (3) refluxion and (4) combined extraction method (maceration+sonication (20 min, 40 min, 60 min) +refluxion) using different solvents (methanol (100%), methanol: ethyl acetate (1:1), acetonitrile (100%), methanol: ethyl acetate: acetonitrile (2:1:1) and sample to solvent ratio (1:1, 10:1, 20:1, 40:1 (mg/ml)), the combined extraction method (maceration+sonication (60 min) +refluxion) with sample to solvent ratio of 20:1 and methanol: ethyl acetate: acetonitrile (2:1:1) was found to be the best extraction method for the qualitative analysis of Guggulsterone in plants samples (leaf, stem and fruit) and callus cultures of *C. wightii*.

Key Outcomes/Lead

- Guggul callus initiation and multiplication media protocol was finalized.
- The freeze drying (lyophilization) was found to be the best method for qualitative analysis.
- We have confirmed the presence of Guggulsterone in samples.

Publication / Patent

- NA

Manpower Detail

Project Coordinator:	Dr. Madhvi Joshi
PI:	Dr. Fenil Patel
RA:	Dr. Sahil Kapoor
JRF:	Jaina Patel

Figure 1: Callus production from leaf samples of *C. weightii.*

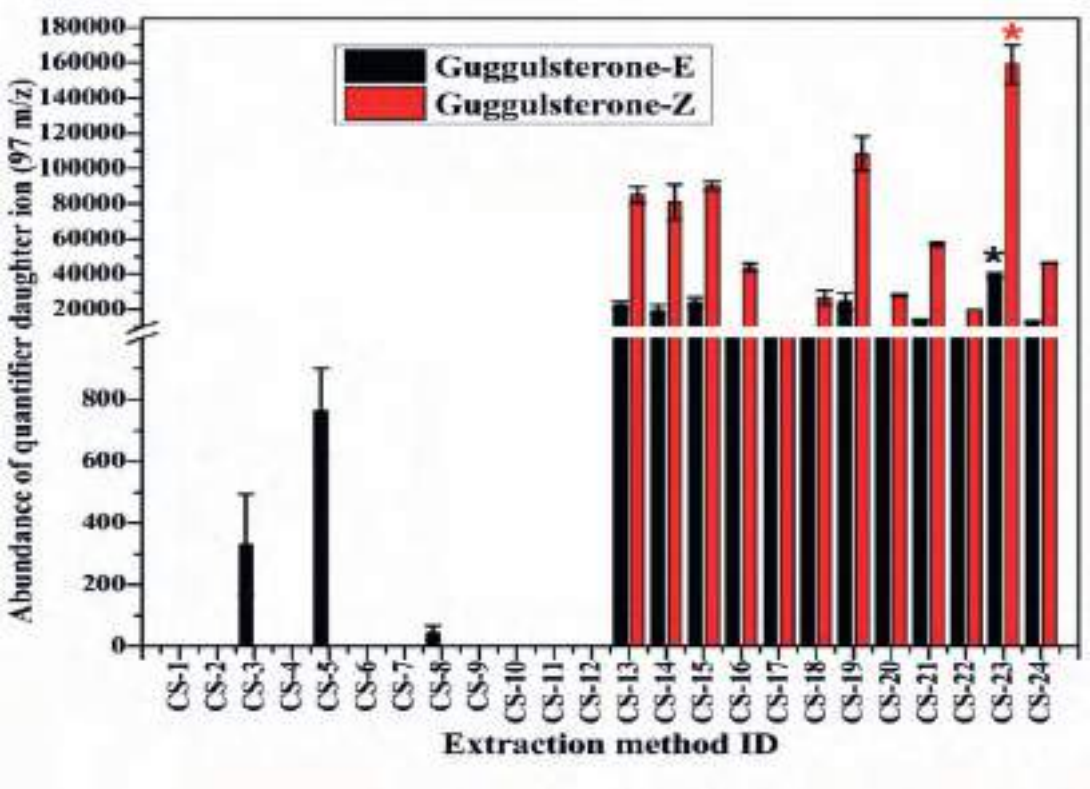


Figure 2: Comparison of extraction efficiency of extraction protocol – 2 and extraction protocol - 4 for extraction of Guggulsterone–E and Guggulsterone-Z from callus samples of *C. wightii*. Values are mean ± standard deviation of two replicates. Mean value followed by the asterisk mark is significantly different at $p \leq 0.05$ according to the Bonferroni post-hoc test. CS-1-12 – Callus initially extracted in methanol, CS 14 - 24 Callus initially extracted in methanol: acetonitrile: ethyl acetate (2:1:1) and dissolved in methanol.

Title of Project

Development of transgenic library for fungal infection in crops

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 60,00,000/-

Total Duration

3 Years

Objectives in Brief

- To identify major crops of Gujarat and percent loss incurred of the said crops due to any fungal disease
- To identify effective resistant gene against such fungal disease
- To isolate such resistant gene and validation of its efficiency
- Construction of fungal resistance gene library

Project Progress

- A direct regeneration system using embryogenic explants in cumin (*Cuminum cyminum L.*) was established to develop a highly efficient transformation system.
- Cumin embryos were utilized as an explant which shows higher regeneration efficiency on B5 media supplemented with 2.0 µM BA+ 0.5 µM NAA (Figure 1).
- Cumin transformation of pSIM24-eGFP plasmid was carried out through *Agrobacterium tumefaciens* and biolistic gene gun techniques.
- Cumin explants were transformed using a helium driven particle delivery system (Bio-Rad, PDS-1000) with plasmid DNA (pSiM24-eGFP) coated with gold particles as microcarriers. Cumin embryos (100) were cultured aseptically and arranged in a circle 20 mm in diameter in petri plates on B5 medium supplemented with 2.0 µM BA + 0.5 µM NAA.
- Gene gun-mediated transformed explants were cultured on different osmolytes (mannitol, sorbitol, and sucrose) containing media for reducing bombardment stress. After bombardment cumin embryos were cultured on B5 + 2.0 µM BA + 0.5 µM NAA supplemented with different concentrations of osmolytes as sucrose (0.2 M, 0.4 M, and 0.6 M), sorbitol (0.2 M, 0.4 M, and 0.6 M) and mannitol (0.2 M, 0.4 M, and 0.6 M).
- Compared to mannitol and sucrose-containing media, transformed explants cultured on sorbitol-containing media showed higher rates of regeneration and transformation, moreover, the prominent GFP expression was found through real-time PCR analysis.
- We have used different optical densities (OD600 0.4, 0.5, and 0.6) of culture for optimization of Agrobacterium-mediated transformation. Transformed explants were cultured on selection media B5 + 0.5 µM BA + 2.0 µM NAA with a concentration of 10 mg/L of kanamycin for the selection of transformed explants.
- The Agrobacterium-mediated transformed explants showed higher regeneration and transformation efficiency with 0.5 O.D. of cell density and 24 hour of co-cultivation compared to 0.4 O.D. and 0.5 O.D. with different co-cultivation time.
- GFP expression analysis was carried out from the T0 transgenic cumin explants raised through Agrobacterium (Figure 2) and gene gun-mediated transformation by fluorescence microscope. Explants were selected randomly from samples of post-transformation incubation. For RT-PCR based analysis, total RNA was isolated from frozen transformed explants. The cDNA was used as a template for qRT-PCR with GFP gene-specific and ribulose-bisphosphate carboxylase (rbcL) gene-specific primers.
- Full length β-1,3-Glucanase (β-glu) gene was amplified through overlapping extension PCR followed by digestion and ligation in pDRIVE vector. Further pDRIVE vector was digested using BamHI and XhoI and ligated in pET22b vector.
- Positive clones were selected for β-1,3-Glucanase (β-glu) activity using β-1,3-Glucane as substrate (Figure 3).

Key Outcomes/Lead

- Optimized efficient techniques for cumin transformation with higher regeneration and transformation efficiency by optimizing different parameters of Agrobacterium and gene gun-mediated transformation.
- Green fluorescence protein (GFP) gene expression analysis was carried out from the T0 transgenic cumin explants raised through Agrobacterium and gene gun-mediated transformation by fluorescence microscope and qRT-PCR.
- Full length β-1,3-glucanase (β-glu) gene was amplified through overlapping extension PCR followed by digestion and ligation in pDRIVE vector.

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Amrutlal K. Patel
Scientist:	Dr. Darshan Dharajiya
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JRF:	Mansi Jani

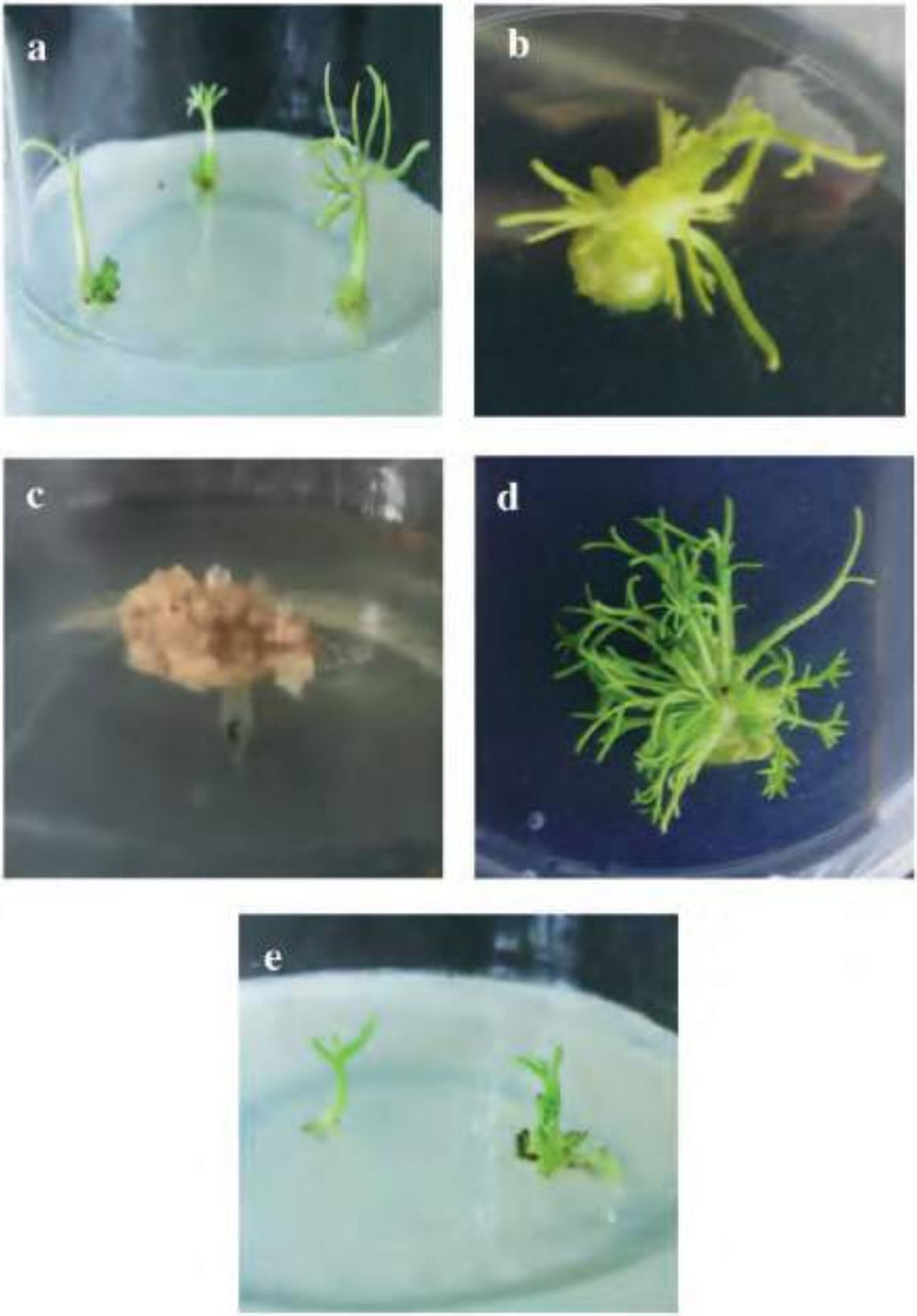


Figure 1: Thirty days old cultures of *C. cyminum* cv. GC-2 showing regeneration on different hormone combinations containing Gamborg's B5 medium. (a) CR1: B5 + 0.5 µM BA + 2.0 µM NAA, (b) CR2: B5 + 1.0 µM BA + 4.0 µM NAA, (c) CR3: B5 + 2.0 µM BA + 6.0 µM NAA, (d) CR4: B5 + 2.0 µM BA + 0.5 µM NAA, and (e) CR5: B5 + 4.0 µM BA + 1.0 µM NAA.

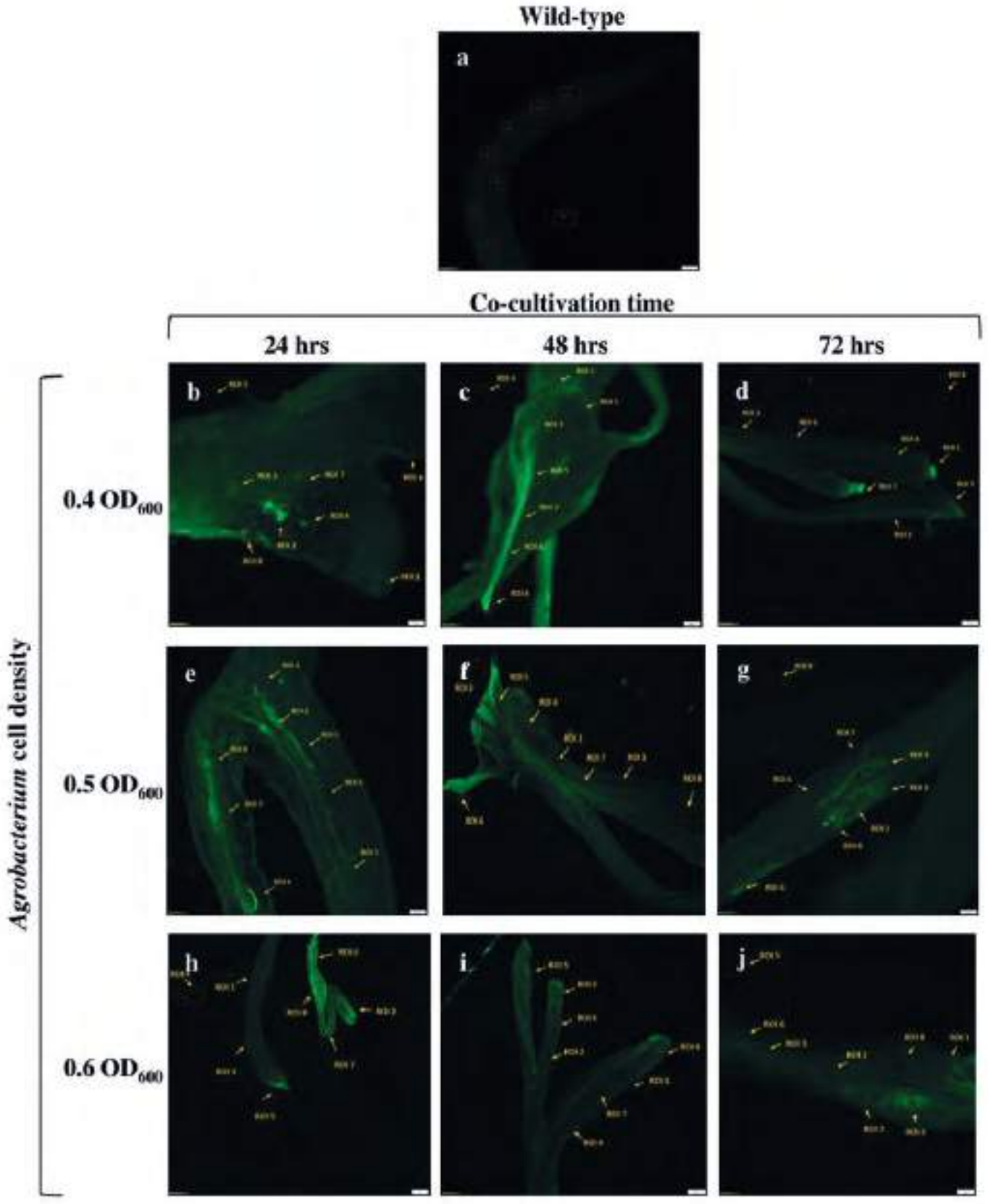


Figure 2: Analysis of GFP expression and intensity profiling of Agrobacterium-mediated transformed (pSIM24-eGFP) cumin explants through inverted fluorescence microscope. (a) WT: wild-type, (b) 0.4 OD_{600} + 24 hrs co-cultivation, (c) 0.4 OD_{600} + 48 hrs co-cultivation, (d) 0.4 OD_{600} + 72 hrs co-cultivation, (e) 0.5 OD_{600} + 24 hrs co-cultivation, (f) 0.5 OD_{600} + 48 hrs co-cultivation, (g) 0.5 OD_{600} + 72 hrs of co-cultivation, (h) 0.6 OD_{600} + 24 hrs co-cultivation, (i) 0.6 OD_{600} + 48 hrs co-cultivation, and (j) 0.6 OD_{600} + 72 hrs co-cultivation.

Title of Project

Development of tissue culture protocol for Date palm, Pomegranate, Guggul, Teak and Guava

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 32,00,000/-

Total Duration

3 Years

Objectives in Brief

Date Palm

- Development of somatic embryogenesis protocol
- Development of multiple shooting protocol
- Development of rooting protocol
- Development of hardening protocol

Pomegranate and Guggul

- Cultivar selection and explant collection
- Development of multiple shooting protocol
- Development of rooting protocol followed by hardening protocol

Teak and Guava

- Survey and collection of germplasm
- Standardization of micro-propagation protocols
- Standardization of protocol for large scale production
- Molecular study to access somaclones of tissue cultured plants

Project Progress

- In this project we are trying to develop plant tissue culture protocol for various crops.
- In Date palm, previously callus has been produced by trying various media combinations. Somatic embryo development and its germination is under optimization.
- For Pomegranate, we already developed media protocol and currently, we are optimising the hardening protocol.
- In Guava tissue culture, various methodologies for control of high phenol in media have been optimized. For control of bacterial and fungal contamination, different antibiotics have been tested.
- For Teak, we used nodes and seed for tissue culture protocol development of Teak. From nodes we got node breaking but we cannot produce multiple shoots, hence it needs optimisation. From seed we got germination from embryo, however it needs optimisation.

Key Outcomes/Lead

- Guggul callus induction and multiplication protocol optimized.
- Guava new bacterial endophytes identified and media with antibiotic were optimized for endophytes control.

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Madhvi Joshi
Scientist:	Dr. Fenil Patel
RA:	Dr. Poonam Patel
JRF:	Priyanka Nagal

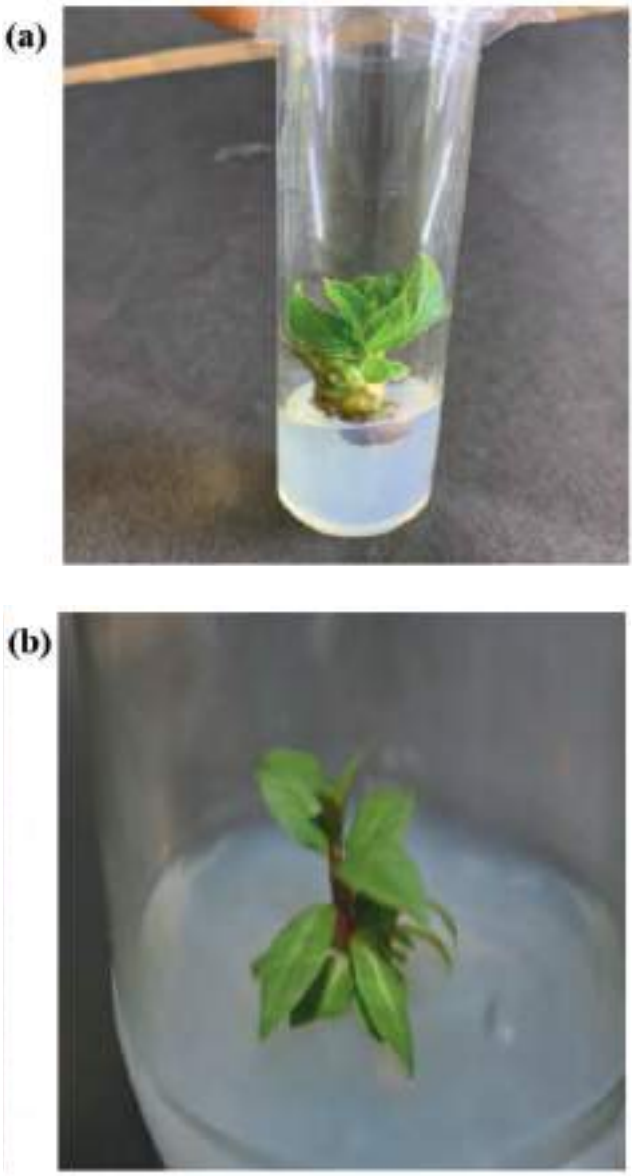


Figure 1: (a) Teak and (b) Guava shoot induction from nodal culture.

Title of Project

Development of assay kit for detection of biological adulteration in highly traded herbal products through DNA tags and barcoding

Funding Agency

Gujarat State Biotechnology Mission, Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 40,00,000/-

Total Duration

3 Years

Objectives in Brief

- Collection and molecular identification of the medicinal plant and their corresponding adulterant materials used in the herbal product
- Collection of respective herbal products/ formulation, optimization of DNA extraction and development of species-specific primers through DNA barcoding
- Designing of amplicon based panels for detection of adulterants
- Development and validation of rapid and efficient PCR/RT-PCR based kit for detection of adulteration for specific formulations

Project Progress

- With the widespread adoption of barcoding and next-generation sequencing, metabarcoding is emerging as a potential tool for detecting labelled and unlabelled plant species in herbal products.
- We validated our 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 (Figure 1) and 15 polyherbal formulations (Figure 2) procured from the Indian market.
- The rbcL metabarcode demonstrated detection efficiencies of 86.7% and 71.7% 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 cumulative 79% 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 as well as in herbal formulations. Our results demonstrated the applicability of multi-locus strategies in metabarcoding as a potential tool for detecting labelled and unlabelled plant species in herbal formulations.

Key Outcomes/Lead

- We have developed two new metabarcodes and data analysis pipeline for pharmacovigilance of herbal formulations.
- We also published two research papers in peer reviewed journals.

Publication / Patent

- Travadi, T., Shah, A. P., Pandit, R., Sharma, S., Joshi, C., & Joshi, M. (2023). Detection of *Carica papaya* adulteration in *Piper nigrum* using chloroplast DNA marker-based PCR Assays. Food Analytical Methods, 16(1), 107-114.
- Travadi, T., Shah, A. P., Pandit, R., Sharma, S., Joshi, C., & Joshi, M. A combined approach of DNA metabarcoding collectively enhances the detection efficiency of medicinal plants in single and polyherbal formulations. Frontiers in Plant Science, 14, 1542.
- Patent: Primers and PCR assay for authentication and identification of *Centella asiatica.* (Application Number: 202221035088)

Manpower Detail

PI:	Dr. Madhvi Joshi
Scientist:	Dr. Rameshchandra Pandit
	Dr. Sonal Sharma
RA:	Dr. Abhi Shah
SRF:	Tasnim Travadi

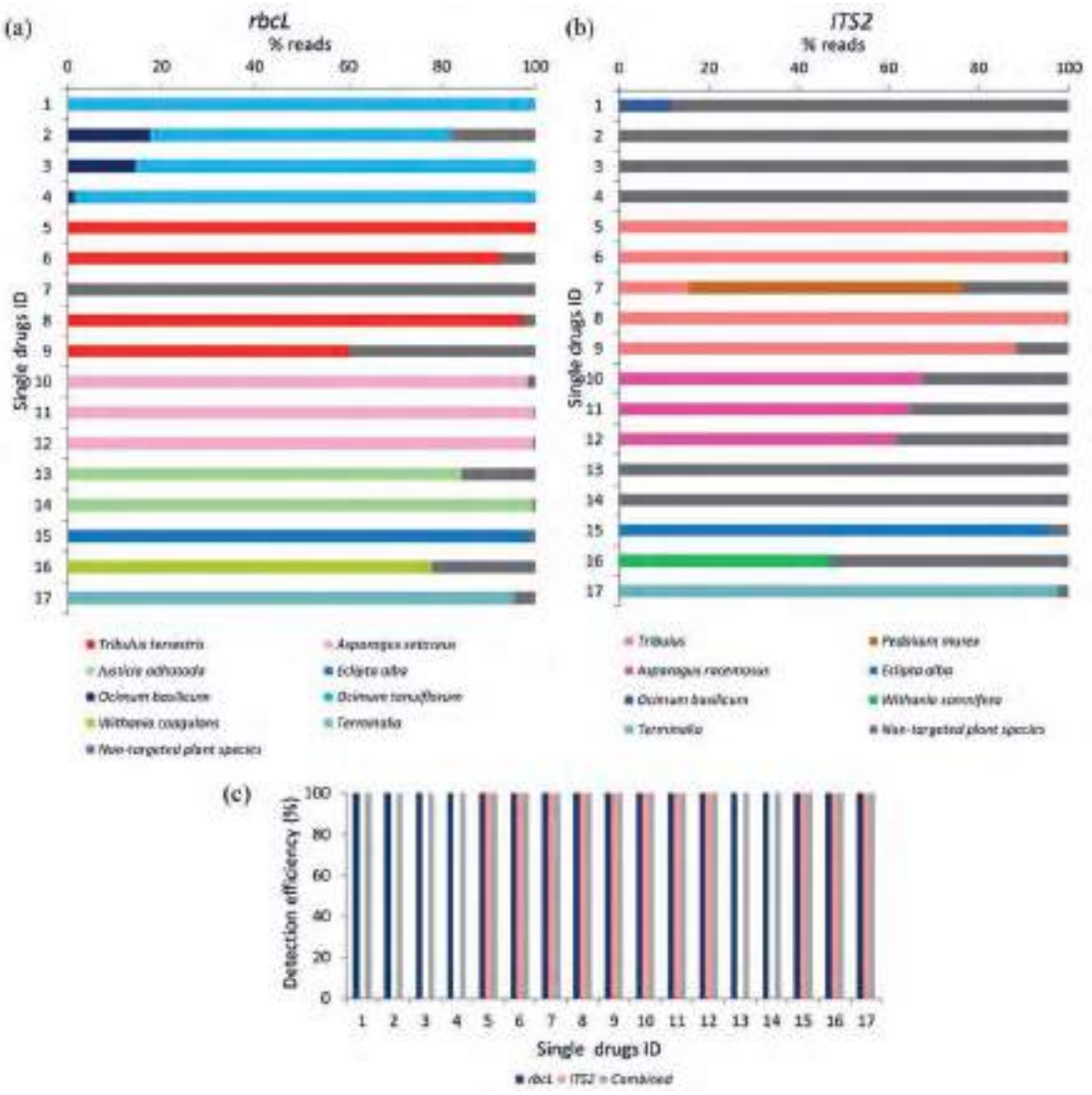


Figure 1: Relative abundance of the plant species and detection efficiency in single drugs through rbcL and ITS2 metabarcoding. (a) Relative abundance (% reads) of the plant species detected in single drugs through rbcL metabarcoding. (b) Relative abundance (% reads) of the plant species detected in single drugs through ITS2 metabarcoding. (c) Detection efficiency obtained in single drugs by rbcL, ITS2 and combined metabarcoding approach. Single drugs ID 1 to 4 for Tulsi (*Ocimum tenuiflorum*) powder, 5 to 9 for Gokhru (*Tribulus terrestris*) powder, 10 to 12 for Shatavari (*Asparagus racemosus*) powder, 13 and 14 for Vasa (*Justicia adhatoda*) powder, 15 for Bhringraj (*Eclipta alba*) powder, 16 for Ashwagandha (*Withania somnifera*) powder, and 17 for Arjuna (*Terminalia arjuna*) powder.

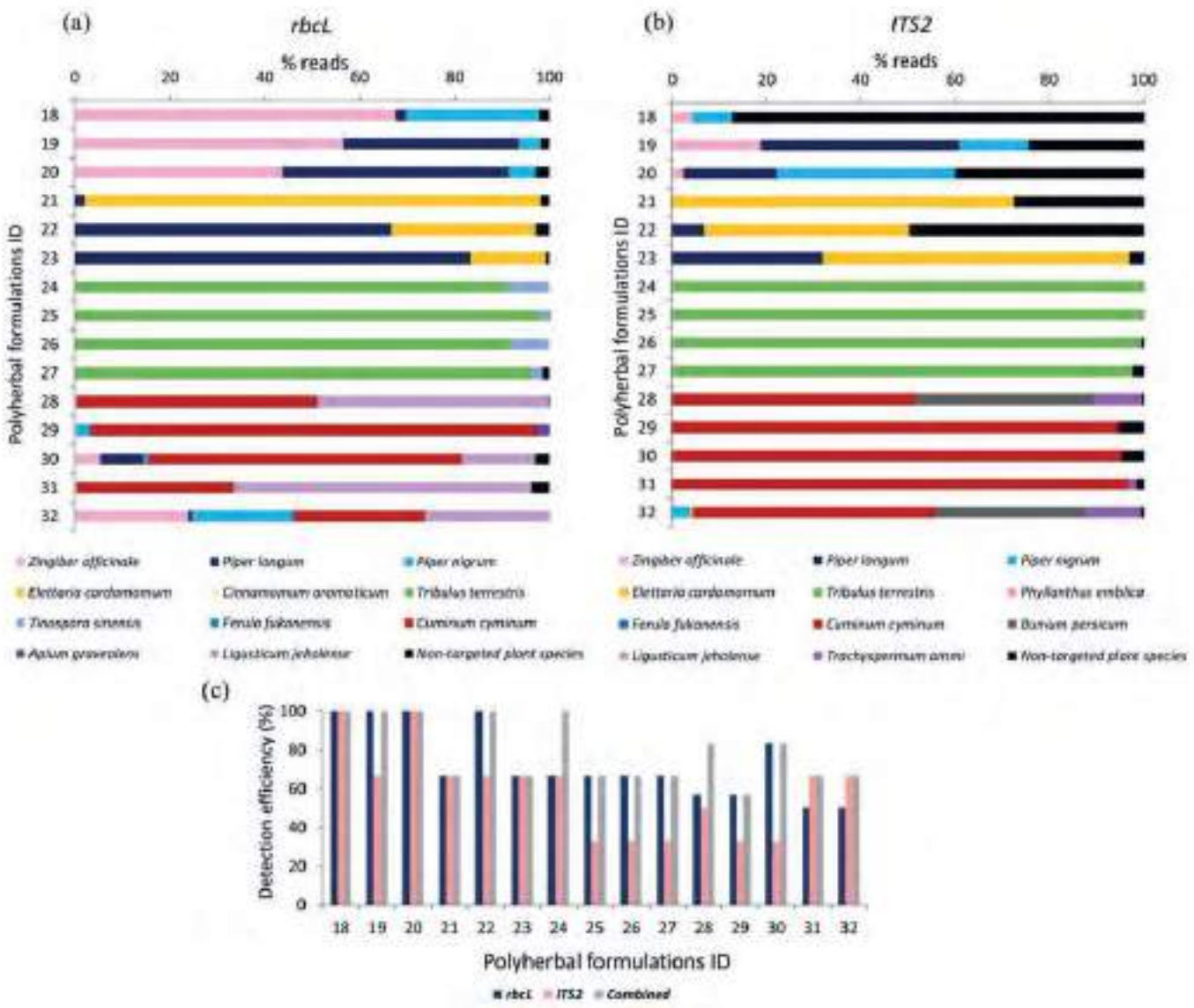


Figure 2: Relative abundance of the plant species and detection efficiency in polyherbal formulations through rbcL and ITS2 metabarcoding. (a) Relative abundance (% reads) of the plant species detected in polyherbal formulations through rbcL metabarcoding. (b) Relative abundance (% reads) of the plant species detected in polyherbal formulations through ITS2 metabarcoding. (c) Detection efficiency obtained in polyherbal formulation by rbcL, ITS2 and combined metabarcoding approach. Polyherbal formulations ID 18 to 20 for Trikatu powder, 21 to 23 for Sitopaladi powder, 24 to 27 for Rasayana powder, 28 to 31 for Hingwashtak powder, 32 for Talisadi powder.

Title of Project

Sex determination kit in date palm (*Phoenix dactylifera*)

Funding Agency

Gujarat State Biotechnology Mission, Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 27,00,000/-

Total Duration

3 Years

Objectives in Brief

- Transcriptome analysis of male and female flowers of date palm
- Data analysis and development of sex specific markers
- Validation of sex specific marker and development of sex determination kit

Project Progress

- We identified male-specific markers to identify sex in date palm at the seedling stage. Genomic DNA is isolated separately from both male and female date palm genotypes. Amplification of this genomic DNA using the GPAT & CYP primers results in an amplicon of 450 bp & 1500 bp only in male samples. Based on this amplification pattern, the sex of date palm seedlings can be predicted.
- In 2022-23, GBRC provided service on sex determination of date palm to farmers and private organizations (msore than 500 leaf samples).

Key Outcomes/Lead

- PCR based method is developed on sex determination of date palm.

Publication / Patent

- NA

Manpower Detail

PI:	Dr. Madhvi Joshi
Scientist:	Dr. Fenil Patel
JRF:	Mansi Jani

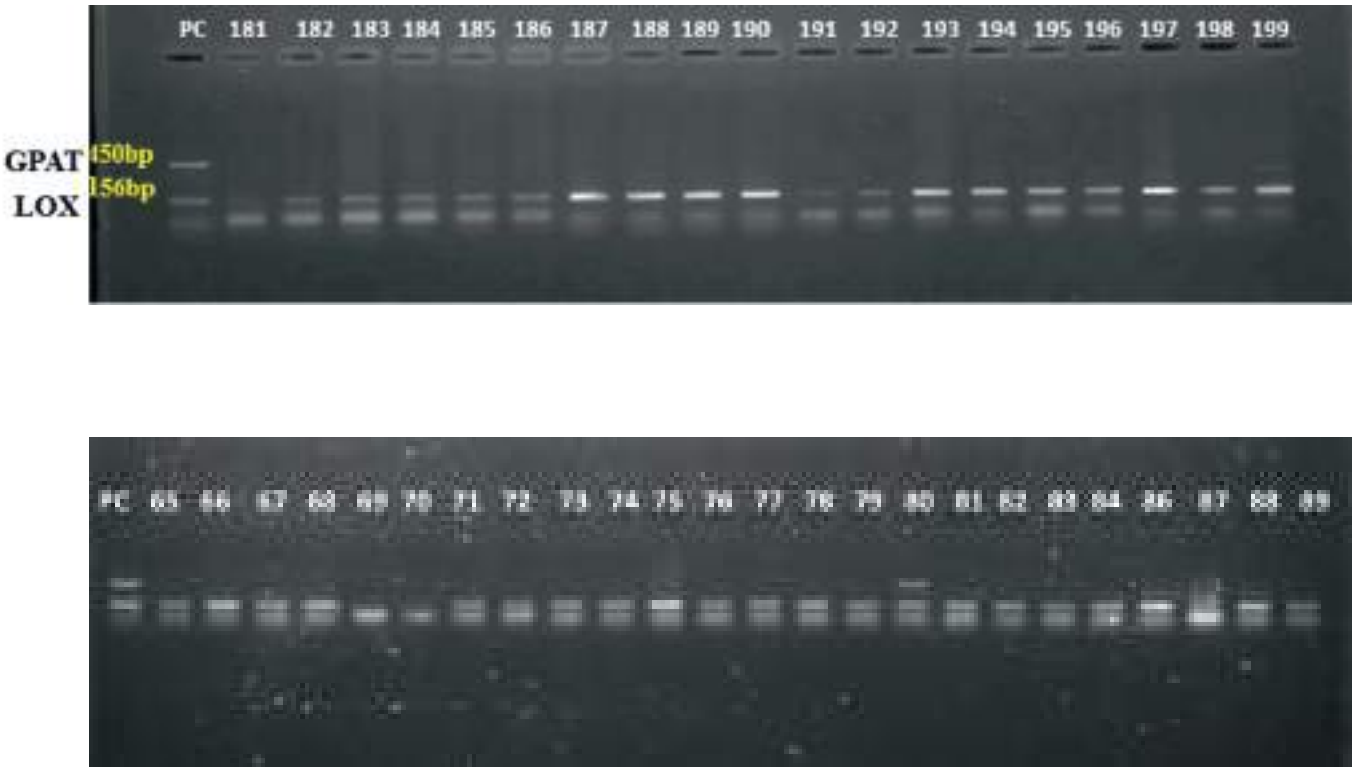


Figure 1: Representative figure for sex determination in date palm.

GUJARAT BIOTECHNOLOGY RESEARCH CENTRE
विज्ञानं ब्रह्मा
GBRC
TRANSLATING BRIGHTER BIO-FUTURE

MARINE
Biotechnology

Title of Project

Genomic selection of elite, high yielding fish variety for seed improvement in aquaculture

Funding Agency

Department of Science and Technology, Government of Gujarat, India

Grant

Rs. 32,00,000/-

Total Duration

3 Years

Objectives in Brief

- Survey and screening of important 3-4 high yielding and important indigenous fish variety with market potential
- Phenotypic and genotypic characterization of selected elite fishes
- Identification of genotypic signature for high quality seed identifications
- Validation and selection of high yielding fish varieties for improved seed aquaculture

Key Outcomes/Lead

- RNA isolation and transcriptome library preparation were carried out for 16 gill tissue samples, 4 brain tissue samples, and 2 kidney tissue samples maintained at various salinity concentrations.
- Transcriptome sequencing on the NovaSeq 6000, Illumina platform. Transcriptome data analysis was conducted. Differential gene expression analysis was performed using the DeSeq2 package from Bioconductor.
- Transcriptome data was processed for identification of lncRNA using Cuffmerge (v2.2.1), FEELnc (v.0.2.1) and CPC2 (v0.1) tools and differentially expressed lncRNAs are identified using DESeq2 (v1.32.0).
- lncRNA-miRNA-mRNA competitive endogenous (ceRNA)network was established for gill, brain and kidney transcriptome.

Publication / Patent

- Harshini, V., Shukla, N., Raval, I., Kumar, S., Shrivastava, V., Patel, A.K. and Joshi, C.G., 2022. Kidney transcriptome response to salinity adaptation in *Labeo rohita*. Frontiers in Physiology, p.2183.

Manpower Detail

Project Coordinator	Prof. Chaitanya G. Joshi
PI:	Dr. Amrutlal Patel
Scientist:	Dr. Ishan Raval
RA:	Dr. Harshini Vemula
JRF:	Nitin Shukla

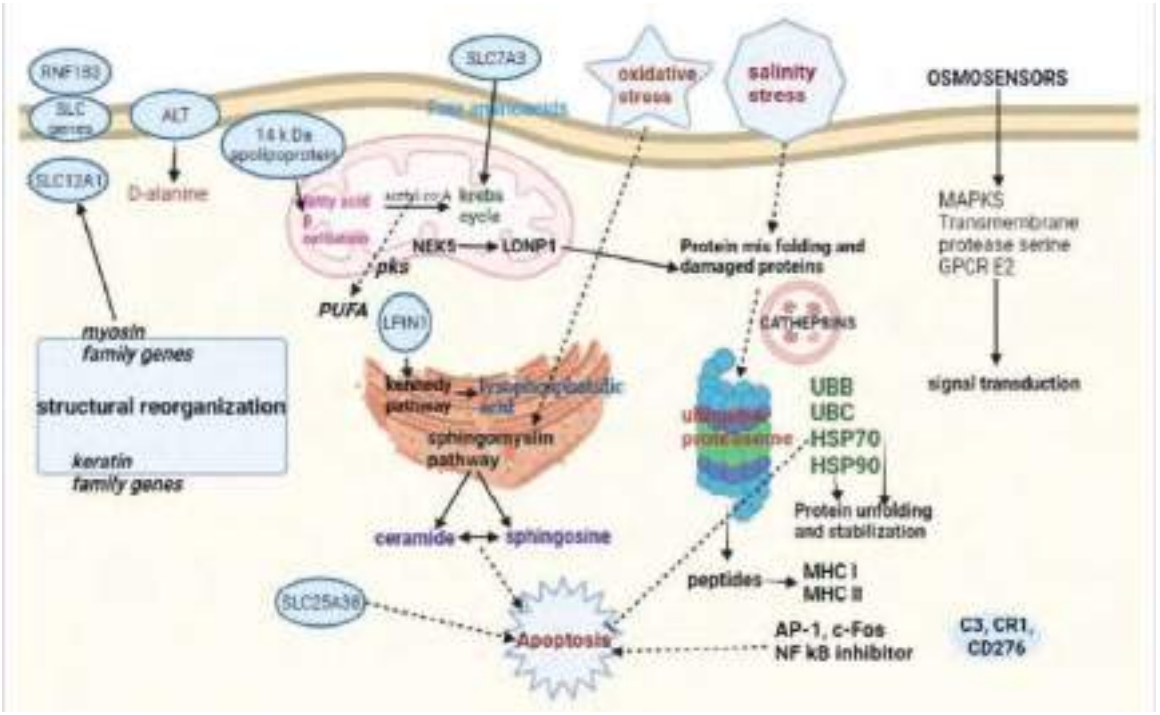
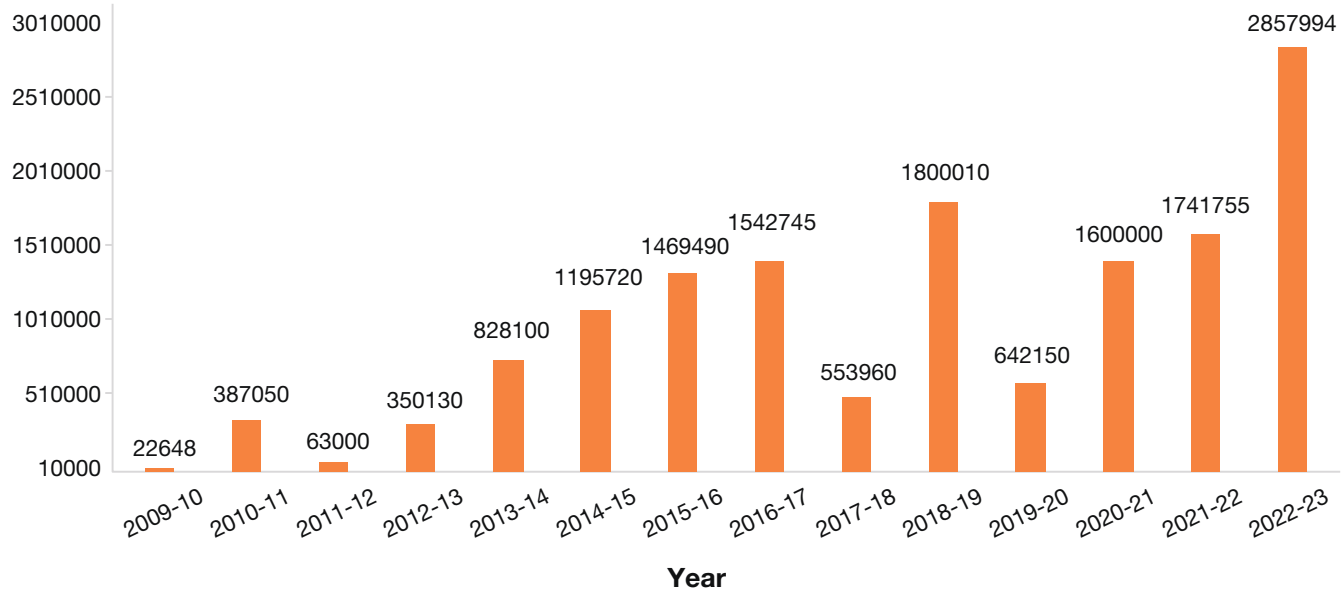


Figure 1: Schematic model for salinity tolerance pathway in *Labeo rohita.*

GBRC
SERVICES

In the financial year 2022-23, GBRC has processed over 800 samples and has provided number of services to 43 research institutes / researchers / academic institutes and 52 different companies / industries all over Gujarat and other states of India generating a revenue of Rs. 28,57,994/-.

Revenue



GBRC SHARED LAB

Shared Lab Usage 2022-2023

Total Bookings	**273**
Users	**88**
Instruments/Facilities used	**19**
Total Revenue	**Rs. 7,42,972/-**

Top Shared Lab Users

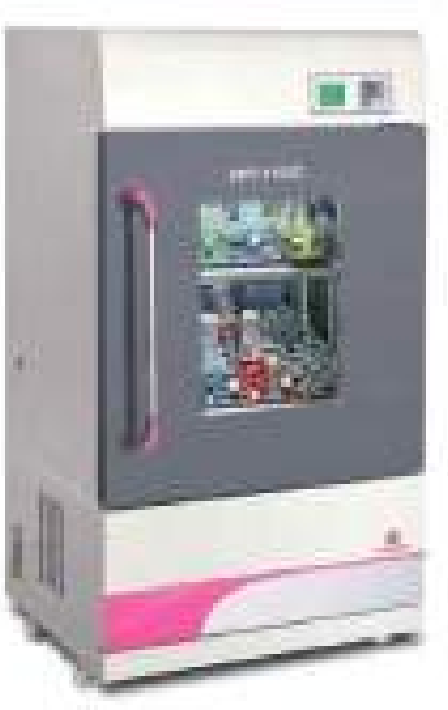
S.No.	Institute / University / Company	S.No.	Institute / University / Company
01	Central University of Gujarat, Gandhinagar	11	ICAR- Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar
02	Gujarat University, Ahmedabad	12	ICAR-National Bureau of Animal Genetic Resources (NBAGR), Karnal
03	Parul University, Vadodara	13	ICMR-National Institute of Occupational Health (NIOH), Ahmedabad
04	The Maharaja Sayajirao University of Baroda, Vadodara	14	CSIR- Central Salt and Marine Chemical Research Institute (CSMCRI), Bhavnagar
05	National Institute of Pharmaceutical Education and Research (NIPER) -Ahmedabad	15	ICAR - Central Institute of Fisheries Education (CIFE), Mumbai
06	Institute of Advanced Research, Gandhinagar	16	Wobble Base Bioresearch Pvt. Ltd., Surat
07	Anand Agricultural University, Anand	17	MedGenome Labs, Bangalore
08	National Forensic Sciences University, Gandhinagar	18	Advait Theragnostics, Ahmedabad
09	Sardar Patel University, Anand	19	Neuberg Centre for Genomic Medicine (NCGM), Ahmedabad
10	Navrachana University, Vadodara	20	Institute for Plasma Research (IPR), Ahmedabad

Establishment of GBRC

1. Staff/Fellow Recruitment

Scientist B	02
Technical Assistants	02
Research Associates	23
Senior Research Fellows	01
Junior Research Fellows	32
Project Scientists	02
Project Associates and Assistants	08
Admin Section	01
Other Staff	08
Total	79

2. New Instruments Purchased



Orbital Shaker Incubator

MALDI-TOF

Cytation 5 Multimode Reader

2-D Gel Electrophoresis System

Automatic Ice Flake Machine

Vertical Autoclave

High-end Inverted Microscope

Patent

1. Shah, A., Travadi, T., Pandit, R., Sharma, S., Joshi, M., Joshi, C. Primers and PCR assay for authentication and identification of *Centella asiatica*. (Application Number: 202221035088)

Publications

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9. Chander, Y., Kumar, R., Verma, A., Khandelwal, N., Nagori, H., Singh, N., Sharma, S., Pal, Y., Puvar, A., Pandit, R., Shukla, N., Chavada, P., Tripathi, B., Barua, S. and Kumar, N. 2022. Resistance evolution against host-directed antiviral agents: Buffalopox virus switches to use p38- under long-term selective pressure of an inhibitor targeting p38-α. Molecular Biology and Evolution, 39(9), p.msac177.

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11. Kumar, D., Saraf, M., Joshi, C.G. and Joshi, M., 2022. Rhizosphere microbiome analysis of healthy and infected cumin (*Cuminum cyminum* L.) varieties from Gujarat, India. Current Research in Microbial Sciences, 3, p.100163.

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Poster/Oral Presentations

1. International conference on “Coronaviruses: Past, Present, and Future”, 10th -11th May, 2022 at Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K)

Dr. Ramesh Pandit	Host genetic factors for COVID-19 severity and outcome in Western Indian population
Dr. Apurvasinh Puvar	Nasopharyngeal microbiome of COVID-19 patients revealed a distinct bacterial profile in demised and recovered individuals

2. International conference - GTU ICON 2022 on “Post-pandemic resilience through biotechnology interventions”, 23rd September, 2022 at Gujarat Technological University, Ahmedabad

Dr. Abhi Shah	A combined approach of species-specific PCR assay, DNA metabarcoding and HPLC reveals the adulteration in Brahmi herbal products
Dr. Rushika Patel	Utilizing a multi-omic approach to assess the effectiveness of panchkarma therapy for amvata (Rheumatoid arthritis)
Tasnim Travadi	Authentication of *Phyllanthus emblica* (Amla), *Terminalia chebula* (Harde) and *Terminalia bellirica* (Baheda) using species-specific PCR assay

3. National conference on “Microbiomes to Macromolecules”, 22nd and 23rd Feb, 2023 at Gujarat University, Ahmedabad

Dinesh Kumar	Cumin (*Cuminum cyminum* L.) rhizosphere microbiome: Unexplored microflora and ramification in *Fusarium wilts*

4. Young Scientist Conference (YSC), part of the 8th India International Science Festival (IISF), held from 21st to 24th January, 2023 at the Maulana Azad National Institute of Technology (MANIT), Bhopal

Dr. Dalipsingh Rathore	Environmental surveillance of SARS-CoV-2 using digital PCR in wastewater samples of Gandhinagar city during Omicron wave
Dr. Fenil Patel	Sex determination in date palm
Kaksha Savaliya	Understanding translational research application: Mining the industrially important enzymes and biocules present in facultative ruminal bacteria using genomics approach
Dr. Abhi Shah	Multi-locus DNA metabarcoding strategy enhance detection efficiency of botanical ingredients within high valued Indian herbal drugs
Sadik Dantroliya	Poultry associated Campylobacter spp: genotypic and phenotypic profiles of antimicrobial resistance from Gujarat region
Tasnim Travadi	Validation of newly designed rbcL and ITS2 metabarcodes for detecting medicinal plants species using DNA metabarcoding in predefined mock controls

Awards

1. Dr. Apurvasinh Puvar (Scientist B) received the best oral presentation at the international conference on “Coronaviruses: Past, Present, and Future” held on May 10-11, 2022 at Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K).

2. Dr. Apurvasinh Puvar (Scientist B) and Dr. Rameshchandra Pandit (Scientist B) received travel award for attending the international conference on “Coronaviruses: Past, Present, and Future" held on May 10-11, 2022 at Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K).

3. Dr. Rushika Patel (Research Associate) got the best oral presentation award in the bioinformatics, IPR and bioenterpreunership category in the international conference, “Post-pandemic resilience through biotechnology interventions”, GTU ICON 2022 for her presentation on “Utilizing a multiomic approach to assess the effectiveness of panchkarma therapy for amvata (Rheumatoid arthritis)”.

4. Dr. Dalipsingh Rathore (Technical Assistant) received the best poster presentation award in the “Water and Food” theme at the Young Scientist Conference (YSC), part of the 8th India International Science Festival (IISF), held from 21st to 24th January, 2023 at the Maulana Azad National Institute of Technology (MANIT), Bhopal, India. The title of his poster was “Environmental surveillance of SARS-CoV-2 using digital PCR in wastewater samples of Gandhinagar city during omicron wave”.

GBRC Training Programs (2022-23)

1. Flow Cytometry: Principles, Experimental Designing and Data Analysis

Duration: 5th - 8th April, 2022
Collaborator: Flow Cytometry Solutions Pvt. Ltd., Jaipur
Venue: GBRC, Gandhinagar

2. Flow Cytometry: Principles, Experimental Designing and Data Analysis

Duration: 24th - 27th May, 2022
Collaborator: Flow Cytometry Solutions Pvt. Ltd., Jaipur
Venue: GBRC, Gandhinagar

3. Basic Bioinformatics

Duration: 22nd - 26th August, 2022
Collaborator: GeneXplore Diagnostics and Research Centre, Ahmedabad
Venue: GBRC, Gandhinagar

4. Basic Molecular Biology Techniques

Duration: 29th August - 2nd September, 2022
Collaborator: Sankalchand Patel University, Visnagar
Venue: Smt. S. S. Patel Nootan Science & Commerce College, Sankalchand Patel University, Visnagar

5. PCR & Real Time PCR

Duration: 5th - 9th September, 2022
Collaborator: Gujarat Technological University, Ahmedabad
Venue: School of Applied Sciences & Technology, Gujarat Technological University, Chandkheda, Ahmedabad

6. Advance Bioinformatics

Duration: 12th - 16th September, 2022
Collaborator: Sterling Accuris Diagnostics, Ahmedabad
Venue: GBRC, Gandhinagar

7. Basic Molecular Biology Techniques

Duration: 19th - 23rd September, 2022
Collaborator: Ganpat University, Mehsana
Venue: Mehsana Urban Institute of Sciences, Ganpat University, Ganpat Vidyanagar, Mehsana

8. Metagenomic Data Analysis

Duration: 26th - 30th September, 2022
Collaborator: Gujarat University, Ahmedabad
Venue: Gujarat University, Ahmedabad

9. Next Generation Sequencing

Duration: 10th - 14th October, 2022
Collaborator: Kamdhenu University, Anand
Venue: College of Veterinary Science and Animal Husbandry, Kamdhenu University, Anand

10. Molecular Docking and Molecular Dynamics

Duration: 17th - 21st October, 2022
Venue: GBRC, Gandhinagar

11. Metagenomic Data Analysis

Duration: 7th -11th November, 2022
Collaborator: Gujarat University, Ahmedabad
Venue: GBRC, Gandhinagar

12. Capillary Sequencing and Fragment Analysis

Duration: 14th - 18th November, 2022
Collaborator: National Forensic Sciences University (NFSU), Gandhinagar
Venue: School of Forensic Science, National Forensic Sciences University, Gandhinagar

13. Next Generation Sequencing

Duration: 21st - 25th November, 2022
Collaborator: Junagadh Agricultural University, Junagadh
Venue: Junagadh Agricultural University, Junagadh

14. *In Vitro* Fertilization

Duration: 28th November - 2nd December, 2022
Collaborator: Kamdhenu University, Gandhinagar
Venue: GBRC, Gandhinagar

15. Next Generation Sequencing

Duration: 5th - 9th December, 2022
Collaborator: S. N. Gene, Surat
Venue: S. N. Gene, Surat

16. *In Vitro* Fertilization

Duration: 12th - 16th December, 2022
Collaborator: Gujarat University, Ahmedabad
Venue: Department of Biochemistry and Forensic Science, Gujarat University, Ahmedabad

17. Analytical Techniques

Duration: 19th – 23rd December, 2022
Collaborator: NIPER-Ahmedabad
Venue: NIPER-Ahmedabad

18. Molecular Docking and Molecular Dynamics

Duration: 26th – 30th December, 2022
Collaborator: Gujarat Biotechnology University, Gandhinagar
Venue: GBRC, Gandhinagar

19. *In Vitro* Fertilization

Duration: 2nd - 6th January, 2023
Collaborator: Kamdhenu University, Gandhinagar
Venue: GBRC, Gandhinagar

20. Basic Bioinformatics

Duration: 9th - 13th January, 2023
Collaborator: Hemchandracharya North Gujarat University, Patan
Venue: Hemchandracharya North Gujarat University, Patan

21. Analytical Techniques

Duration: 16th - 20th January 2023
Collaborator: Gujarat Vidyapith, Ahmedabad
Venue: Bio Gas Research Center and Microbiology Department, Gujarat Vidyapith, Sadra

22. Metagenomic Data Analysis

Duration: 23rd - 27th January, 2023
Collaborator: Veer Narmad South Gujarat University, Surat
Venue: GBRC, Gandhinagar

23. Molecular Techniques to Monitor and Investigate AMR

Duration: 12th – 21st January, 2023
Collaborator: Anand Agricultural University, Anand
Venue: GBRC, Gandhinagar

24. 24th INDO-US Flow Cytometry Workshop on Flow cytometry and its Applications in Biological, Clinical, Pharmaceutical, Plant and Veterinary Sciences

Duration: 1st - 7th February, 2023
Collaborator: Trust for Education and Training in Cytometry (TETC), Mumbai
Venue: GBRC, Gandhinagar; IIT Gandhinagar; NIPER-Ahmedabad; Kamdhenu University, Anand

25. Genome-Wide Association Study

Duration: 13th - 17th February, 2023
Collaborator: National Dairy Development Board, Anand
Venue: National Dairy Development Board, Anand

26. PCR & Real Time PCR

Duration: 20th - 24th February, 2023
Collaborator: Kamdhenu University, Sardarkrushinagar
Venue: College of Veterinary Science and Animal Husbandry, Kamdhenu University, Sardarkrushinagar

27. Transgenic Plant Tissue Culture

Duration: 27th February- 3rd March, 2023
Collaborator: Anand Agricultural University, Anand
Venue: Centre for Advanced Research in Plant Tissue Culture, Anand Agricultural University, Anand

28. Genome-Wide Association Study

Duration: 13th - 17th March, 2023
Collaborator: National Dairy Development Board, Anand
Venue: GBRC, Gandhinagar

29. Transgenic Plant Tissue Culture

Duration: 20th - 24th March, 2023
Collaborator: Anand Agricultural University, Anand
Venue: GBRC, Gandhinagar

30. Molecular Docking & Molecular Dynamics

Duration: 27th - 31st March, 2023
Collaborator: Gujarat Biotechnology University, Gandhinagar
Venue: GBRC, Gandhinagar

PRABODH

PRABODH (Promoting Research Awareness in BiOtechnology for Development of Human resource) is a journal club constituted by GBRC to promote awareness about latest research worldwide and to improve scientific communication skills amongst its staff members. Two staff members present prominent research articles every month in order to enrich scientific knowledge of the GBRC community. In addition, experts from various relevant areas of the scientific community are invited to deliver a guest lecture.

S.No.	Name	Month	Topic
01	Dr. Ishan Raval	April, 2022	An intracellular nanobody targeting T4SS effector inhibits Ehrlichia infection
02	Ms. Roshni Mishra	April, 2022	Bacteria-triggered tumor-specific thrombosis to enable potent photothermal immunotherapy of cancer
03	Mr. Nitin Shukla	May, 2022	Pre-activated antiviral innate immunity in the upper airways controls early SARS CoV-2 infection in children
04	Dr. Reshma Talkal	June, 2022	Regulation of rumen development in neonatal ruminants through microbial metagenomes and host transcriptomes
05	Mr. Rupesh Thorat	June, 2022	A nanovaccine for antigen self-presentation and immunosuppression reversal as a personalized cancer immunotherapy strategy
06	Dr. Darshan Dharajiya	July, 2022	Whitefly hijacks a plant detoxification gene that neutralizes plant toxins
07	Dr. Komal Sapara	July, 2022	Arabidopsis P4 ATPase-mediated cell detoxification confers resistance to *Fusarium graminearum* and *Verticillium dahlia*
08	Dr. Haidar Abbas Masi	August, 2022	A stable antimicrobial peptide with dual functions of treating and preventing citrus Huanglongbing
09	Dr. Monika Jain	August, 2022	An activated platelet-sensitive nano-carrier enables targeted delivery of tissue plasminogen activator for effective thrombolytic therapy
10	Dr. Apurvsinh Puvar	September, 2022	Integrating taxonomic, functional and strain level profiling of diverse microbial communities with bioBakery 3

S.No.	Name	Month	Topic
11	Dr. Fenil Patel	October, 2022	The bacterial effector AvrRxo1 inhibits vitamin B6 biosynthesis to promote infection in rice
12	Dr. Abhi Shah	October, 2022	Cooperative action of gut-microbiota-accessible carbohydrates improves host metabolic function
13	Dr. Niraj Kumar Singh	November, 2022	The short chain fatty acid butyrate imprints an antimicrobial program in macrophages
14	Dr. Harshini Vemula	November, 2022	MBD5 and MBD6 stabilize the BAP1 complex and promote BAP1- dependent cancer
15	Dr. Dalip Singh Rathod	December, 2022	Improved cultivation and isolation of diverse endophytic bacteria inhabiting dendrobium roots by using simply modified agar media
16	Dr. Krishna Bharwad	December, 2022	The global regulator Hfq exhibits far more extensive and intensive regulation than Crc in Pseudomonas protegens H78
17	Dr. Arivudainambi Seenichamy	January, 2023	Enhancing nutritional niche and host defences by modifying the gut microbiome
18	Ms. Purva Gohil	January, 2023	Gut Microbiome ADP ribosyltransferases are widespread phage - encoded fitness factors
19	Dr. Maitri Trivedi	February, 2023	Highly potent multivalent VHH antibodies against Chikungunya isolated from an alpaca naïve phage display library
20	Dr. Pranitha Pandit	March, 2023	Metabolic flexibility of aerobic methanotrophs under anoxic conditions in Arctic lake sediments
21	Ms. Janvi Raval	March, 2023	Glucosidase inhibitor, Nimbidiol ameliorates renal fibrosis and dysfunction in type-1 diabetes

Invited Lectures at GBRC

Dr. Karla Mercado Shekhar
Assistant Professor,
Biological Engineering,
IIT Gandhinagar

Topic: Enabling techniques for tissue characterization using ultrasound

Dr. Karla Mercado-Shekhar's lecture was mainly focused on the application of quantitative ultra sound imaging in translational medicine and non-invasive diagnosis for cancer tissue detection, blood clot localization in the body and also to differentiate injured tissue from the normal tissue type. In translational medicine, quantitative ultrasound imaging can aid in the development and evaluation of new therapies. By providing real-time information about tissue characteristics, it can help researchers in assessing treatment response and monitor disease progression. This can lead to more effective and personalized treatment strategies.

Shri Maulik Bhatt
Managing Trustee,
Cosmo Research Foundation,
Ahmedabad

Topic: Shri Ram - Cosmological timeline

Shri Maulik Bhatt discussed the actual time period of the Bhagwan Shri Ram's existence. With the help of Vedic astronomical calculations, he found some discrepancies in modern science. The timeline of Lord Rama's life is not explicitly mentioned in the Ramayana in terms of specific dates or years. Instead, it is described in terms of the events and occurrences during his lifetime. He also mentioned some misinterpretation of Ramayana written by Maharishi Valmiki. With the help of mathematical calculations and his research on Ramayana, he proved that the mythology behind it is a history of more or less ten thousand years.

Dr. Shekhar Mande
Former Director General,
CSIR, New Delhi

Topic: How atomic view has enhanced our understanding of biology

Dr. Shekhar Mande discussed that how atomic view has enhanced our understanding of biology. He discussed about how the research progression in biophysics impacted the research in general biology. It has enhanced our understanding of biological world, structural features of biomolecules, cell membrane, DNA packing and their three dimensional arrangements. Biophysics has helped to understand the structural basis of various biological mechanisms such as protein translation, drug interaction with the target protein as well as the mechanism of invasion of SARS-CoV-2 virus in the host through interaction with the angiotensin-converting enzyme. This will further help in development of neutralizing antibodies. Cryoelectron microscopy technique is also revolutionizing the biological research. He also discussed about the bio-enterpreneurship and encouraged the students to develop biology based innovations.

Shri Dipak P. Joshi
IAS (Retd.)

Topic: Significance of science communication

Shri Dipak Joshi discussed the importance of books, which were written by the great scientists to elaborate the science to a normal non-scientific person. According to him, books are very important to explore history, philosophy, morality and science. Reading regularly increases our knowledge and boosts our intelligence. Many people find that reading helps them relax and provides an enjoyable escape to a different world. Books help children to develop their verbal and creative skills. Reading books helps pupils to learn, to develop their intellect and to raise their awareness on the diverse nations and civilizations around the world. Also, reading novels helps students develop their imagination and creativity.

Prof. Utpal Tatu
Professor,
IISc, Bangalore

Topic: Research on orphan diseases

Prof. Utpal Tatu gave introduction to orphan diseases and their ongoing research. Less than 100 patients are affected by such orphan diseases, also known as rare diseases. A handful of them bear the names of patients or even the medical centres where they were first discovered. In general, it is predicted that 1 in 17 persons may have a rare disease at some point in their lives. At the same time, there are up to 7,000 rare diseases, and more are being found every year.

Dr. Ajai Tripathi
Sr. Scientist,
Merck, USA

Topic: The effect of microglial dicer loss on demyelination and remyelination

Dr. Ajai Tripathi talked about how multiple sclerosis (MS) is affected by microglial dicer. Demyelination of neurons in the central nervous system, which results in damage, cell death, and impairment, characterizes this autoimmune condition. He explained how the CNS has mechanisms to repair the damage, but these systems are interrupted in MS and there are no existing treatments to make up for this deficiency. The role of tiny, non-coding RNA molecules called microRNAs (miRNAs) in autoimmune diseases like MS have received more attention in recent years. The research on the function of the microglial dicer was described.

Shri Partha Majumdar
Distinguished Professor
National Institute of Biomedical Genomics (NIBMG), Kolkata

Topic: Enabling precision medicine for cancer

Shri Partha Majumdar talked about precision medicine, a branch of medicine that makes use of a patient's own genes or proteins to treat, diagnose, or prevent illness. Precision medicine is used to diagnose cancer, design a patient's course of treatment, assess the effectiveness of that treatment, and determine the patient's prognosis. He talked about the history of cancer genetics. He continued by discussing the prevalence of breast and ovarian cancer in women. Numerous epidemiological and statistical research on hereditary diseases such Philadelphia chromosome, Lymphoma, and Leukemia were covered in the presentation.

Dr. Mitul Trivedi
Scientist,
Archaeologist and Historian

Topic: Physiology in Vedas

Dr. Mitul Trivedi talked about modern science and ancient vedic science in context of human physiology. According to him, Hinduism is not a religion, but a path that leads us towards freedom i.e. moksha, a final state of volatile energies. India, as described in scriptures and as experienced by many is a land beyond ideas of possessions and debts, a land beyond physical limitations, a land of ideas and emotions.

Dr. Madhvi Sheth
MS – Ophthalmology, Eye Surgeon

Topic: New horizons in eye research

Dr. Madhvi Sheth talked about optic diseases/conditions in humans as well as in animals like cataracts, diabetic retinopathy, glaucoma, retinal detachment and optical atrophies. Further, she discussed possible cures regarding recent research in the field of ophthalmic science. Eye research is a rapidly advancing field that has seen many promising developments in recent years. From gene therapy for inherited retinal diseases to stem cell therapy for age-related macular degeneration, researchers are exploring new ways to treat and cure eye diseases that were previously considered untreatable. She talked regarding vascular inserts, maculopathies and intravitreal implants. She discussed brain implants for blind people.

Dr. Aparna Chaudhari
Principal Scientist & Head
Fish Genetics and Biotechnology Division,
ICAR- CIFE, Mumbai

Topic: Development of White Spot Syndrome Virus (WSSV) vaccine

Dr. Aparna Chaudhari talked about her research, concentrating on how viral structural proteins and envelope proteins can be used as subunit vaccines to defend the host. The complexity of WSSV and the lack of a suitable immune response in crustaceans have posed challenges in vaccine development. Several research groups have demonstrated that a WSSV vaccine can be a useful and successful method for reducing WSSV infection. Research in the area has increasingly centred on the creation of such a vaccination and has resulted in substantial advances in the development of WSSV vaccines.

Prof. L. S. Shashidhara
Professor and Eminent Scientist
in Evolutionary Biology,
IISER, Pune

Topic: From flies genetics to cancer genomics

Prof. L.S. Shashidhara talked about the study of genes, heredity, and variation in living things that is known as genetics. Researchers initially concentrated their efforts on studying simple organisms like fruit flies in the early days of genetics research (*Drosophila melanogaster*). Scientists have learned a lot about the fundamentals of genetics and heredity by examining fruit fly genetics. Finding the precise genetic mutations that cause cancer is one of the main aims of cancer genomics research. Using this knowledge, customised treatment plans that specifically target the genetic mutations found in a patient's tumour can then be created.

Dr. Malini Laloraya
Scientist G
Rajiv Gandhi Centre for Biotechnology,
Thiruvananthapuram, Kerala

Topic: Towards the development of newer strategies for improved assisted reproduction outcome

Dr. Malini Laloraya talked about assisted reproductive strategies. IVF is a treatment that can help hopeful parents struggling with a range of fertility issues to successfully conceive and deliver a child. Assisted Reproductive Technology (ART) includes *in vitro* fertilization-embryo transfer (IVF-ET), gamete intrafallopian transfer (GIFT), zygote intrafallopian transfer (ZIFT), and frozen embryo transfer (FET). These techniques also apply to oocyte donation and gestational carriers. She talked about her research focusing on critical events of pregnancy such as uterine receptivity involving adhesion, invasion, tissue remodelling and immune tolerance leading to embryo implantation.

Dr. Gitanjali Yadav
Scientist-V
National Institute of Plant Genome Research (NIPGR), Delhi

Topic: Green carbon for food security: Genomes & networks

Dr. Gitanjali Yadav discussed green carbon for food security, which is a key component of food security, as it is stored in plants and soil through photosynthesis. Genomics and network studies can help to understand and utilize green carbon for food security. Through the study of an organism's genetic material, researchers can identify genes and pathways that are important for photosynthesis and carbon storage. Networks can be used to understand how plants interact with the soil and microorganisms in their environment to store carbon and produce food. By understanding the genetic basis of plant carbon storage and the complex networks that underlie plant-soil interactions, we can develop more efficient and sustainable agricultural systems.

Dr. Sumit Pandey
Scientific Investigator
GSK Immunology Network, UK

Topic: Molecules to medicine - Precision medicine approach

Dr. Sumit Pandey discussed that by using molecular (genomic, transcriptomic, proteomic, metabolomic, etc.), phenotypic, and health data from patients, precision medicine strategies can be developed. It is a healthcare strategy that can prevent or treat human disease, considering patient specific differences in genes, environment, and lifestyle. It involves implication of genetic information to tailor medical treatments to individual patients and aims to improve the effectiveness and safety of medical treatments to the patients who are most likely to benefit from them. Precision medicine is already being used to treat a range of diseases, including cancer, cardiovascular disease, and rare genetic disorders, and is likely to become an increasingly important part of healthcare in the future.

Swami Nikhileshwarananda
Adhyaksha, Shri Ramakrishna Ashram, Rajkot

Topic: Science and spirituality

Swami Nikhileshwarananda delivered a talk on relationship between science and spirituality. Central to both science and spirituality is the seeking of truth and grasping the essential nature of reality. The goal of science is a complete understanding of the fundamental principles underlying the physical universe in all its diverse forms. Spirituality is the science of the 'life giving substance'. In physics, we have moved from molecules to atoms to the sub-atomic world and identified many fundamental forces. However, these forces only attempt to explain how matter is formed.

Prof. Ramasamy Paulmurugan
Professor
Department of radiology,
Stanford University, USA

Topic: Biomimetric Microbubbles - A novel delivery platform for cancer immunotherapy and imaging

Prof. Ramasamy Paulmurugan talked about microbubbles (MBs). They are gas-filled microparticles predominantly synthesized from a combination of lipids. Due to their size, MBs stay confined in the vasculature and are used in clinical ultrasound imaging to monitor blood flow and vascular density. In addition to imaging, MBs can be used as drug delivery enablers through targeted sonoporation (i.e., transient pore formation), or directly as a therapeutic for cancer treatment. MBs are most likely captured by spleenic macrophages, mononuclear phagocytes and by Kupffer cells for phagocytosis. Pulmonary macrophages may also contribute to some MB entrapment during bubble gas core exhalation. Thus, linking the inherent lymphoid organ accumulation of MBs with in situ immune cell activation mediated by dendritic cells could highly potentiate anti-cancer immunotherapies.

Prof. Shailendra Saraf
Director
NIPER - Ahmedabad

Topic: An interactive session on pharmaceutical research

Prof. Shailendra Saraf talked about scope and future of pharmaceutical research. In terms of the future of pharmaceutical research, there are several areas of particular focus, such as the development of targeted therapies, drugs that can modulate the immune system, advances in gene editing and cell-based therapies, and improved efficiency and cost-effectiveness of the drug development process. In the future, innovation and collaboration are likely to be characterized by an increasing emphasis on patient-centered and value-based healthcare.

Visitors At GBRC

S.No.	Name of the Guest	Affiliation
01	Dr. Shekhar Mande	Former Director General, CSIR, India
02	Dr. Dhaval Patel	IAS, Municipal Commissioner, Gandhinagar
03	Dr. Shirshendu Mukherjee	Mission Director, Biotechnology Industry Research Assistance Council (BIRAC), GoI
04	Dr. S. Murali Krishna	Secretary, Tribal Development Department, GoG
05	Dr. Geetha Vani Rayasam	Principal Scientist & Head, Business Development CSIR-IGIB, New Delhi
06	Dr. B. N. Tripathi	Deputy Director General, ICAR, New Delhi
07	Prof. Utpal Tatu	Professor, IISc, Bangalore
08	Dr. Ajai Tripathi	Senior Scientist, Merck, USA
09	Shri Dipak P. Joshi	IAS (Retd.)
10	Dr. Purnima Rupal	Head, SCDD, CSIR, Ministry of Science and Technology, GoI, New Delhi
11	Dr. Vibha Malhotra Sawhney	Scientist H and Head, TMD, CSIR, Ministry of Science and Technology, GoI, New Delhi
12	Dr. Alka Sharma	Scientist H/Senior Adviser, DBT, Ministry of Science and Technology, GoI, New Delhi
13	Dr. Rajesh Gokhale	Secretary, DBT, Ministry of Science and Technology, GoI, New Delhi
14	Dr. Alok Chadar	Scientist F, CSIR, New Delhi

15	Dr. Mahendra Darokar	Chief Scientist, Technology Management Directorate, CSIR, New Delhi
16	Dr. Kannan Srinivasan	Director, CSIR-CSMCRI, Bhavnagar, Gujarat
17	Prof. V. K. Jain	Head, Department of Chemistry, Gujarat University
18	Dr. Aparna Chaudhari	Principal Scientist & Head, Fish Genetics and Biotechnology Division, ICAR- CIFE, Mumbai
19	Dr. Subeer S. Majumdar	Director General, Gujarat Biotechnology University
20	Shri R. K. Sugoor	Director and APCCF, GEER Foundation, Gandhinagar
21	Dr. Parimal Trivedi	Former Vice Chancellor, Gujarat University, Ahmedabad
22	Dr. Nitin Kumar Jain	Scientist F, Scientist at Department of Biotechnology, GoI
23	Dr. Arvind C. Ranade	Executive Director, Indian National Science Academy, New Delhi
24	Dr. K. G. Tirumurugaan	Project Director, Translational Research Platform for Veterinary Biologicals, Tamilnadu
25	Dr. Debashis Mitra	CEO, DBT/Wellcome Trust India Alliance, Hyderabad
26	Dr. Sudhir Singh Bhadauria	Director, University Institute of Technology, Rajiv Gandhi Technological University, Bhopal
27	Shri Rakesh Mishra	Director, Tata Institute for Genetics and Society, Bengaluru
28	Dr. Mahavir Singh	Faculty and Senior Scientist, School of Medicine, University of Louisville, USA
29	Dr. M. S. Chauhan	Vice Chancellor, G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarrakhand
30	Dr. Dheer Singh	Joint Director Research (Acting) & Head of Department, Animal Biochemistry Division, National Dairy Research Institute, Karnal, Haryana
31	Shri Praveen Ramdas	National Secretary, Vijnana Bharati (Vibha), New Delhi

32	Dr. Sanjeev Khosla	Director, CSIR-Institute of Microbial Technology, Chandigarh
33	Dr. Srikrishna Subramanian	Chief Scientist, CSIR-Institute of Microbial Technology, Chandigarh
34	Dr. Srinivasan Krishnamurthi	Principal Scientist, CSIR-Institute of Microbial Technology, Chandigarh
35	Dr. Malini Laloraya	Scientist G, Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram, Kerala
36	Shri Manoj Aggarwal	IAS, Additional Chief Secretary, Department of Health and Family welfare, GoG
37	Dr. Shailendra Saraf	Director, NIPER- Ahmedabad, Gandhinagar
38	Dr. R. K. Singh	Former Director, Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh
39	Dr. Mandeep Sharma	Dean, College of Veterinary and Animal Sciences, CSK HPKV, Palampur, Himachal Pradesh
40	Dr. Saugata Hazra	Associate Professor, Indian Institute of Technology Roorkee, Uttarakhand
41	Shr Remya Mohan	IAS Officer, Mission Director, National Health Mission, Gujarat
42	Dr. Sujeet Kumar Singh	Advisor, National Cooperative Development Corporation, Gandhinagar
43	Vd. Chetanaben Jani	Director, Ayush Government of Gujarat, Gandhinagar
44	Dr. Sindura Ganapathi	Visiting PSA Fellow, Office of the Principal Scientific Advisor, GoI
45	Dr. Ryo Honda	Professor, Faculty of Geosciences and Civil Engineering, Institute of Science and Engineering, Kanazawa University, Japan
46	Dr. Tushara Chaminda	Professor, Civil and Environmental Engineering, University of Ruhuna, Sri Lanka
47	Mr. Abhijit Mitra	Animal Husbandry Commissioner, DAHD Ministry of Fisheries, Animal Husbandry & Dairying, GoI
48	Dr. Richa Dayaramani	Pro-Vice Chancellor (I/C), Indrashil University, Kadi

49	Dr. N. Kalaiselvi	DG-CSIR & Secretary, DSIR, New Delhi
50	Prof. Vinod K. Diwan	Senior Professor, Centre for Global Health, Karolinska Institutet (KI), Sweden
51	Dr. Komal Shah	Assistant Professor, Indian Institute of Public Health, Gandhinagar
52	Dr. Karla Mercado-Shekhar	Assistant Professor, Biological Engineering, IIT Gandhinagar
53	Dr. Chirayu Desai	Associate Professor, Gujarat Biotechnology University, Gandhinagar
54	Dr. Tarun Sharma	Associate Professor, Gujarat Biotechnology University, Gandhinagar
55	Dr. Sudheer Pamidimarri	Associate Professor, Gujarat Biotechnology University, Gandhinagar
56	Dr. Ravindra Pal Singh	Associate Professor, Gujarat Biotechnology University, Gandhinagar
57	Dr. Uday Trivedi	Gujarat Student Start up and Innovation Hub (I -Hub)
58	Mr. Yoshiyuki Tanaka	Director, R & D, Arkray Healthcare Private Ltd., Mumbai
59	Shri C. M. Trivedi	Dy. Municipal Commissioner, Gandhinagar
60	Dr. Sandeep Kale	Managing Director, QPAT, Pune
61	Dr. Ranjitsinh Devkar	Assistant Professor, M.S. University of Baroda, Vadodara
62	Dr. Saravanan Matheshwaran	Assistant Professor, IIT Kanpur
63	Dr. Ramesh Venkataramaiah Upadhyaya	Principal, P.D. Patel Institute of Applied Sciences. Charotar University of Science and Technology, Changa
64	Prof. Datta Madamwar	Scientific Advisor, Charotar University of Science and Technology, Changa
65	Dr. Devang Joshi	Registrar, Charotar University of Science and Technology, Changa

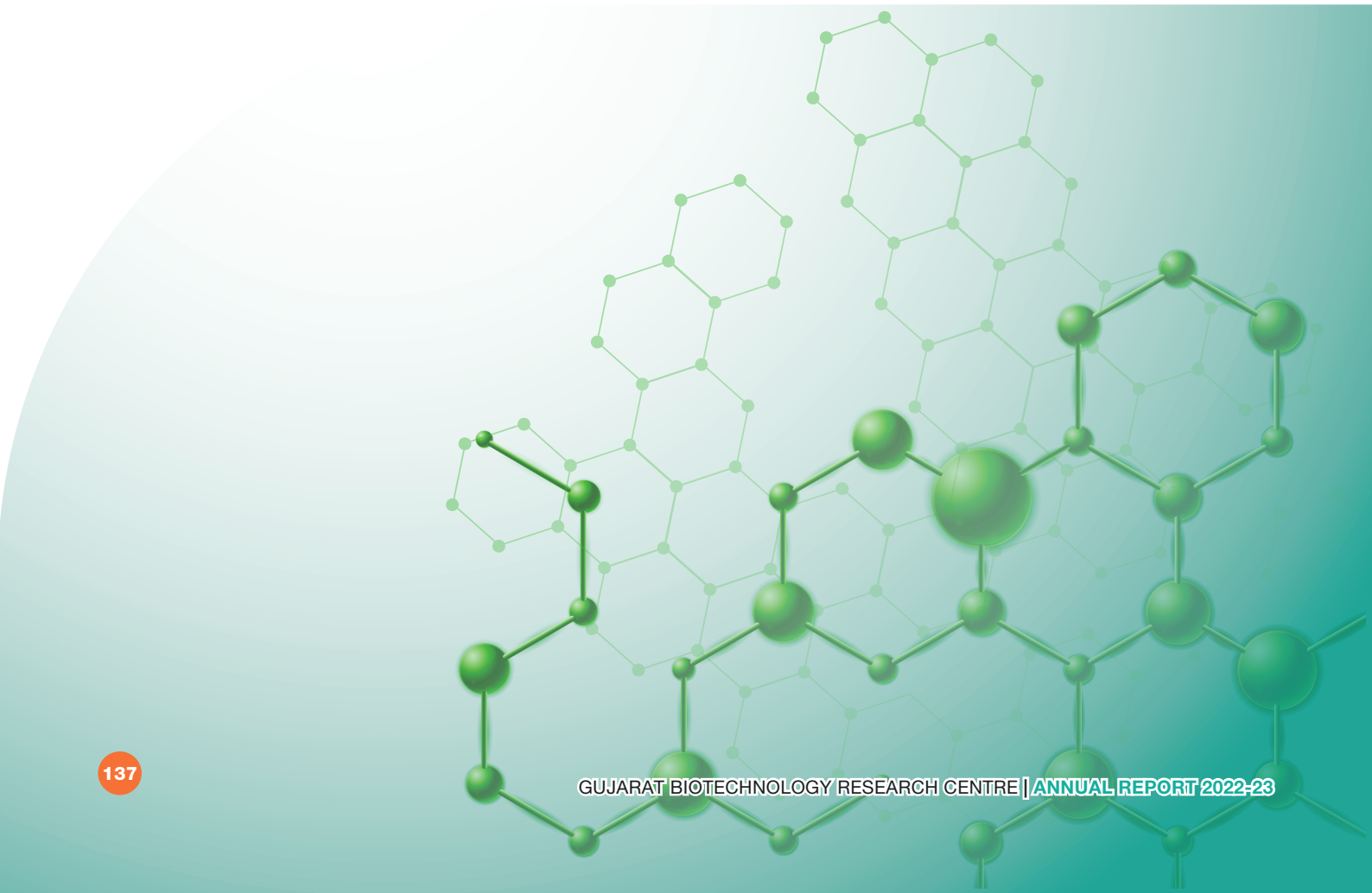
66	Dr. N. Kalaiselvi	Advisor (IT & Admin Affairs), Charotar University of Science and Technology, Changa
67	Prof. Vinod K. Diwan	Director, CSIR-National Institute of Oceanography, Goa
68	Dr. Komal Shah	Vice Chancellor, Karnavati University, Gandhinagar
69	Dr. Karla Mercado-Shekhar	Director, Institute of National Importance (INI), Jamnagar
70	Dr. Chirayu Desai	Associate Professor, National Institute of Pharmaceutical Education and Research – Ahmedabad
71	Dr. Tarun Sharma	M.S. Ophthalmology, Eye Surgeon, Vadodara
72	Dr. Sudheer Pamidimarri	Principal Law, Science and BCA College, Ahmedabad
73	Dr. Ravindra Pal Singh	Chief Scientific Officer, Hester Biosciences Limited, Ahmedabad
74	Dr. Uday Trivedi	Mentor, School of Science, Navrachana University, Vadodara
75	Mr. Yoshiyuki Tanaka	Associate Professor & Program Chair, School of Science, Navrachana University, Vadodara
76	Shri C. M. Trivedi	Associate Professor & Program Chair, School of Science, Navrachana University, Vadodara
77	Dr. Sandeep Kale	Professor, National Forensic Science University, Gandhinagar
78	Dr. Ranjitsinh Devkar	Managing Director, Banas Dairy, Palanpur
79	Dr. Saravanan Matheshwaran	Manager (QMS), Banas Dairy, Palanpur
80	Dr. Ramesh Venkataramaiah Upadhyaya	Assistant Professor, Central University of Gujarat, Gandhinagar
81	Prof. Datta Madamwar	SSO & Laboratory Head, GEMI, Gandhinagar
82	Dr. Devang Joshi	I/C Managing Director, Dudhsagar Dairy, Mehsana

83	Shri Anshul Saxena	Senior Director, Life Sciences Sector, Skill Development Council, New Delhi
84	Dr. Gitanjali Yadav	Scientist V, National Institute of Plant Genome Research (NIPGR), New Delhi
85	Shri Vijay Teng	President, Global Animal Health and Fertility, INTAS Pharmaceuticals, Ahmedabad
86	Dr. Nitin Bhatia	Vice President-Technical & Vet Regulatory, INTAS Pharmaceuticals, Ahmedabad
87	Dr. Sumit Pandey	Scientific Investigator, GSK Immunology Network, UK
88	Dr. Rajesh Parikh	Hon. Director, Sophisticated Instrumentation Centre for Applied Research & Testing - SICART, Vallabh Vidyanagar, Anand
89	Dr. Pradeep Kumar Agarwal	Senior Principal Scientist, CSIR-CSMCRI, Bhavnagar
90	Dr. Shiho Oikawa	Assistant Director, Japan Ayurveda School
91	Dr. Pratik Shah	Barts Health NHS trust and Queen Mary, University of London, London
92	Prof. Ramasamy Paulmurugan	Professor, Department of Radiology, Stanford University, USA
93	Dr. Himali Maniar Patel	Gynecologist and Obstetrician, Nisha Women's Hospital And IVF Centre, Ahmedabad
94	Shri Manish Jain	Founder, GormalOne LLP, Mumbai
95	Dr. Dipak Barot	CEO, Society for Research & Initiatives for Sustainable Technologies & Institutions - SRISTI, Ahmedabad
96	Dr. Trilok Akhani	I/C Dean & Principal, Parul University, Vadodara
97	Dr. Gireesh Babu	Professor and Head, Department of Life Sciences, PIAS, Parul University, Vadodara
98	Dr. Jwalant Vora	Principal, M. G. Science Institute, Ahmedabad

Lectures by GBRC Members

S.No.	Topic	Event	Date	Faculty
01	One health approach for management of COVID-19	The International Conference on Coronaviruses: Past, Present, and Future, at Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K)	10th -11th May 2022	Prof. Chaitanya G. Joshi
02	Management of COVID-19			Dr. Madhvi Joshi
03	Wastewater surveillance: Powerful tool for pandemic management	Webinar organized by Tata Institute for Genetics and Society (TIGS)	31st May 2022	Dr. Madhvi Joshi
04	Applications of biotechnology to veterinary medicine	BIRACs SITARE-BIIS 12 program, SRISTI, Ahmedabad	21st June 2022	Dr. Amrutlal Patel
05	Application of digital PCR	Digital PCR user forum	19th July 2022	Dr. Madhvi Joshi
06	Science, innovation and humanity	Shree Swaminarayan High School, Gandhinagar	22nd July 2022	Dr. Haidar Abbas Masi
07	Role of whole genome sequence in antimicrobial resistance	9th Annual Conference of Molecular Pathology Association of India	7th August 2022	Dr. Madhvi Joshi
08	Environmental surveillance of COVID-19: Trash to treasure	Student Innovation Festival (SIF)-2022 at Silver Oak Institute of Science, Ahmedabad	10th August 2022	Dr. Madhvi Joshi
09	Host-microbiome interaction in augmenting productivity of ruminants	Uttar Pradesh Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go-Anusandhan Sansthan, Mathura	24th August 2022	Prof. Chaitnya G. Joshi
10	Role of NGS in management of COVID-19: One health approach to pandemic management	RAJMICROCON-2022 organized by IAMM Rajasthan Chapter & Department of Microbiology SMS Medical College, Jaipur	9th October 2022	Dr. Madhvi Joshi
11	Panellist for the panel discussion	Sustainability Fair 2022 organized by the University of Petroleum and Energy Science (UPES), Dehradun	14th October 2022	Dr. Madhvi Joshi
12	Molecular Surveillance of AMR	GCRF UKRI One Health Poultry Hub Conference, Gandhinagar	25th - 27th October 2022	Dr. Madhvi Joshi

13	Wastewater based epidemiology (WBE) for SARS-CoV-2: A powerful tool for forecasting, preparedness and management of pandemic	National Institute of Biomedical Genomics (NIBMG), Kolkata	23rd November 2023	Dr. Madhvi Joshi
14	Molecular methods to investigate AMR: Tools to study one health ecosystems	One-day Symposium on "One Health" held at Department of Biosciences, Veer Narmad South Gujarat University, Surat	28th January 2023	Dr. Madhvi Joshi
15	Molecular biology in healthcare system	Nobel University Junagadh in Workshop of Molecular Biology and Bioinformatics	3rd February 2023	Dr. Bhumika Prajapati
16	Opportunities and challenges in bio manufacturing 5.0: Gujarat Perspective	National Consulting Meeting on Biomanufacturing	24th February 2023	Dr. Madhvi Joshi
17	AMR: Transmission dynamics in different value chains	International Symposium on Environmental Dimensions of Antimicrobial Resistance (AMR) and COVID-19 for One Health in Asia-2023	28th March 2023	Dr. Madhvi Joshi



MoUs

1	Date	8th April, 2022
	Participants	GBRC National Dairy Development Board Dudhsagar Dairy Banas Milk Union, Banas Dairy Dept. Of Animal Husbandry, Govt. Of Gujarat Kamdhenu University
	Scope of MoU	The purpose of this MoU is to work towards establishing genomic selection network for dairy cattle and buffalo breeds in Gujarat.

2	Date	26th July, 2022
	Participants	GBRC Trust for Education and Training in Cytometry (TETC), Jaipur
	Scope of MoU	The aim of the MoU is to conduct the 24th Indo-US flow cytometry workshop. The aim of the workshop is to bring experts from India and abroad to the same platform, where their expertise is being harnessed by the participants to understand the basics and advanced concepts in flow cytometry and to apply this insight to their biological and clinical research.

3	Date	7th September, 2022
	Participants	GBRC National Dairy Development Board
	Scope of MoU	GBRC and National Dairy Development Board signed a pact for developing state of the art greenfield BSL-4 lab with ABSL facility.

4	Date	23rd September, 2022
	Participants	GBRC Scriptics Technologies Inc.
	Scope of MoU	The core aim is to enhance research in AMR and bioinformatics through Machine Learning, Deep Learning, Computer Vision, Artificial Intelligence and Big data analytics.
		
5	Date	27th September, 2022
	Participants	GBRC Cosmo Research Foundation
	Scope of MoU	The primary objective is to undertake a collaboration in the research and development of traditional knowledge.
6	Date	17th November, 2022
	Participants	GBRC NIPER-Ahmedabad

	Scope of MoU	GBRC signed a MoU with NIPER-Ahmedabad for collaborative biomedical research. 
7	Date	12th November, 2022
	Participants	GBRC CHARUSAT, Changa
	Scope of MoU	The objective of this MoU is to collaborate on research, education, and training in the field of biological sciences. 
8	Date	6th December, 2022
	Participants	GBRC Navrachana University
	Scope of MoU	The primary objective is to provide the best quality education to students, academicians and staff members.

9	Date	27th February, 2023
	Participants	GBRC Anand Pharmacy College
	Scope of MoU	The objective of this MoU is to conduct collaborative research and joint organization of conferences, workshops, and seminars.

Important Meetings/Events

1. Scientific Advisory Council (SAC) meeting of RGCB

Prof. Chaitanya G. Joshi attended the 16th Scientific Advisory Council (SAC) meeting of Rajiv Gandhi Center for Biotechnology (RGCB), Thiruvananthapuram, Kerala organized on 4th April, 2022.

2. COVID-19 Book Launch

An international conference was organized at Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K) on May 10-11, 2022 on the theme of “The International Conference on Coronaviruses: Past, Present, and Future". On the occasion, Dr. Jitendra Singh (Union Minister of State, Science & Technology) released the book "A Report on Contribution of GBRC in Combating COVID-19 Pandemic". The book is the compilation of all the COVID-19 related research work published by GBRC.

Dr. Jitendra Singh, Union Minister of State, Science & Technology, launching the book “A Report on Contribution of GBRC in Combating COVID-19 Pandemic” at the conference.

3. Industry Academia Meet: New Era Needs and Social Impact

Gujarat State Biotechnology Mission (GSBTM) organized “Industry Academia Meet: New Era Needs and Social Impact” on 23rd June, 2022. This event was organized in order to create synergy between the industry and academia, imparting technical education to help bridge the skill gap and upskilling youth. Scientific staff of GBRC also participated in the event.

GBRC staff at the “Industry Academia Meet: New Era Needs and Social Impact” on 23rd June, 2022.

4. Nomination of Prof. Chaitanya G. Joshi in GEAC

Prof. Chaitanya G. Joshi has been nominated as a member of the Genetic Engineering Appraisal Committee (GEAC), Ministry of Environment, Forest & Climate Change, Government of India. GEAC functions in the Ministry of Environment, Forest and Climate Change. It is responsible for appraisal of activities involving large-scale use of hazardous microorganisms and recombinants in research and industrial production from the environmental angle. The committee is also responsible for appraisal of proposals relating to release of genetically engineered (GE) organisms and products into the environment including experimental field trials.

5. Centre-State Science Conclave 2022

The Director of GBRC, along with Joint Directors and Scientists, attended the 1st Centre-State Science Conclave 2022 held at Science City on 9th and 10th September, 2022. The Prime Minister, Shri Narendra Modi inaugurated the conclave via video conferencing. He emphasized the importance of science as the basis of solutions, evolution and innovation and gave vision of Jai Jawan, Jai Kisan, Jai Vigyan as well as Jai Anusandhan. Chief Minister of Gujarat, Shri Bhupendra Patel and Union Minister of State of Science and Technology, Dr. Jitendra Singh were also present on the occasion. GBRC, along with other departments of Department of Science and Technology, Government of Gujarat exhibited at the conclave.

6. Research Advisory Committee - National Institute of Animal Biotechnology

Prof. Chaitanya G. Joshi attended Research Advisory Committee of National Institute of Animal Biotechnology at Hyderabad on 21st -22nd September, 2022.

7. GCRF UKRI One Health Poultry Hub Conference

Dr. Ramesh Pandit, Scientist B attended GCRF UKRI One Health Poultry Hub Conference held at Dhaka, Bangladesh on 25th - 27th October, 2022.

GCRF UKRI One Health Poultry Hub Conference, Dhaka.

8. The Sustainability Fair 2022

Dr. Madhvi Joshi was one of the panelist for the panel discussion at the Sustainability Fair 2022 organized by the University of Petroleum and Energy Science (UPES), Dehradun on 14th October, 2022. The theme of the fair was “Safe, Resilient, and Sustainable Cities & Communities”. The fair included exhibitions by regional industries and organizations working on sustainable urban planning and industrial activities, green building materials, pollution, green energy, waste management and biorefinery, air pollution, and climate change which aims to display cutting-edge research on sustainability and related challenges of high societal importance, promote cost-effective and sustainable solutions, and organize brainstorming sessions on sustainable solutions through the industry-academia conclave/symposium to establish networking among various stakeholders.

9. World Record for The Longest Science & Innovation Expert Talk Series Under “SIF 2022”

Dr. Ramesh Pandit, Scientist B attended GCRF UKRI One Health Poultry Hub Conference held at Dhaka, Bangladesh on 25th - 27th October, 2022.

Dr. Madhvi Joshi at Sustainability Fair 2022 for panel discussion.

On the celebration of the 75th Azadi Ka Amrit Mahotsav, Vigyan Gurjari, Karnavati-Gandhinagar Unit, Gujarat organized the longest expert talk series under “SIF 2022” - a student innovation festival across the Gujarat state, wherein 75 academicians, scientists, and industry experts from 75 universities, research institutes, colleges and schools participated and delivered sessions on science, technology and innovation subjects for 75 days (7500 minutes) and set a new record on 30th August, 2022 at Gandhinagar, Gujarat, India. Around 10,000+ students, faculties, researchers, and employees have participated in this innovation festival.

Following faculties of GBRC delivered talk in the event:

1) Dr. Madhvi Joshi
2) Dr. Niraj Kumar Singh
3) Dr. Haidar Abbas Masi
4) Dr. Apurvasinh Puvar
5) Dr. Ishan Raval
6) Dr. Krishna Bharwad

World record for the longest science & innovation expert talk

10. Review Meeting for Corona Virus Pandemic

Dr. Madhvi Joshi attended the meeting with honorable chief minister of Gujarat Shri Bhupendra Patel to review the situation of coronavirus, vaccination coverage and emergence of Omicron cases in the state on 24th December, 2022.

Dr. Madhvi Joshi at the review meeting with the Chief Minister of Gujarat

TAX AUDIT REPORT

ACCOUNTING YEAR: 2022-2023

ASSESSMENT YEAR: 2023-2024

GUJARAT BIOTECHNOLOGY RESEARCH CENTRE

PAN: AADTG1571H

B4D BLOCK 6TH FLOOR, M S BUILDING SECTOR NO 11, GANDHINAGAR, GUJARAT, 382011

AUDITORS

Ramani & Vasoya

Chartered Accountants

226 to 229, 2nd Floor,
Pramukh Tangent,
Sargasan Cross Road,
Gandhinagar – 382 010,
GUJARAT- INDIA

Contact: + 91 99 24 99 88 99
Email: ramaniandvasoya@gmail.com

RAMANI & VASOYA
Chartered Accountants

226 to 229, 2nd Floor, Pramukh Tangent,
Sargasan Cross Road, Gandhinagar-382421
079-296 99999 +91 99 24 99 88 99
ramaniandvasoya@gmail.com

REPORT OF AUDITOR RELATING TO ACCOUNTS AUDITED
(Under sub-section (2) of Section 34 read with Rule 19)

Registration No: GUJ/2849, Gandhinagar Dt.10/07/2018
Name of Public Trust: GUJARAT BIOTECHNOLOGY RESEARCH CENTER
Address: Block No. A, 6th Floor, Multi Storied Building, Sector 11, Gandhinagar

We have audited the annexed Balance sheet of the above-mentioned trust as at **31st March, 2023** and also the Income and Expenditure accounts for the year ended on the date and report as under: -

a) Accounts are maintained regularly and in accordance with the provisions of the Act and Rules.
b) Receipts and disbursements are properly and correctly shown in the accounts.
c) The cash balance and vouchers in the custody of the manager/Trustee on the date of audit were in the agreement with the accounts.
d) All Books, deeds accounts, Vouchers and other documents or records required by us were produced before us.
e) All inventory of movable as certified by the Trustees of the public Trust has been/has not been produced-------NA-------
f) The Trustee **Shri. Chaitanya G. Joshi** has furnished the necessary information and explanation to our satisfaction as required.
g) Property of fund of the trust were not applied for the object or purpose other than the object or purpose of the Trust.
h) The outstanding amount for more than one year is Rs. **NIL** /-And amount Written of Rs. **NIL** /-
i) Tenders were invited / not invited for repairs of construction, involving expenditure exceeding Rs.5000/- N.A
j) Money of public Trust has not been invested contrary the provisions of section 35.
k) Sale/Transfer of immovable property of the Trust has not been made U/S, 36 of the Act.

Ramani and Vasoya Chartered Accountants FRN 135828W Gandhinagar

For, **Ramani & Vasoya**
Chartered Accountants
Firm Reg. No. 135828W

Sagar Vasoya
Partner
Mem. No.129998

Place: Gandhinagar
Date: 23/10/2023
UDIN: 23129998BGRPXT8783

GUJARAT BIOTECHNOLOGY RESEARCH CENTRE
BLOCK No. B, 6th FLOOR, M. S. BUILDING, SECTOR NO. 11, GANDHINAGAR

BALANCE SHEET AS ON 31.03.2023

For the Year 2021-22 Rs.	Laibilities	Sch	For the Year 2022-23		Rs.	For the Year 2021-22 Rs.	Assets	Sch	For the Year 2022-23		Rs.
	Differed Grant Income	A					**Fixed Asset**				
55289695.53	**Opening Balance (See Sch. A Col.11)**		**170418326.53**			55289699.60	Opening Bal (See Sch. A Col.11)	D	170418331.25		
	ADD :					134474618.00	Add : During the year (See Sch.A Col.4)		65874724.00	236293055.25	
						189764617.60					
27445263.00	Fixed Asset Purchase During the Year GBRC - 04 (See Sch. A (D) Col.04)		11513455.00			19346286.55	Less : Depreciation (See Sch. A to H Col.8)		34687324.96	34687324.96	
360839.00	Fixed Asset Purchase During the Year GBRC - 05 Sch.D (See Sch. A (C) Col.04)		834481.00			**170418331.25**	(See Sch. A Col.10)				**201605730.49**
1470000.00	Fixed Asset Purchase During the Year GSBTM Grant Sch.D (See Sch. A (E) Col.04)		2081618.00				**Investment**	D			
166001.00	Fixed Asset Purchase During The Year J.D.-1 Project - CBR/DBT/JD-1/HLT & GBRC/GSBTM/JD-HRD/FSA/2020-21 (See Sch. A (G) (a+b) Col.04)		0.00				Auto Sweep F.D. With SBI			171266883.96	
0.00	Fixed Asset Purchase During the Year U. K. GOVT. For J. D. -1 Project (See Sch. A (F) (a)+(b) Col.04)		413997.00			91875968.63					
105032815.00	Fixed Assets - GBRC/JD-HRD/FSA/20-21 (See Sch. H) Col.04)		0.00								
0.00	Fixed Asset Purchase During the Year Unutilised Grant GBRC 04 & 05 (See Sch. A (I) Col.04)		51031173.00								
134474618.00	**(See Sch.A Col.4)**		**65874724.00**			104672681.00	FDR With GSFS			109151279.00	**280418162.96**
189764613.53				**236293060.53**		**156549629.63**					
	LESS :						**Loans & Advances**				
1745406.00	Depreciation on Dev. Of BT - 01 Assets W/Off (See Sch.A (A +B)a to g) Col.08)		1470065.45			51658.00	Other Advance			66930.00	
3574058.00	Depreciation on GBRC - 04 Assets W/Off (See Sch.A (D) Col.08)		8157139.35			5000000.00	Adv. Exe. Engg. Cp Ele. DIV-21			5000000.00	
368188.00	Depreciation on GBRC - 05 Assets W/Off (See Sch.A (C) Col.08)		321443.72			0.00	Adv. Gujarat State Police Housing Corp			0.00	
5438363.00	Depreciation on GSBTM Assets W/Off (See Sch.A (E) Col.08)		4797618.22			9440.00	Adv. National Centre for Cell Sci.			9440.00	**6076370.00**
210570.00	Depreciation on CBR-DBT/JD-1/HLT Assets W/Off (See Sch.A (G) Col.08)		215620.48			**5061098.00**					
132241.00	Depreciation on GBRC/UKRI/GCRF/JD1/HLT Assets W/Off (See Sch.A (F) Col.08)		157656.18			**249066.00**	**Sundry Debtors**				**27895.00**
7877461.00	Depreciation on GBRC/JD-HRD/FSA Assets W/Off (See Sch.A (H) Col.08)		14573303.10				**Cash & Bank Balance**				
0.00	Depreciation on Unutilised Grant Assets W/Off (See Sch. A (I) Col.08)		6994278.45								
19346207.00	**(See Sch. A to H Col.8)**			**34687324.96**		**64740556.50**	State Bank of India S.B. A/c				**15304293.00**
170418327.35	**(See Sch. A Col.10)**				**201605725.57**	**19.20**	Cash on Hand				**26086.00**

Ramani and Vasoya
Chartered Accountants
FRN 136826W
Gandhinagar

For the Year 2021-22 Rs.	Liabilities	Sch	For the Year 2022-23		Rs.	For the Year 2021-22 Rs.	Assets	Sch	For the Year 2022-23		Rs.
	Grant Received For Establishment GBRC - 05 (See Sch.B Col.2)	B				42906.00	**TDS - Receivable** TDS - 2018-19			42906.00	
10740685.06	Opening Balance		10262945.56			987450.01	TDS - 2020-21			7297	
30000000.00	Grant Recd. During The Year GCG		40000000.00								
0.00	Interest Earned on S.B. A/c During Year		0.00			0.00	TDS - 2021-22			1003075.00	
1.00	Add: Other Income / Exp. Round off		0.00								
0.00	Balance Grant Tras. From GSBTM		0.00	50262945.56		1003075.00	TDS - 2022-23			1444445.00	**2697683.00**
40740685.06						**2033431.01**					
29477211.50	**Less : Expenditure Incurred during the year (See Sch B Col.02)**		40476510.00								
1000429.00	**Less Fixed Assets Purchse (See Sch B Col.02)**		854267.00								
0.00	**Less:Tras. To Unutilised Grant**		8932168.56	50262945.56	**0.00**						
10262945.56							**Interest Accrued But not Due**				
	Grant Received For Research in Biotechnology - 04 (See Sch.B Col.3)	B				1110664.00	On GSFS F.D			1398001.00	
59210135.83	Opening Balance		73477890.08								
140000000.00	Grant Received During the Year		82000000.00			1882582.00	On Auto Sweep F.D			4588762.86	**5986763.86**
1.25	Add: Other Income / Exp. Round off		0.00			**2993246.00**					
0.00	Add: Transfer from another grant		12917543.17	168396432.00							
199210137.08											
29024561.00	**Less :** Expenditure Incurred Including Fixed Assets Purchase during the year (See Sch B Col.03)		59771538.00								
26707688.00	**Less Fixed Assets Purchse (See Sch B Col.03)**		9210180.00								
70000000.00	**Less:Tras. To Sub Head of GBRC - 04**		0.00								
0.00	**Less:Tras. To Unutilised Grant**		9913714.00	168396432.00	**0.00**						
73477890.08											
	Grant Received From GSBTM for Lab Equipment Procurement (See Sch.B Col.4)	B									
21759006.00	Opening Balance		20289006.00								
0.00	Grant Received During the Year		0.00	20289006.00							
21759006.00											
1470000.00	**Less : Expenditure Incurred Including Fixed Assets Purchase during the year (See Sch.B Col 04)**		0.00	0.00	**20289006.00**						
20289006.00											
	Grant Received From Forest Dept. - CDV Rese. Project (See Sch.B Col.5)	B									
1698504.00	Opening Balance		1698504.00								
0.00	Add : Grant Received During the Year		0.00								
0.00	Add: Other Income / Exp. Round off		1.00	1698505.00							
1698504.00											
0.00	**Less : Expenditure Incurred Including Fixed Assets Purchase during the year (See Sch.B Col.05)**		1698505.00	1698505.00	**0.00**						
1698504.00											
	Grant Received For JD-01Project From U. K. (Britan) (See Sch.B Col.6)	B									
929333.00	Opening Balance		16861581.28								
22436337.00	Add : Grant Received During the Year		0.00								
0.00	Add: Interest on S.B. A/c		0.00								
2.28	Add: Other Income / Exp. Round off		1.04	16861582.32							
23365672.28											
6504091.00	**Less : Expenditure Incurred excluding Fixed Assets Purchse during the year (See Sch.B Col.06)**		15789681.50								
0.00	**Less Fixed Assets Purchse (See Sch B Col.06)**		0.00	15789681.50	**1072000.82**						
16861581.28											

For the Year 2021-22 Rs.	Liabilities	Sch	For the Year 2022-23		Rs.	For the Year 2021-22 Rs.	Assets	Sch	For the Year 2022-23		Rs.
	Grant Received from Development of Health and Family Welfare	B									
0.00	Opening Balance		28044906.00								
139524900.00	Add : Grant Received During the Year		0.00								
1.00	Add: Other Income / Exp. Round off		0.00	28044906.00							
139524901.00											
6546313.00	**Less : Expenditure incurred excluding Fixed Assets Purchase during the year (See Sch.B Col.07)**		7711288.00								
104932782.00	**Less Fixed Assets Purchse (See Sch B Col.07)**		0.00	7711288.00	20333618.00						
28044906.00											
	Grant for Various Project from GSBTM (See Sch.B Col.8)	B									
77001993.66	Opening Balance		81697475.66								
44156144.00	**Add :** Received During the Year		116224213.96								
1.00	Add: Other Income / Exp. Round off		0.00								
333410.00	Advance Trns. from Other Project		8822260.00	208743949.62							
131491548.66											
	Less : Expenditure Incurred Including Fixed Assets Purchase during the year (See Sch.B Col.08)										
32943679.00	Exp. of JD - 1 Projects **(See Sch.B-4)**		30899456.77								
6257205.00	Exp. of JD - 2 Projects **(See Sch.B-4)**		3868576.68								
	Exp. of JD - 2 Projects **(See Sch.B-4)**		1484231.00								
132271.00	Exp. of Scientist B **(See Sch.B-4)**		1493814.00								
127708.00	**Fixed Assets Purchase - JD-1, JD 2, JD 3 and Scientist Project (See Sch B 4)**		3061616.00								
333410.00	Advance Trns. To Other Project		0.00	39827693.45	168916256.17						
39794073.00											
81697475.66											
	Grant For Weekly Surveilance SARs Covid-2 Waste Water (See Sch.B Col.9)	B									
18005.00	Opening Balance		17030.00								
0.00	Add: Received During The Year		0.00	17030.00							
18005.00											
975.00	**Less :** Expenditure Incurred Including Fixed Assets Purchase during the year (See Sch.B Col.09)		0.00	0.00	17030.00						
17030.00											
	Balance of Unutilised Grant GBRC 04 & 05 (See Sch.B Col.10)	B									
0.00	Opening Balance		0.00								
0.00	Add: Received During The Year		117767740.66	117767740.66							
0.00											
0.00	**Less :** Used		82599648.77	82599648.77	35171091.79						
	Development fund										
3000000.00	Opening Balance			5000000.00							
0.00	**Add: Transfered from Research & Testing Income**			5107286.44							
2000000.00	**Add: Transfered from Overhead**			6571478.00	18678764.44						
5000000.00											
793684.00	Duties & Taxes				1077736.00						
300.00	Salary Deduction				300.00						
42025.00	Sundry Creditors				55239.00						
13964042.00	Security Deposit	C			11869827.00						

Ramani and Vasoya
Chartered Accountants
Firm 138928W
Gandhinagar

For the Year 2021-22 Rs.	Liabilities	Sch	For the Year 2022-23		Rs.	For the Year 2021-22 Rs.	Assets	Sch	For the Year 2022-23		Rs.
4273062.00	GSFS Interest Payble to Govt. of Gujarat				9691984.00						
2000.00	TA-DA Payable WS-1/2021-22 Jasminkumar Bhalodiya				0.00						
	Income & Expenditure										
	Other than Inhouse Projects										
11130601.66	Opening Balance			15602588.66							
6486987.00	Add : Excess of Income over Expense			8571825.85							
-2000000.00	Less : Transfer To Devlopment Fund			0.00	24174414.51						
15602588.66											
442045367.59	Total				510942984.30	442045367.59	Total				510942984.30

For Ramani & Vasoya
Chartered Accountants

Sagar Vasoya
Partner
M No. 128998
Place : Gandhinagar
Date : 23/10/2023

Ramani and Vasoya Chartered Accountants FRN 136826W Gandhinagar

UDIN: 23128998BGRPXT8783

Director

Place : Gandhinagar
Date : 23/10/2023

Account Officer

GUJARAT BIOTECHNOLOGY RESEARCH CENTRE
BLOCK No. B, 6tH FLOOR, M. S. BUILDING, SECTOR NO. 11, GANDHINAGAR

INCOME & EXPENDITURE ACCOUNT
FOR THE YEAR ENDED ON 31.03.2023

As on 31.03.2022	Particular	As on 31.03.2023	As on 31.03.2022	Particular	As on 31.03.2023
19346287.00	Depreciation Exps.	34687324.96	291300.00	Training Fees Income	0.00
317038.00	Forfeiture of Advances	0.00	2526772.00	Interest on Auto Sweep F.D.	6717905.86
5111056.00	Interest Expense GSFS	5418922.00	247345.00	Interest on Saving Bank	523529.00
			5111056.00	Interest From GSFS	5418922.00
0.00	Research & Testing Fee Trasnsfer to Devlopment Fund	5107286.44	461967.00	Application Fee	316500.00
			2049968.00	Research & Testing Fee	5107286.44
			138000.00	Tender Fee	240000.00
			433490.00	Notice Pay Income	439898.00
			8695.00	Sale of Office Scrap	46175.00
			19346287.00	Depreciation W/Off	34687324.96
			128296.00	Interest on Income Tax Refund	73506.99
			498190.00	Interest on LC	210647.00
				Penalty Income	3680.00
	Excess of Income Over			Kasar	4.00
6466987.00	Expenditure	8571825.85			
31241368.00	**Total**	**53785359.25**	**31241368.00**	**Total**	**53785359.25**

For Ramani & Vasoya
Chartered Accountants

Sagar Vasoya
Partner
M No. 129998
Place : Gandhinagar
Date : 23/10/2023

Ramani and Vasoya
Chartered Accountants
FRN 136824W
Gandhinagar

For Gujarat Bioitechnology Research Centre,

Director

Place : Gandhinagar
Date : 23/10/2023

Account Officer

UDIN: 23129998BGRPXT8783

SCHEDULE - A

GUJARAT BIOTECHNOLY REASERCH SOCIETY, GANDHINAGAR

Statement of Fixed Assets & Depreciation for F.Y. 2022-23

Sr. No.		Gross Block				Depreciation				Net Block	
		Opening Balance 01.04.2022	Addition During the Year	Substraction	Total Assets 31.03.2023	Depri. As on 1.4.2022	Depri. For the year 2022-23	Adjusted	Total for the 31.03.23	As on 31.03.22	As on 31.03.23
1	2	3	4	5	6	7	8		9	11	10
A	**Fixed Assets - GBRC**										
1	Computer	945187	0	0	945187	896189	19599	0	915788	48998	29399
2	Furniture & Fixture	1083466	0	0	1083466	408317.8	67515	0	475833	675148	607633
3	Instrument & Equipment	229527	0	0	229527	118462.825	16660	0	135122	111064	94405
	Total - A	**2258180**	**0**	**0**	**2258180**	**1422970**	**103774**	**0**	**1526743**	**835210**	**731437**
B	**Fixed Assets - Development of B.T - 01**										
B a	**Bio Infra Development - 01**										
1	Air Conditioner - Bio Infra Devp.	96770	0	0	96770	53832.5	6441	0	60273	42938	36497
2	Books - TFC	30022	0	0	30022	16701.35	1998	0	18699	13321	11323
3	Computer At District	375	0	0	375	355.6	8	0	363	19	12
4	Mono Laser Printer	18684	0	0	18684	10394	1244	0	11638	8290	7047
	Total - B a	**145851**	**0**	**0**	**145851**	**81283**	**9690**	**0**	**90973**	**64568**	**54878**
B b	**Fixed Asset - GGI Project**										
1	Air Conditioner - GGI	68450	0	0	68450	35398.9	4958	0	40357	33051	28093
2	Bio Tech Instrument & Equipment	53364	0	0	53364	29685.5	3552	0	33237	23679	20127
3	C C TV System	21499	0	0	21499	11959.35	1431	0	13390	9540	8109
4	Computer	78	0	0	78	74.2	2	0	76	4	2
5	Furniture & Fixture	1377	0	0	1377	563.5	81	0	645	814	732
6	Lab Instrument	1103827	0	0	1103827	570837.775	79948	0	650786	532989	453041
7	Refrigerator	12182	0	0	12182	6777.15	811	0	7588	5405	4594
	Total - B b	**1260777**	**0**	**0**	**1260777**	**655296**	**90782**	**0**	**746079**	**605481**	**514698**

Ramani and Vasova Chartered Accountants FRN 135826W Gandhinagar

Sr. No.		Gross Block				Depreciation				Net Block	
		Opening Balance 01.04.2022	Addition During the Year	Subetraction	Total Assets 31.03.2023	Depri. As on 1.4.2022	Depri. For the year 2022-23	Adjusted	Total for the 31.03.23	As on 31.03.22	As on 31.03.23
1	2	3	4	5	6	7	8		9	11	10
B c	**Fixed Asset - SGB Project**										
1	Attendance Machine	5982	0	0	5982	3327.45	398	0	3726	2655	2256
2	Biotech Instrument & Equipment	1033292	0	0	1033292	574814.95	68772	0	643587	458477	389705
3	CC TV SGB	21046	0	0	21046	11707.9	1401	0	13109	9338	7937
4	Cluster Machine - Seed Gene Bank	905502	0	0	905502	503726.25	60266	0	563993	401776	341509
5	Computer	12399	0	0	12399	20046.2	-3060	0	16986	-7648	-4590
6	Computerise Vegetable Seed Dryer	111370	0	0	111370	53661.8	8656	0	62318	57708	49052
7	EPABX Machine	6506	0	0	6506	3618.65	433	0	4052	2887	2454
8	Fire Safety Instrument	4878	0	0	4878	2713.45	325	0	3038	2165	1840
9	Freezer Verticle	28986	0	0	28986	16125.06	1929	0	18054	12861	10932
10	Furniture & Fixture	232398	0	0	232398	95169.6	13723	0	108892	137228	123506
11	GPS System	18086	0	0	18086	10060.95	1204	0	11265	8025	6821
12	Lab Instrument	11973314	0	0	11973314	6660691.15	796893	0	7457585	5312623	4515729
13	Lab Moduels	270202	0	0	270202	150311.95	17984	0	168295	119890	101907
14	Microwave Oven	6352	0	0	6352	3533.15	423	0	3956	2819	2396
15	Office Equipment	9072	0	0	9072	5046.2	604	0	5650	4026	3422
16	PH Elctrodes	2088	0	0	2088	1161.25	139	0	1300	927	788
17	Refregerator	15627	0	0	15627	8693.7	1040	0	9734	6933	5893
18	R.O. System	5332	0	0	5332	2966.5	355	0	3321	2366	2011
19	Scanner	985	0	0	985	547.55	66	0	613	437	372
20	Security System	32740	0	0	32740	18213.55	2179	0	20393	14526	12347
21	UPS System	8675	0	0	8675	4825.75	577	0	5403	3849	3272
22	Water Cooler	11225	0	0	11225	6245.55	747	0	6992	4979	4233
	Total - B c	**14716057**	**0**	**0**	**14716057**	**8157211**	**975053**	**0**	**9132264**	**6558846**	**5583793**
B d	**Fixed Asset - Policy Planning - 01**										
1	Attendance Machine - Polic. Plann. - 01	23690	0	0	23690	13178.65	1577	0	14755	10511	8935
2	Display Scroller - Bio Infra - 01	12823	0	0	12823	7133.45	853	0	7987	5690	4836
	Total - B d	**36513**	**0**	**0**	**36513**	**20312**	**2430**	**0**	**22742**	**16201**	**13771**
B e	**Fixed Asset - BGB - 01**										
1	Computer A/c. - Bio Gen BGB - 01	691878	0	0	691878	656011	14347	0	670358	35867	21520
2	Fingerprint Scanner - BGB - 01	14621	0	0	14621	8133.8	973	0	9107	6487	5514
3	Furniture & Fixture - Biodiversity Gene Bank BGB- 01	688251	0	0	688251	281846	40641	0	322486	406406	365765
4	Lab Instrument - Bio GEN Bank - 01	1351676	0	0	1351676	751931	89962	0	841893	599745	509783
	Total - B e	**2746426**	**0**	**0**	**2746426**	**1697921**	**145922**	**0**	**1843843**	**1048505**	**902583**

Ramani and Vasova
Chartered Accountants
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Gandhinagar

Sr. No.		Gross Block				Depreciation				Net Block	
		Opening Balance 01.04.2022	Addition During the Year	Substraction	Total Assets 31.03.2023	Depri. As on 1.4.2022	Depri. For the year 2022-23	Adjusted	Total for the 31.03.23	As on 31.03.22	As on 31.03.23
1	2	3	4	5	6	7	8		9	11	10
B f	**Fixed Asset - Human & Animal Diagnostic Unit**										
1	Furniture & Fixture - Human/Animal Diagnostic - 01	172724	0	0	172724	70732	10199	0	80931	101992	91793
2	Instrument / Equipment - Human /Animal Diagnostic - 01	1766319	0	0	1766319	982594	117559	0	1100153	783725	666166
	Total - B f	**1939043**	**0**	**0**	**1939043**	**1053326**	**127758**	**0**	**1181084**	**885717**	**757959**
B g	**Fixed Asset - Bio Prospecting Unit - 01**										
1	Computer A/c - Bio Prospecting Unit - 01	509709	0	0	509709	483286	10569	0	493855	26423	15854
2	Furniture & Fixtures - Bio Prospecting Unit - 01	49163	0	0	49163	20133	2903	0	23036	29030	26127
3	Instrument/Equipment - Bio Prospecting Unit-01	22293	0	0	22293	12401	1484	0	13884	9892	8409
	Total - B g	**581165**	**0**	**0**	**581165**	**515819.95**	**14956**	**0**	**530776**	**65345.05**	**50389**
	TOTAL (A + B(a) to (g)	**23684012**	**0**	**0**	**23684012**	**13604139.5**	**1470365**	**0**	**15074505**	**10079872.5**	**8809507.05**
C	**Fixed Asset - GBRC - 05**										
1	Computer & Peripheral/Software - 05	2154383	0	0	2154383	1709184	178080	0	1887264	445199	267119
2	Furniture & Fixture - 05	233786	0	0	233786	55481.45	17830	0	73312	178305	160474
3	Industrial Locker GBRC -05	14580	0	0	14580	2187	1859	0	4046	12393	10534
4	Lab Banchee GBRC 05	273000	0	0	273000	27300	24570	0	51870	245700	221130
5	Lab Equipement - 05	110715	0	0	110715	40904.225	10472	0	51376	69811	59339
6	Mitsubsy 2.0 TR MU-GK24VA 05	48899	0	0	48899	7335	6235	0	13570	41564	35329
7	Revolving Chair GBRC 05	24360	0	0	24360	2435	2193	0	4628	21925	19733
8	Executive Table	0	10900	0	10900	0	1090	0	1090	0	9810
9	Computer Table	0	19200	0	19200	0	1920	0	1920	0	17280
10	Ex Revolving Chair	0	24000	0	24000	0	2400	0	2400	0	21600
11	AC Ventilating Fan	0	8900	0	8900	0	1335	0	1335	0	7565
12	Video Conferencing Camera	0	207999	0	207999	0	31200	0	31200	0	176799
13	LG Split Air conditionar	0	172207	0	172207	0	12916	0	12916	0	159291
		0	391275	0	391275	0	29346	0	29346	0	361929
	Total - C	**2859723**	**834481**	**0**	**3694204**	**1844527**	**321444**	**0**	**2165270**	**1014896**	**1527934**

Ramani and Vasoya
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Sr. No.		Gross Block				Depreciation				Net Block	
		Opening Balance 01.04.2022	Addition During the Year	Substraction	Total Assets 31.03.2023	Depri. As on 1.4.2022	Depri. For the year 2022-23	Adjusted	Total for the 31.03.23	As on 31.03.22	As on 31.03.23
1	2	3	4	5	6	7	8		9	11	10
D	**Fixed Asset - GBRC - 04**										
1	Air Conditioner BT - 04	1809062	0	0	1809062	776441.15	154892	0	931333	1032611	877719
2	Computer / Software - 04	170206	0	0	170206	138864.6	12537	0	151401	31341	18805
3	Lab Equipement - 04	4193326	0	0	4193326	1397358.8	419395	0	1816754	2795967	2376572
4	4.2 Lab Instrument Purchase	227779	0	0	227779	56090.425	25753	0	81844	171689	145935
5	4.4 Lab instrument Purchase	127619	0	0	127619	35415	13831	0	49246	92204	78373
6	4.4 Lab Lab Module/Vc Res in BT - 04	1394960	0	0	1394960	538280.4	128502	0	666782	856680	728178
7	4.3 Digital Reflectometer Purchase - 04	22420	0	0	22420	7436.2	2248	0	9684	14984	12736
8	4.7 Furniture & Fixture - 04	35400	0	0	35400	8160.1	2724	0	10884	27240	24516
9	4.2 Rotor for Ultra Centrifuge Machine - 04	162880	0	0	162880	54025.6	16328	0	70354	108854	92526
10	4.7 Switch & C C TV system Purchase - 04	13900	0	0	13900	5363.25	1281	0	6644	8537	7256
11	LC-QTOF-MS	18820037	0	0	18820037	1411503	2611280	0	4022783	17408534	14797254
12	PCR Lab Fridge	74350	0	0	74350	5576	10316	0	15892	68774	58458
13	Qiagen Quity-Digtal PCR System	2662060	0	0	2662060	399309	339413	0	738722	2262751	1923338
14	Drill Machine - Minor Instrument 04	5799	0	0	5799	435	805	0	1240	5364	4559
15	Lab instrument Minor Instrument 04	398957	0	0	398957	47836	52668	0	100504	351121	298453
16	Mitsubsy SRK 5025-56 MBF	134100	0	0	134100	10058	18606	0	28664	124042	105436
17	Preparative HPCL - Maintenance Of Instrument 04	5250000	0	0	5250000	787500	669375	0	1456875	4462500	3793125
18	Centrifuge Machine	0	460798	0	460798	0	69120	0	69120	0	391678
19	Horizontal Cylindrical Steam Sterliser	0	490300	0	490300	0	73545	0	73545	0	416755
20	High Quality water purification System (Bio AGE)	0	320000	0	320000	0	48000	0	48000	0	272000
21	Precision Balance - - Minor Instruments 04	0	46883	0	46883	0	7002	0	7002	0	39881
22	Benchtop PH meter - Minor Instruments 04	0	44415	0	44415	0	6662	0	6662	0	37753
23	Stirred water Bath Basic 20L	0	34718	0	34718	0	5208	0	5208	0	29510
24	OT-EQ-compact Gel Rocker	0	26649	0	26649	0	3997	0	3997	0	22652
25	Shaker Incubator	0	498954	0	498954	0	74843	0	74843	0	424111
26	Fast Prep-24TM Classic - Sheted Lab	0	199000	0	199000	0	29850	0	29850	0	169150
27	Optima XPIN 100 Ultra Centifuge Bio Molecules	0	5877523	0	5877523	0	881628	0	881628	0	4995895
28	Vertical Steam Sterilizer	0	305750	0	305750	0	22931	0	22931	0	282819
29	Water bath	0	38096	0	38096	0	2857	0	2857	0	35239
30	Minicentrifuge	0	29471	0	29471	0	2210	0	2210	0	27261
31	Kent Automatic ABS plastic Air purifier	0	19381	0	19381	0	1454	0	1454	0	17927
32	Omni PAC power supply	0	149156	0	149156	0	11187	0	11187	0	137969
33	Vortex Mixer	0	27376	0	27376	0	2053	0	2053	0	25323
34	Magnetic stirrer with Hot plate	0	32096	0	32096	0	2407	0	2407	0	29689
35	CO2 Incubator	0	481735	0	481735	0	36130	0	36130	0	445605
36	HP Intel core i7 14 inch laptop	0	1710000	0	1710000	0	342000	0	342000	0	1368000
37	High capacity vaccum/pressure pump	0	24072	0	24072	0	1805	0	1805	0	22267
38	Elanpro freezer capacity (L) 350	0	77275	0	77275	0	5796	0	5796	0	71479
39	Kent Automatic ABS plastic Air purifier	0	19381	0	19381	0	1454	0	1454	0	17927
40	Kent Automatic ABS plastic Air purifier	0	19381	0	19381	0	1454	0	1454	0	17927
41	Rotary Shaker	0	275495	0	275495	0	20662	0	20662	0	254833
42	Vertical Steam Sterilizer	0	305750	0	305750	0	22931	0	22931	0	282819
	Total - D	**35502845**	**11513459**	**0**	**47016300**	**5679683**	**6157139**	**0**	**11836792**	**29823192**	**35179508**

Ramani and Vasova
Chartered Accountants
FRN 135826W
Gandhinagar

Sr. No.		Gross Block				Depreciation				Net Block	
		Opening Balance 01.04.2022	Addition During the Year	Substraction	Total Assets 31.03.2023	Depri. As on 1.4.2022	Depri. For the year 2022-23	Adjusted	Total for the 31.03.23	As on 31.03.22	As on 31.03.23
1	2	3	4	5	6	7	8		9	11	10
E	**Fixed Asset - GSBTM GRANT**										
1	Computer / Software - BS-14	337250	0	0	337250	293542	17483	0	311025	43708	26225
2	Flow Cytometer with cell shorter instrument	18533158	0	0	18533158	7151482.3	1707251	0	8858734	11381676	9674424
3	LED TV Purchase JD/1/Confer/19-20	48040	0	0	48040	15934.55	4816	0	20750	32105	27290
4	Plant Growth Chamber - GSBTM	1470000	0	0	1470000	220501	187425	0	407926	1249499	1062074
5	Pur Lab instrument - GSBTM	22970731	0	0	22970731	8789701.8	2127154	0	10916856	14181029	12053875
6	SuperCriticalfluid Extractor System - GSBTM	5897878	0	0	5897878	1889914.55	571195	0	2461109	3807963	3236769
7	Top opening Deep Freezer capacity (L) 350	0	71970	0	71970	0	10796	0	10796	0	61175
8	Bio-Rad Single Moulded Vertical Electrophoresis system	0	277000	0	277000	0	41550	0	41550	0	235450
9	Front opening Freezer capacity (L) 600	0	81250	0	81250	0	6094	0	6094	0	75156
10	Ice Flake Making Machine	0	174500	0	174500	0	13088	0	13088	0	161413
11	Lawbit LCD Display orbital shaking incubators	0	490000	0	490000	0	36750	0	36750	0	453250
12	Lawbit LCD Display orbital shaking incubators	0	486900	0	486900	0	36518	0	36518	0	450383
13	Laboratory Deep Freezer	0	499998	0	499998	0	37500	0	37500	0	462498
	Total - E	**49057057**	**2081618**	**0**	**51138675**	**16361076.2**	**4797618.22**	**0**	**23158694.4**	**30695980.8**	**27979980.56**
F	**Fixed Assets - U. K. GOVT. For J. D. -1 Project**										
a	**Fixed Assets - GBRC/UKRI/GCRF/JD-1/HLT PROJECT**										
1	Air Conditioner - UKRI/GCRF/JD-1/HLT	57500	0	0	57500	8301.5	7380	0	15681	49199	41819
2	Laptop Pur - UKRI/GCRF/JD-1/HLT	173647	0	0	173647	111133.8	25005	0	136139	62513	37508
3	Voltage Stebilizer Pur - UKRI/GCRF/JD-1/HLT	352170	0	0	352170	97727.5	38166	0	135894	254443	216276
4	Wi Jungle U150EX	0	248997	0	248997	0	37350	0	37350	0	211647
5	Technoulas WAN Non PoE Ethernet LAN PORT router	0	165000	0	165000	0	24750	0	24750	0	140250
	Total - F (a) 1 to 3	**583317**	**413997**	**0**	**997314**	**217163**	**132651**	**0**	**349814**	**366154**	**647500**
b	**Fixed Assets - JD1/HLT/CONFERENCE/2019-20**										
1	Laptop - JD-1/HLT/Conference/2019-20	173647	0	0	173647	111134	25005	0	136139	62513	37508
	Total - F (b) 1	**173647**	**0**	**0**	**173647**	**111134**	**25005**	**0**	**136139**	**62513**	**37508**
	Total - F (a) + (b)	**756964**	**413997**	**0**	**1170961**	**328297**	**157656**	**0**	**485953**	**428667**	**685008**
G	**Fixed Assets JD-1 Project**										
a	**Fixed Assets - CBR-DBT/JD-1/HLT**										
1	Centifuge Equipement CBR-DBT/JD-1/HLT	471900	0	0	471900	68130.5	60565	0	128696	403770	343204
2	Digital Monitor - CBR-DBT/JD-1/HLT	15899	0	0	15899	4439.85	1734	0	6174	11559	9825
3	Lab Refrigerator - CBR-DBT/JD-1/HLT	59490	0	0	59490	16508.5	6447	0	22956	42982	36534
4	Samsung Tablet - CBR-DBT/JD-1/HLT	35000	0	0	35000	22400	5040	0	27440	12600	7560
5	Zebra Printer - CBR-DBT/JD-1/HLT	11199	0	0	11199	1616.925	1437	0	3054	9582	8145
6	Ice Flake Maker (FIM 20)	133245	0	0	133245	9993	18488	0	28481	123252	104764
7	Mouse Anthi Stidne Tag : ALK PHOS	32756	0	0	32756	2457	4545	0	7002	30299	25754
	Total - G (a) 1 to 5	**759589**	**0**	**0**	**759589**	**125546**	**98256**	**0**	**223802**	**634043**	**535787**
b	**Fixed Assets- JD-1/WORKSHOP -1/2021-22"**										
1	Soft Wear Purchase - JD-1/WORKSHOP -1/2021-22	916125	0	0	916125	329805	117264	0	447069	586320	469056
	Total - G (b) 1	**916125**	**0**	**0**	**916125**	**329805**	**117264**	**0**	**447069**	**586320**	**469056**
	Total - G (a) + (b)	**1675714**	**0**	**0**	**1675714**	**455351**	**215520**	**0**	**670871**	**1220363**	**1004843**
H	**Fixed Assets - Family and Health Welfare**										
1	Nova SEQ 6000	105032815	0	0	105032815	7877461	14573303	0	22450764	97155354	82582051
	Total - H	**105032815**	**0**	**0**	**105032815**	**7877461**	**14573303**	**0**	**22450764**	**97155354**	**82582051**
I	**Fixed Assets UNUTILISED GRANT GBRC 04 & 05**										
1	MalDi-ToF Machine	0	37100000	0	37100000	0	5565000	0	5565000	0	31535000
2	2-D electrophoresis based proteomics set up	0	3500000	0	3500000	0	525000	0	525000	0	2975000
3	Olympus Model: bplore double deck system	0	8805300	0	8805300	0	660398	0	660398	0	8144903
4	Cytation 5 Multi-Mode Reader	0	1625873	0	1625873	0	243881	0	243881	0	1381992
	Total - I	**0**	**51031173**	**0**	**51031173**	**0**	**6994278.45**	**0**	**6994278.45**	**0**	**44036894.55**
	Total - A To I	**218569130**	**55874724**	**0**	**274443854**	**48150803**	**34687325**	**0**	**82838128**	**170418327**	**201605726**
	Previous Year	**84094212**	**134474918**	**0**	**218569130**	**28804516**	**19346287**	**0**	**48150803**	**55289696**	**170418327**

GUJARAT BIOTECHNOLOGY RESEARCH CENTRE - 2022-23

BLOCK B & D, M. S. BUILDING, GANDHINAGAR 382011

GRANT UTILISED

SCHEDULE - B

Sr. No.	Particulars	Grant from Govt. of GUJ		From GSBTM For Lab Instrument Purchae	CDV Forest Dept. For JD - 1 Project	From U. K. GOVT. For J. D. -1 Project (See Sch. B2)	Grant from Development of Health and Family Welfare	JD-1, JD - 2, JD-3 & Scientist B Projects (See Sch. B 3 & B 4)	Weekly Surveillance SARS Covid-2 Waste Water	UNUTILISED GRANT GBRC 04 & 05	Grant Total
		GBRC - 05 Esta.	4 GBRC R & D (See Sch. B1)								
	1	2	3	4	5	6	7	8	9	10	11=2 to 10
A	**Opening Balance**	10282945.56	73477888.83	20289007.00	1698505.00	16861579.00	28044906.00	81697474.56	17030.00	0.00	232349336.05
	Add: Recd. During The year	40000000.00	82000000.00	0.00	0.00	0.00	0.00	118224213.96	0.00	0.00	240224213.96
	Add : Advance for GBRC/SERB/JD1/WBE/2022	0.00	0.00	0.00	0.00	0.00	0.00	6598864.00	0.00	0.00	6598864.00
	Add : Adv. For Trainning Programme JD1/WORKSHOP -1/2021-22	0.00	0.00	0.00	0.00	0.00	0.00	2223396.00	0.00	0.00	2223396.00
	Add : Transferred from other grants									117767740.56	117767740.56
	Add : Tras. From unutilsed grant	0.00	12917543.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12917543.17
	Total Income - A	**50282945.56**	**168395432.00**	**20289007.00**	**1698505.00**	**16861579.00**	**28044906.00**	**208743948.52**	**17030.00**	**117767740.56**	**612081093.74**
B	**Less : Expenditure During the Year**										
	Grant Trns. To Development Fund	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Grant Trns. To Unutilised Grant	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**82596648.77**	**82596648.77**
	Blood Sample Collection Charges	0.00	0.00	0.00	0.00	3200.00	0.00	237121.00	0.00	0.00	240321.00
	Staff Salary Expenses	27068853.00	15703860.00	0.00	0.00	2049507.00	0.00	6889026.00	0.00	0.00	51711046.00
	Administrative Work	14000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14000.00
	Advertisement Expenses	130187.00	0.00	0.00	0.00	0.00	0.00	7056.00	0.00	0.00	137243.00
	E Tendering / E Auction Expenses	8850.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8850.00
	Bank Charges	0.00	13917.00	0.00	0.00	43925.50	0.00	64636.00	0.00	0.00	122478.50
	Fire Extinguisher	147251.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	147251.00
	Electricity Charges	2935549.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2935549.00
	Foixed Assets Purchase	**854267.00**	**9210180.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2081616.00**	**0.00**	**0.00**	12146063.00
	Insurance of Fixed Assets	984763.00	0.00	**0.00**	**0.00**	0.00	**0.00**	0.00	0.00	0.00	984763.00
	Food/Refreshment Expenses	134829.00	0.00	0.00	0.00	6600.00	0.00	278710.00	0.00	0.00	420139.00
	Purchase Of Chemical and Consumables	0.00	0.00	0.00	0.00	0.00	0.00	6128497.79	0.00	0.00	6128497.79
	Lab Mater / Consum Pur Expenses	0.00	15504098.03	0.00	0.00	11691135.00	0.00	18059307.98	0.00	0.00	45354541.01
	Lab Misc. Exp.-HLT/Conference	0.00	90119.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	90419.00
	Server Department of Health and Welfare	0.00	0.00	0.00	0.00	0.00	7711288.00	0.00	0.00	0.00	7711288.00
	Meeting Charges	24175.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24175.00
	Manpower Hire Charges	1744544.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1744544.00
	Misc Lab Expenses	261451.00	0.00	0.00	0.00	0.00	0.00	56615.00	0.00	0.00	318066.00
	Purchase Lab Material Expenses	0.00	4971273.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4971273.25
	Internet Charges	383500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	383500.00
	Office Expenses	454791.00	8000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	462791.00

Ramani and Vasoya Chartered Accountants FRN 1[illegible] Gandhinagar

Repairs & Maintanance of Instrument	0.00	302945.00	0.00	0.00	0.00	0.00	17936.00	0.00	0.00	320881.00
Post And Courier Expenses	44545.00	0.00	0.00	0.00	0.00	0.00	15932.00	0.00	0.00	60477.00
Printer/ Xerox Machine Hire Charges	65823.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65623.00
Printing & Stationery Charges	709127.00	0.00	0.00	0.00	48275.00	0.00	215119.00	0.00	0.00	972521.00
Professional Charges	279820.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	279820.00
Software	19116.00	0.00	0.00	0.00	268113.00	0.00	0.00	0.00	0.00	287229.00
Profle. Exp/ Devp. Of Omics Based Treatment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Publication Charge Main Banking Facilities	0.00	551891.72	0.00	0.00	0.00	0.00	68227.68	0.00	0.00	620119.40
Repair & Maintenance Expenses	450620.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	450620.00
Staff Welfare Club Charges	81004.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	81004.00
Traveling Expense Creation Of Capital Assets	0.00	7430.00	0.00	0.00	0.00	0.00	168713.00	0.00	0.00	176143.00
TA-DA/ Honorarium Charges Of New Building	0.00	77624.00	0.00	0.00	0.00	0.00	341452.00	0.00	0.00	419076.00
Security Charges	0.00	64017.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	64017.00
Transferred to other grant	0.00	0.00	0.00	1698505.00	0.00	0.00	0.00	0.00	0.00	1698505.00
TA/DA / Honorarium Charges	574104.00	0.00	0.00	0.00	24096.00	0.00	0.00	0.00	0.00	598200.00
Tele / Mobile Bill Charges	750.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	750.00
Transport Expenses	83571.00	0.00	0.00	0.00	0.00	0.00	57896.00	0.00	0.00	141787.00
Seminar Festival Rent Expenses	1000000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1000000.00
Staff Recruitment Charges	2006000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2006000.00
Lab Testing Fees Expenses	0.00	0.00	0.00	0.00	0.00	0.00	787075.00	0.00	0.00	787075.00
Vehicle Hire Charges	860934.00	0.00	0.00	0.00	257672.00	0.00	334518.00	0.00	0.00	1453124.00
Training Expense	0.00	0.00	0.00	0.00	0.00	0.00	-354798.00	0.00	0.00	-354798.00
Web Hosting/ Domain Pur Expenses	8453.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8453.00
EXP. Paid IIT - Gandhinagar	0.00	0.00	0.00	0.00	0.00	0.00	655000.00	0.00	0.00	655000.00
Custom Duty Charges	0.00	3063832.00	0.00	0.00	490723.00	0.00	2476984.00	0.00	0.00	6021539.00
Software Repository Of Bio-Molecules	0.00	957125.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	957125.00
Bio Chemical Waste Expenses	0.00	122311.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	122311.00
Advertisement Exp Construction Of New Building	0.00	26756.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26756.00
Consulting Services Exp. Creation Of Capital Assets	0.00	7264425.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7264425.00
E Tendering / E Auction Exp Con Of New Bulding	0.00	8850.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8850.00
Professional Fees For Constructoin Of New Building	0.00	8344694.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8344694.00
Maintanance of Instrument Res	0.00	2598370.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2598370.00
Installation Of Fiber Grid Network	0.00	0.00	0.00	0.00	1234026.00	0.00	0.00	0.00	0.00	1234026.00
Router	0.00	0.00	0.00	0.00	164999.00	0.00	0.00	0.00	0.00	164999.00
Traveling Expenses	0.00	0.00	0.00	0.00	6371.00	0.00	0.00	0.00	0.00	6371.00
Adv For UKRI/GCRF /JD1/HIT/2019-20	0.00	0.00	0.00	0.00	-499361.00	0.00	0.00	0.00	0.00	-499361.00
Transfer to Overhead	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1241053.00**	**0.00**	**0.00**	**1241053.00**
Transfer to unutilised Balance	**8932168.56**	**99413714.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**108345882.56**
Total Expenditure - B	**50262945.56**	**168395432.00**	**0.00**	**1698505.00**	**15789581.50**	**7711288.00**	**39827693.45**	**0.00**	**82596648.77**	**366282094.28**
Clossing Balance Total - C= A - B	**0.00**	**0.00**	**20289007.00**	**0.00**	**1071997.50**	**20333618.00**	**168916255.17**	**17030.00**	**35171091.79**	**245798999.46**
Previous Year	**10262945.56**	**73477886.83**	**20289007.00**	**1698505.00**	**16861579.00**	**28044906.00**	**81697474.66**	**17030.00**	**0.00**	**232349336.05**

Ramani and Vasoya
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FRN 135826W
Gandhinagar

GUJARAT BIOTECHNOLOGY RESEARCH CENTRE - 2022-23

BLOCK B & D, M. S. BUILDING, GANDHINAGAR 382011

GRANT UTILISED

SCHEDULE - B 1

Sr. No.	Particulars	GBRC - 04 R & D							
		4 GBRC R & D	4.1 Felloship Exp.	GBRC Others Charges - 04	4.7 Minor Instrument	4.8 Construction of New Building	4.9 BSL3+FACILITY LAB	4.10 Renovation of GBRC	Total 4.1 to 4.10
1	2	3	4	5	6	7	8	9	10=3+4+5+6+7+8+9
A	**Opening Balance**	41179963.00	-12161080.00	12458254.83	4304800.00	34404272.00	0.00	-6708321.00	73477888.83
	Add: Recd. During The year	0.00	25000000.00	16000000.00	8500000.00	32500000.00	0.00	0.00	82000000.00
	Add : Interest Earned on S. B. A/c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Add : Other Income / Exp. Round Off	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Add : Trns. From unutilised grant	0.00	2864940.00	3344282.17	0.00	0.00	0.00	6708321.00	12917543.17
	Total Income - A	**41179963.00**	**15703860.00**	**31802537.00**	**12804800.00**	**66904272.00**	**0.00**	**0.00**	**168395432.00**
B	**Less : Expenditure During the Year**								
	Grant Trns. To 4.1 to 4.8 R & D Projects - 04 GOG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	05 Staff Salary Exp. GBRC 05	0.00	15703860.00	0.00	0.00	0.00	0.00	0.00	15703860.00
	Bank Charges - 04	0.00	0.00	13917.00	0.00	0.00	0.00	0.00	13917.00
	Fixed Asset Purchase Exp. 04	**0.00**	**0.00**	**5930623.00**	**3279557.00**	0.00	0.00	0.00	9210180.00
	4(4) Purchase Lab Material Exp. -04	0.00	0.00	2629585.25	2341688.00	0.00	0.00	0.00	4971273.25
	4.1 Lab Mater / Consum Pur Exp. - 04	0.00	0.00	15604098.00	0.00	0.00	0.00	0.00	15604098.00
	Lab Instrument Purchase 04	0.00	0.00	64017.00	0.00	0.00	0.00	0.00	64017.00
	Lab Misc Exp. Res In BT 04	0.00	0.00	17119.00	73000.00	0.00	0.00	0.00	90119.00
	Office Exp. Res In BT 04	0.00	0.00	8000.00	0.00	0.00	0.00	0.00	8000.00
	Maintenance of Instrument Res in BT 04	0.00	0.00	2598370.00	0.00	0.00	0.00	0.00	2598370.00
	Custom Duty Charges- 04 / Mbt	0.00	0.00	3053832.00	0.00	0.00	0.00	0.00	3053832.00
	Software Repository Of Bio-Molecules	0.00	0.00	957125.00	0.00	0.00	0.00	0.00	957125.00
	Bio Chemical Waste Exp. GBRC 04	0.00	0.00	122311.00	0.00	0.00	0.00	0.00	122311.00
	Publication Charge Main Banking Facilities 04	0.00	0.00	551891.72	0.00	0.00	0.00	0.00	551891.72
	Traveling Expense Creation Of Capital Assets	0.00	0.00	0.00	0.00	7430.00	0.00	0.00	7430.00
	Advertisment Exp Construction Of New Building -04	0.00	0.00	0.00	0.00	26756.00	0.00	0.00	26756.00
	Consulting Services Exp. Creation Of Capital Assets	0.00	0.00	0.00	0.00	7264425.00	0.00	0.00	7264425.00
	E Tendering / E Auction Exp Con Of New Building 04	0.00	0.00	0.00	0.00	8850.00	0.00	0.00	8850.00
	Professional Fees For Construction Of New Building	0.00	0.00	0.00	0.00	5344694.00	0.00	0.00	5344694.00
	TA-DA/ Honorarium Charges Of New Building 04	0.00	0.00	0.00	0.00	77624.00	0.00	0.00	77624.00
	Repairs & Maintenance of Instrument	0.00	0.00	251645.00	51300.00	0.00	0.00	0.00	302945.00
	Balance Transered to unutilised Grant	41179963.00			7058258.00	51174480.00			99413716.00
	Total Expenditure - B	**41179963.00**	**15703860.00**	**31802537.00**	**12804800.00**	**66904272.00**	**0.00**	**0.00**	**168395432.00**
	Clossing Balance Total - C= A + B	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Previous Year	**41179963.00**	**-12161080.00**	**12458254.83**	**4304800.00**	**34404272.00**	**0.00**	**-6708321.00**	**73477888.83**

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GUJARAT BIOTECHNOLOGY RESEARCH CENTRE - 2022-23

BLOCK B & D, M. S. BUILDING, GANDHINAGAR 382011

GRANT UN UTILISED

SCHEDULE - B 2

Sr. No.	Particulars	From U. K. GOVT. For J. D. -1 Project		
		GCRF /JD1/HLT/2019-20	JD1/HLT/CONFERENCE/2019-20	Total U.K Govt. For J.D.-1
1	2	3	4	5=3+4
A	Opening Balance	16225434.00	636145.00	16861579.00
	Add: Recd. During The year	0.00	0.00	0.00
	Add : Interest Earned on S. B. A/c	0.00	0.00	0.00
	Add : Other Income/ Exp. Round off	0.00	0.00	0.00
	Add : Other Income/ Tras. Grant	0.00	0.00	0.00
	Total Income - A	**16225434.00**	**636145.00**	**16861579.00**
B	**Less : Expenditure During the Year**			
	Staff Salary Expenses	2049507.00	0.00	2049507.00
	Bank Charges	43925.50	0.00	43925.50
	Blood sample collection charge	3200.00	0.00	3200.00
	Custom Duty	490723.00	0.00	490723.00
	Lab Mater / Consume Pur Expenses	11691135.00	0.00	11691135.00
	Lab Misc. Exp.-HLT/Conference	300.00	0.00	300.00
	Vehicle Hire Charge	257672.00	0.00	257672.00
	TA-DA Expenses	24096.00	0.00	24096.00
	Food And Refreshment Expenses	6600.00	0.00	6600.00
	Installation Of Fiber Grid Network	1234026.00	0.00	1234026.00
	Printing And Stationery Expenses	48275.00	0.00	48275.00
	Router	164999.00	0.00	164999.00
	Softwear	268113.00	0.00	268113.00
	Traveling Expenses	6371.00	0.00	6371.00
	Adv For UKRI/GCRF /JD1/HIT/2019-20	-499361.00	0.00	-499361.00
	Total Expenditure - B	**15789581.50**	**0.00**	**15789581.50**
	Clossing Balance Total - C= A + B	**435852.50**	**636145.00**	**1071997.50**
	Previous Year	**16225434.00**	**636145.00**	**16861579.00**

GUJARAT BIOTECHNOLOGY RESEARCH CENTRE - 2022-23

BLOCK B & D, M. S. BUILDING, GANDHINAGAR 382011

GRANT UTILISED

SCHEDULE - B 3

	Particulars	Director Project AML/2021	Grant / Advance for Various Projects												
			JD - 1 Project												
			CDR-DBT/HLT/2019-20	JD-1/HLT/20-21/22	GBRC/GSBTM/JD 1/WWS/2020	JD-1 & 2/RSS/ENV/2017-18/16	JD-1/AGR/2017-18/19	JD-1/AGR/2017-18/12-13	JD-1/ENV/2017-18/09	JD1/FOREST-DEPT -2020-21	JD-1/HLT/2017-18/05	JD-1/HLT/2017-18/06	JD-1/HLT/2017-18/07	JD -1/HLT/2017-18/08	Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15=2 to 14
A	Opening Balance	3644623.00	-1399467.00	194952.00	0.00	1664799.00	783187.00	5228410.00	5947662.00	341739.00	948764.00	1052036.00	9889989.00	1139939.00	62261743.00
	Add: Recd. During The year	64745581.99	4083995.00	0.00	7154030.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75983607.99
	Add : Other Income / Exp. Round Off	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Add : Trns. From FRD 01	0.00	0.00		0.00	0.00	0.00	0.00	0.00	1698504.00	0.00	0.00	0.00	0.00	1698504.00
	Total Income - A	161185804.00	2684528.00	194952.00	7154030.00	1664799.00	783187.00	5228410.00	5947662.00	2040243.00	948764.00	1052036.00	9889989.00	1139939.00	139943825.01
B	Less : Expenditure During the Year														
	Adv. Trns. To Worksop-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Adv. Trns. To Worksop-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Blood Sample Collection Charges	3462.00	227040.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	230502.00
	Bank Charges	4564.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4564.00
	Staff Salary Expenses	4975367.00	563330.00	0.00	0.00	0.00	0.00	0.00	0.00	101315.00	0.00	0.00	0.00	0.00	5640012.00
	Lab Testing Fees Expenses	0.00	787075.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	787075.00
	Custom Duty	2135270.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2135270.00
	Post and Courier Expenses	0.00	15932.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15932.00
	Lab Meter / Consume Pur Expenses	3951464.98	27496.00	0.00	0.00	1785513.00	0.00	54446.00	0.00	104904.00	0.00	0.00	0.00	268405.00	6192357.98
	Misc. Lab Expenses	39231.00	1500.00	0.00	0.00	0.00	0.00	1990.00	0.00	0.00	0.00	0.00	0.00	0.00	42721.00
	Fixed Assets Purchase Expenses	2081516.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2081516.00
	Printing And Stationery Expenses	173049.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	173049.00
	Publication Charges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vehicle Hire Charges	82740.00	251778.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	334518.00
	Repair and Maintenance Expenses	17996.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17996.00
	EXP. Paid IIT - Gandhinagar	655000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	655000.00
	Traveling Expence	145740.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	145740.00
	Purchase Of Chemical and Consumables	5057153.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5057153.79
	Food/Refreshment Expenses	69868.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	69868.00
	Transportation Expenses	0.00	16437.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16437.00
	Transfer to overhead	0.00	778940.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	778940.00
	TA/DA / Honorarium Charges	46729.00	61045.00	0.00	0.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	108274.00
	Total Expenditure - B	19339190.77	2730733.00	0.00	0.00	1785513.00	0.00	56936.00	0.00	206219.00	0.00	0.00	0.00	268405.00	24449995.77
	Closing Balance - A - B	61846614.19	-46734.00	194952.00	7154030.00	-120714.00	783187.00	5171475.00	5947662.00	1774024.00	948764.00	1052036.00	9889989.00	871534.00	115499829.24

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	Particulars	Grant / Advance for Various Projects														
		JD - 1 Project														
		JD1HLT-21/2020-21	JD -1/IND/2017-18/02	JD -1/IND/2017-18/03	JD-1/IND/2017-18/04	JD-1/NRACOG/2021-22	JD -1/WC/2017-18/01	JD-1/RSS/AMR/2019-20/8570K8	JD-1/RSS/HLT/2017-18/15	JD-1/RSS/PLT/2017-18/14	JD1/WORKSHOP 1/19-20	JD1/WORKSHOP -1/2021-22	JD1/WORKSHOP-2/2019-20	JD1/WORKSHOP -2/2021-22	JD-1/AGR/2017-18/11	Total JD-1 Projects
	14	15	16	15	16	17	18	19	20	21	22	23	24	25	26	27=15 to 26
C	Opening Balance	2254258.00	-383541.00	997426.00	776139.00	8940615.00	548992.00	456670.00	-1739692.00	89812.31	13552.00	-359555.00	472079.00	-75299.00	0.00	5772772.99
	Add: Revd. During The year	0.00	0.00	0.00	0.00	16906595.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16906595.00
	Add : Advances for JD-1/HLT/2020-21/21	1742864.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1742864.00
	Add : Adv. For Trainning Programme JD1/WORKSHOP -1/2021-22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	227384.00	0.00	297688.00	0.00	524892.00
	Total Income - C	4991122.00	-383541.00	997426.00	776139.00	8906980.00	548992.00	456670.00	-1739692.00	89812.31	13552.00	-132281.00	472079.00	222389.00	0.00	13483578.11
D	Less : Expenditure During the Year															
	Adv. Trns. To Other JD-1 Projects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Blood Sample Collection Charges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bank Charges	7634.00	0.00	3173.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Staff Salary Expenses	0.00	0.00	0.00	0.00	833138.00	0.00	85122.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10807.00
	Lab Testing Fees Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	918080.00
	Fixed Assets Purchase Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Food and Refreshment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Lab Meter / Consums Per Expenses	286483.00	0.00	17066.00	0.00	6569926.00	0.00	0.00	-1786513.00	0.00	0.00	14100.00	0.00	0.00	0.00	14100.00
	Misc Lab Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5069964.00
	Lab Material Purchase	1071344.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4311.00	0.00	4311.00
	Training Programs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1071344.00
	Publication Charges	0.00	0.00	147384.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5000.00	0.00	5000.00
	Custom Duty Expense	55147.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	147384.00
	Vehicle Hire Charges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	55147.00
	Transfer to overhead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TA/DA / Honorarium Charges	0.00	0.00	0.00	0.00	240000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	240000.00
						0.00	0.00	0.00	0.00	0.00	0.00	12894.00	0.00	0.00	0.00	12894.00
	Total Expenditure - D	1419608.00	0.00	167643.00	0.00	7643068.00	0.00	85122.00	-1786513.00	0.00	0.00	26994.00	0.00	9311.00	0.00	7589231.00
	Closing Balance C - D	3571514.00	-383541.00	829783.00	776139.00	1263912.00	548992.00	371548.00	46821.00	89812.31	13552.00	-159245.00	472079.00	213078.00	0.00	5894347.11

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	Particulars	Grant / Advance for Various Projects								Grant / Advance for Various Projects		
		JD - 1 Project								JD - 3 Projects		Total of JD- 3 Projects
		JD-1/AGR/2017-18/11	GBRC/JD1/MP HB/2022	GBRC/SERB/JD 1/WBE/2022	JD - 1/BIBACOG - 2 /2022	JD-1/PANCHKARM/ 2022	Total	Grand Total Director Project & J D 1		JD 3 /RHYL/2022-23	JD 3 /TRAINING/2022-23	
E	Opening Balance	2457344.25	0.00	0.00	0.00	0.00	2457344.25	98946314.41		0.00	0.00	0.00
	Add: Recd. During The year	0.00	1320000.00	0.00	748200.00	5397600.00	8465800.00	101325972.96		1698504.00	2481000.00	4179504.00
	Add : Advance for GBRC/SERB/JD1/WBE/2022	0.00	0.00	1375000.00	0.00	0.00	1375000.00	3117864.00		0.00	0.00	0.00
	Add : Adv. For Trainning Programme JD1/WORKSHOP - 1/2021-22	0.00	0.00	0.00	0.00	0.00	0.00	2223696.00		1698504.00	0.00	1698504.00
	Total Income E = A+C	2457344.25	1320000.00	1375000.00	748200.00	5397600.00	12299144.25	166613847.37		3698504.00	2481000.00	5179504.00
F	Less : Expenditure During the Year											
	Adv. Tres. To Other JD-1 Projects	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00
	Adv. Tras. To Other JD-2 Projects	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00
	Blood Sample Collection Charges	0.00	0.00	0.00	0.00	8619.00	8619.00	237121.00		0.00	0.00	0.00
	Bank Charges-HRD/FSA	0.00	0.00	0.00	0.00	0.00	0.00	15371.00		0.00	0.00	0.00
	Staff Salary Expenses	0.00	0.00	0.00	0.00	0.00	0.00	6558272.00		0.00	0.00	0.00
	Lab Testing Fees Exp. CBR-DBT/JD1/HLT/2019-20	0.00	0.00	0.00	0.00	0.00	0.00	787073.00		0.00	0.00	0.00
	Fixed Assets Purchase Exp.	0.00	0.00	0.00	0.00	0.00	0.00	2081616.00		0.00	0.00	0.00
	Travelling Expense	0.00	0.00	0.00	0.00	0.00	0.00	145740.00		0.00	22973.00	22973.00
	Lab Mater / Consume Pur Expenses	28732.00	483355.00	3665.00	0.00	325317.00	841072.00	12003443.68		9975.00	1265508.00	1299483.00
	Mini Lab Expenses	0.00	0.00	0.00	0.00	0.00	0.00	47032.00		0.00	4000.00	4000.00
	Training Expense	0.00	0.00	0.00	0.00	0.00	0.00	5000.00		0.00	-359798.00	-359798.00
	Advertisement Expense	0.00	0.00	0.00	0.00	7056.00	7056.00	7056.00		0.00	0.00	0.00
	Food and Refreshment Expense	0.00	0.00	0.00	0.00	0.00	0.00	63969.00		0.00	194742.00	194742.00
	Custom Duty	0.00	0.00	0.00	0.00	0.00	0.00	2230417.00		0.00	86788.00	86788.00
	Printing and Xerox/ Stationery	0.00	0.00	0.00	0.00	1440.00	1440.00	174489.00		0.00	40630.00	40630.00
	TA-DA	0.00	0.00	13658.00	0.00	0.00	13658.00	134826.00		0.00	198413.00	198413.00
	Vehicle Hire Charges	0.00	0.00	0.00	0.00	0.00	0.00	334518.00		0.00	0.00	0.00
	Repair and Maintenance Expenses	0.00	0.00	0.00	0.00	0.00	0.00	17936.00		0.00	0.00	0.00
	Transportation Expenses	0.00	0.00	0.00	0.00	0.00	0.00	16437.00		0.00	0.00	0.00
	Post and Courier Expenses	0.00	0.00	0.00	0.00	0.00	0.00	15932.00		0.00	0.00	0.00
	Expenses Paid IIT	0.00	0.00	0.00	0.00	0.00	0.00	655000.00		0.00	0.00	0.00
	Purchase Of Chemical and Consumables	0.00	0.00	0.00	0.00	0.00	0.00	6138497.79		0.00	0.00	0.00
	Publication Charges	0.00	0.00	0.00	0.00	0.00	0.00	147384.00		0.00	0.00	0.00
	Transfer to Overhead	0.00	0.00	50000.00	25000.00	0.00	75000.00	1093340.00		0.00	0.00	0.00
	Total Expenditure - F = B + D	28732.00	483355.00	67323.00	25000.00	340432.00	944842.00	32881071.77		9975.00	1474296.00	1484231.00
	Closing Balance = E - F	2428612.25	836645.00	1307677.00	723200.00	5057168.00	11353299.25	132632475.60		3688529.00	1006744.00	3695273.00
	Previous Year	2457344.25	0.00	0.00	0.00	0.00	2457344.25	98946314.41		0.00	0.00	0.00

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	Scientist B	GBRC/GSBTM/KCHRC/2021-22	GBRC/GSBTM/SO-B10/AGR-14/2023	CB4/PAMP/2022	KCHR/OSP/2022	SCIST/CLIMET/2022	SCIBS/PHERO/2022	Total
A	Opening Balance	2389729.00	0.00	0.00	0.00	0.00	0.00	2389729.00
	Add. Recd. During The year	4079129.00	3144112.00	1530000.00	1060000.00	525000.00	1530000.00	11868241.00
	Add : Other Income / Exp. Round Off	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Add : Tras. Other Project	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Income E = A+C	6468858.00	3144112.00	1530000.00	1060000.00	525000.00	1530000.00	14257970.00
B	Less : Expenditure During the Year							
	Adv. Tras. To Other Projects	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Adv. Tras. To Other Projects	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Blood Sample Collection Charges	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bank Charges	3173.00	0.00	0.00	0.00	0.00	0.00	3173.00
	Staff Salary Expenses	330754.00	0.00	0.00	0.00	0.00	0.00	330754.00
	Lab Testing Fees Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Fixed Assets Purchase Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Lab Mater / Consume Pur Expenses	434235.00	0.00	53876.00	83456.00	3626.00	372892.00	948089.00
	Misc Lab Expenses	3766.00	0.00	0.00	0.00	0.00	0.00	3766.00
	National DairyDevep. Board	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Post And Courier Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Professional Charges	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transportation Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Traveling Expence	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Purchase Of Chemical and Consums	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Custom Duty	23257.00	0.00	0.00	0.00	0.00	0.00	23257.00
	Vehicle Hire Charges	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transferred to Overhead	147113.00	0.00	0.00	0.00	0.00	0.00	147113.00
	TA-DA / Honorarium Charges	7562.00	0.00	0.00	0.00	0.00	0.00	7562.00
	Total Expenditure - B	949860.00	0.00	53876.00	83456.00	3626.00	372892.00	1493814.00
	Closing Balance = A - B	5518998.00	3144112.00	1446124.00	1006542.00	521372.00	1157108.00	12764156.00
	Previous Year	2389729.00	0.00	0.00	0.00	0.00	0.00	2389729.00

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GUJARAT BIOTECHNOLOGY RESEARCH CENTRE - 2022-23
BLOCK B & D, M. S. BUILDING, GANDHINAGAR 382011
GRANT UTILISED

SCHEDULE - B 4

	Particulars	Grant / Advance for Various Projects											
		JD - 2 Project											
		JD - 2/BS-14/2017-18	JD - 2/ENV-16/2017-18	JD - 2/ENV-17/2017-18	JD - 2/HLT-12/2017-18	JD - 2/HLT-13/2017-18	JD - 2/HLT-15/2017-18	JD - 2/MB-18/2017-18	JD - 2/MB-19/2017-18	JD - 2/MBRK-85 QH 4	JD-2/ADENO/2022	JD - 2/MBRK 85 QH 4	Total JD-2 Projects
	1	2	3	4	5	6	7	8	9	10	11	12	11=02 to 10
A	Opening Balance	1721855.18	-2208654.00	2537411.00	3345270.74	4527190.00	4532625.33	4626828.00	1033331.00	245574.00	0.00	0.00	20361431.25
	Add: Recd. During The year	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3000000.00	2000000.00	5000000.00
	Add : Other Income / Exp. Round Off	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Add : Other Income/ Tras. From Other JD-1 Project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Income - A	1721855.18	-2208654.00	2537411.00	3345270.74	4527190.00	4532625.33	4626828.00	1033331.00	245574.00	3000000.00	2000000.00	25361431.25
B	Less : Expenditure During the Year												
	Adv. Tras. To Other JD-2 Projects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bank Charges	0.00	0.00	0.00	3661.00	3629.00	0.00	12895.00	0.00	0.00	0.00	25917.00	46092.00
	Staff Salary Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Lab Mater / Consume Pur Expenses	365632.00	32891.00	50402.00	221272.00	49245.00	165300.00	2180723.00	0.00	0.00	506703.00	149124.00	3721292.00
	Misc. Lab Expenses	0.00	1517.00	0.00	0.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	1817.00
	Custom Duty Expense	0.00	0.00	0.00	17485.00	15208.00	0.00	102819.00	0.00	0.00	0.00	0.00	136522.00
	Publication of Research Paper	0.00	-177179.32	0.00	0.00	0.00	0.00	98023.00	0.00	0.00	0.00	0.00	-79156.32
	Professional Charges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transportation Expenses	0.00	0.00	0.00	0.00	0.00	0.00	41459.00	0.00	0.00	0.00	0.00	41459.00
	Traveling Expences	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TA-DA / Honoranum Charges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	551.00	551.00
	Total Expenditure - B	365632.00	-142771.32	50402.00	242418.00	68082.00	165300.00	2436219.00	0.00	0.00	506703.00	175592.00	3868576.68
	Total - A - B	1356223.18	-2065882.68	2487009.00	3102852.74	4458108.00	4367325.33	2190609.00	1033331.00	245574.00	2493297.00	1824408.00	21492854.57
	Previous Year	1721855.18	-2208654.00	2537411.00	3345270.74	4527190.00	4532625.33	4626828.00	1033331.00	245574.00	0.00	0.00	20361431.25

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	Summary of JD - 1, JD - 2 & JD - 3 and Scientist B Project	Director Project & JD - 1 Project	JD - 2 Project	JD - 3 Project	Scientist B	Total Director Project, JD - 1, JD - 2 & Scientist B Project
A	**Opening Balance**	58946314.41	20361431.25	0.00	2389729.00	81697474.66
	Add: Recd. During The year	101325972.96	5000000.00	0.00	11898241.00	118224213.96
	Add : Advance for GBRC/SERB/JD1/WBE/202	3117864.00	0.00	3481000.00	0.00	6598864.00
	Add : Adv. For Trainning Programme JD1/WORKSHOP -1/2021-22	2223396.00	0.00	0.00	0.00	2223396.00
	Total Income B = A+C	**165613547.37**	**25361431.25**	**3481000.00**	**14287970.00**	**208743948.62**
B	**Less : Expenditure During the Year**					
	Adv. Tras. To Other Projects	0.00	0.00	0.00	0.00	0.00
	Adv. Tras. To Other Projects	0.00	0.00	0.00	0.00	0.00
	Blood Sample Collection Charges	237121.00	0.00	0.00	0.00	237121.00
	Bank Charges	15371.00	46092.00	0.00	3173.00	64636.00
	Staff Salary Expenses	6558272.00	0.00	0.00	330754.00	6889026.00
	Lab Testing Fees Expenses	787075.00	0.00	0.00	0.00	787075.00
	Fixed Assets Purchase Expenses	2081616.00	0.00	0.00	0.00	2081616.00
	Travelling Expense	145740.00	0.00	22973.00	0.00	168713.00
	Lab Mater / Consume Pur Expenses	12063443.98	3721292.00	1296483.00	978089.00	18059307.98
	Misc Lab Expenses	47032.00	1817.00	4000.00	3766.00	56615.00
	Training Expense	5000.00	0.00	-359798.00	0.00	-354798.00
	Advertisement Expense	7056.00	0.00	0.00	0.00	7056.00
	Food and Refreshment Expense	83968.00	0.00	194742.00	0.00	278710.00
	Custom Duty	2230417.00	138522.00	86788.00	23257.00	2479984.00
	Printing and Xerox/ Stationery	174489.00	0.00	40630.00	0.00	215119.00
	TA-DA	134826.00	551.00	198413.00	7662.00	341452.00
	Vehicle Hire Charges	334518.00	0.00	0.00	0.00	334518.00
	Repair and Maintenance Expenses	17936.00	0.00	0.00	0.00	17936.00
	Transportation Expenses	16437.00	41459.00	0.00	0.00	57896.00
	Post and Courier Expenses	15932.00	0.00	0.00	0.00	15932.00
	EXP. Paid IIT - Gandhinagar	655000.00	0.00	0.00	0.00	655000.00
	Purchase Of Chemical and Consumables	6128497.79	0.00	0.00	0.00	6128497.79
	Publication Charges	147384.00	-79156.32	0.00	0.00	68227.68
	Transfer to Overhead	1093940.00	0.00	0.00	147113.00	1241053.00
	Total Expenditure - B	**32981071.77**	**3868576.68**	**1484231.00**	**1493814.00**	**39827693.45**
	Closing Balance = A - B	**132632475.60**	**21492854.57**	**1996769.00**	**12794156.00**	**168916255.17**
	Previous Year	**58946314.41**	**20361431.25**	**0.00**	**2389729.00**	**81697474.66**

	Director Project AML/2021	DIRECTOR PORJECT AMR/2022-23	DIRECTOR PROJECT AML/2020-21	DIRECTOR PROJECTS IAYUR 21-22	GBRC/GOI-DBT/TATVAM/2022	GBRC/GSBTM/DIR/WORKSHOP/2022-23	Total Director Project AML/2021
A	**Opening Balance**	3145600.00	13837025.00	796948.00	18660640.00	0.00	36440213.00
	Add: Recd. During The year	22048000.00	41237812.00	0.00	-200000.00	1659779.96	64745591.96
	Add : Other Income / Exp. Round Off	0.00	0.00	0.00	0.00	0.00	0.00
	Add : Tras. Other Project	0.00	0.00	0.00	0.00	0.00	0.00
	Total Income E = A+C	**25193600.00**	**55074837.00**	**796948.00**	**18460640.00**	**1659779.96**	**101185804.96**
B	**Less : Expenditure During the Year**						
	Adv. Tras. To Other Projects	0.00	0.00	0.00	0.00	0.00	0.00
	Adv. Tras. To Other Projects	0.00	0.00	0.00	0.00	0.00	0.00
	Blood Sample Collection Charges	0.00	3462.00	0.00	0.00	0.00	3462.00
	Bank Charges	684.00	0.00	0.00	3880.00	0.00	4564.00
	Staff Salary Expenses	510972.00	325259.00	158564.00	3980572.00	0.00	4975367.00
	Custom Duty	1511170.00	0.00	0.00	624100.00	0.00	2135270.00
	Fixed Assets Purchase Expenses	0.00	0.00	0.00	2081616.00	0.00	2081616.00
	Lab Mater / Consume Pur Expenses	0.00	0.00	202389.00	3497330.98	151765.00	3851484.98
	Misc Lab Expenses	0.00	0.00	0.00	39231.00	0.00	39231.00
	Repair and Maintenance Expenses	0.00	0.00	0.00	17936.00	0.00	17936.00
	EXP. Paid IIT - Gandhinagar	0.00	0.00	0.00	0.00	655000.00	655000.00
	Food/Refreshment Expenses	0.00	0.00	0.00	0.00	69868.00	69868.00
	Printing And Stationary Expenses	0.00	0.00	0.00	0.00	173049.00	173049.00
	Traveling Expence	0.00	0.00	0.00	0.00	145740.00	145740.00
	Purchase Of Chemical and Consumables	5049454.79	7899.00	0.00	0.00	0.00	5057153.79
	Vehicle Hire Charges	0.00	0.00	0.00	0.00	82740.00	82740.00
	TA-DA / Honoranium Charges	0.00	18149.00	0.00	28268.00	3312.00	46729.00
	Total Expenditure - B	**7072280.79**	**364569.00**	**360933.00**	**10269933.98**	**1281474.00**	**19339190.77**
	Closing Balance = A - B	**18121319.21**	**54720268.00**	**436015.00**	**8190706.02**	**378305.96**	**81846614.19**
	Previous Year	**3145600.00**	**13837025.00**	**796948.00**	**18660640.00**	**0.00**	**36440213.00**

Ramani and Vasoya
Chartered Accountants
FRN 135828W
Gandhinagar

GUJARAT BIOTECHNOLGY RESEARCH CENTRE 2022-23

BLOCK No - B, 6TH FLOOR, M. S. BUILDING, SECTOR NO. 11, GANDHINAGAR

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31-03-2023

Security Deposit

SCHEDULE - C

Particulars	As at 2021-22	As at 2022-23
S. D. - Absolute Filtertech	25000.00	25000.00
S. D. - Ashapura Services	90000.00	90000.00
S. D. - B. Hiten & Co.	120000.00	120000.00
S. D. - Bio Innovations	0.00	65785.00
S. D. - Bio Linx	698900.00	198900.00
S. D. - Capital Offset	50000.00	0.00
S. D. - Capital Travels	14604.00	14604.00
S. D. - Chirag Security	10197.00	10197.00
S. D. - Chiti Chem Corporation Vadodara (GSBTM)	-118764.00	-118764.00
S.D. - Crescent Scientific Pvt. Ltd.	271328.00	271328.00
S. D. - Divya Scientific and Chemicals	1375000.00	1375000.00
S. D. - Dolphin	45000.00	45000.00
S. D. - Dynamic Marketing House	1375000.00	155000.00
S..D. - ESCO Biotech Pvt. Ltd.	76000.00	76000.00
S. D. - Ghanshyam Trading	110000.00	110000.00
S. D. - Gujarat Technology	25000.00	25000.00
S. D. - Inventa System	1295000.00	1295000.00
S. D. - Invitrogen Bioservices	1395000.00	1395000.00
S. D. - Invitrogen (Life Technologies)	1430000.00	1430000.00
S. D. - Labtronik	75000.00	75000.00
S. D. - Manisha Enterprise	941777.00	941777.00
S. D. - Matrix Enterprise	1030000.00	1030000.00
S. D. - MyLab Lifesolution Pvt. Ltd.	475000.00	475000.00
S. D. - Premas Lifescience Pvt. Ltd.	500000.00	500000.00
S. D. - Qiagen India Pvt. Ltd.	1000000.00	1000000.00
S. D. - Shaksham Technology Pvt. Ltd.	45000.00	45000.00
S. D. - Shree Siddhi Vinayak Enterprise	660000.00	660000.00
S. D. - Siya Enterprise	25000.00	25000.00
S. D. - Sterling Accurieswellness Pvt. Ltd.	500000.00	500000.00
S. D. - Surekh Education	25000.00	25000.00
Grand Total	**13564042.00**	**11859827.00**

GUJARAT BIOTECHNOLGY RESEARCH CENTRE 2022-23

BLOCK No - B, 6TH FLOOR, M. S. BUILDING, SECTOR NO. 11, GANDHINAGAR

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31-03-2023

Investments

SCHEDULE - D

Particulars	As at 2021-22	As at 2022-23
A. FIXED DEPOSIT WITH GSFS		
G.F.D.C F.D. NO. 83758	83662620.00	0.00
G.S.F.S. F.D. NO. 85959	10473729.00	0.00
G.S.F.S. F.D. NO. 86084	10536312.00	0.00
G.S.F.C F.D. NO 93377	0.00	87268728.00
G.S.F.C F.D. NO 95365	0.00	10889803.00
G.S.F.C F.D. NO 95598	0.00	10992748.00
TOTAL - A	**104672661.00**	**109151279.00**
B. AUTO SWEEP F.D. WITH SBI		
Auto Sweep - 40753172883	1647000.00	0.00
Auto Sweep - 40709426924	12691000.00	0.00
Auto Sweep - 40242558290	20093635.00	0.00
Auto Sweep - 40167106588	57307293.00	52287338.20
Auto Sweep - 0040106776917	138040.63	144498.63
AUTO SWEEP - 40898675246		2450000.00
AUTO SWEEP - 40941818858		42820607.00
AUTO SWEEP - 41004308618		42296440.00
AUTO SWEEP - 41037722543		6299000.00
AUTO SWEEP - 41052763499		4448000.00
AUTO SWEEP - 41187580333		8736000.00
AUTO SWEEP - 41412217853		10658000.00
AUTO SWEEP - 41653400603		1127000.00
TOTAL - B	**91876968.63**	**171266883.83**
TOTAL - A + B	**196549629.63**	**280418162.83**

GUJARAT BIOTECHNOLOGY RESEARCH CENTRE

SCHEDULES FORMING PART OF INCOME & EXPENDITURE FOR THE YEAR ENDED 31.03.2023

SCHEDULE D-SIGNIFICANT ACCOUNTING POLICIES

1. ACCOUNTING CONVENTION

The financial statements are prepared on the basis of historical cost convention, unless otherwise stated and on the accrual method of accounting.

2. INVENTORY VALUATION

2.1 Stores and Spares (including machinery spares) are valued at cost.
2.2 Raw materials, semi-finished goods and finished goods are valued at lower of cost and net realizable value. The costs are based on weighted average cost. Cost of finished goods and semi-finished goods is determined by considering material, labour and related overheads.

3. INVESTMENTS

3.1Investments classified, as "long term investments" are carried at cost. Provision for decline, other than temporary, is made in carrying cost of such investments.
3.2Investments classified as "Current" are carried at lower of cost and fair value. Provision for shortfall on the value of such investments is made for each investment considered individually and not on a global basis.
3.3Cost includes acquisition expenses like brokerage. Transfer stamps.

4. FIXED ASSESTS

4.1Fixed Assets are stated authorities at cost of acquisition inclusive of inward freight, duties and taxes and incidental and direct expenses related to acquisition. In respect of projects involving construction, related pre-Operational expenses (including interest on loans for specific project prior to its completion), from part of the value of the assets capitalizes
4.2Fixed Assets received by way of non-monetary grants, (other than towards the Corpus Fund), are capitalized at values stated, by corresponding credit to Capital Reserve.

5. DEPRECIATION

5.1Depreciation is provided on straight-line as per rates specified in the Income tax Act, 1961 except depreciation on cost adjustments arising on account of conversion of foreign Currency Liability for acquisition of fixed assets, which is amortized over the residual life of the respective assets

5.2In respect of additions to /deductions from fixed assets during the year, depreciation is considered on pro-rata basis.

5.3Assets costing Rs. 5,000 or less each are fully provided.

6. MISCELLANEOUS EXPENDITURE

Deferred revenue expenditure is written off over a period of 5 years from the year it is incurred.

7. ACCOUNTING FOR SALES

Sales include GST and are net of sales returns, rebate and trade discount.

8. GOVERNMENT GRANT/SUBSIDIES

8.1Government grants of the nature of contribution towards capital cost of setting up projects are treated as Capital Reserve.

For, **Ramani & Vasoya**
Chartered Accountants
Firm Reg. No. 135828W

Ramani and Vasoya * Chartered Accountants FRN 135828W * Gandhinagar

Sagar Vasoya
Partner
Mem. No.129998

Place: Gandhinagar
Date: 23/10/2023
UDIN: 23129998BGRPXT8783

Gujarat Biotechnology Research Centre

Department of Science & Technology, Government of Gujarat

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