



## Advance Level State Biotech Hub Sikkim State Council of Science and Technology

### B.Sc final year students attended 5 days hands-on training on Molecular & Microbiological Techniques

Five days hands on training on Molecular and Microbiological Techniques was conducted from 27th march 2018 to 1st April 2018 for B.Sc final year students of Nar Bahadur Bhandari Government Degree College (Formerly called as Sikkim Government College), Tadong. The training was provided on the Basic Techniques of Microbiology, were also given hands on training on microbiology techniques, aseptic techniques, followed by laboratory ethics and bio-safety.

Hands on sessions also included Molecular Techniques. The students were imparted training on Isolation of DNA, Quantification, Gel Electrophoresis and Polymerase Chain Reaction (PCR).

The training programme was conducted by Shri. K.B. Subba (ASO), Dr. Sushen Pradhan, (RA) Ms Neelam Gurung, (SRF), Ms Prerna Pradhan (SRF) and Ms Pratima Ghimiray (SRF). Total twelve students were trained during the five days hands on training programme. The whole objective of training was to impart basic knowledge on subjects Biotechnology and Microbiology. The programme concluded successfully with a positive remark from all the fellow participants and certificate was distributed from the hands of Dr. B.C. Basistha, AD, DST&CC.



Figure 1. Five days hands-on training programme on Microbiological and Molecular Techniques for final year B.Sc students of Sikkim Govt. College.

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# RECENT ACTIVITIES

## Dr. Renu Swarup, Secretary, Department of Biotechnology visits Sikkim

Dr. Renu Swarup, Secretary, Department of Biotechnology, Government of India was on an official tour to IBSD, Tadong, Sikkim from 31st May 2018 to 3rd June 2018. Dr. B.C. Basistha Additional Director, DST & CC along with all the biotechnology division officials called on madam Swarup at RCIBSD, Gangtok. Firstly, Dr. Basistha welcomed her to Sikkim by offering a traditional Khadha (scarf) and a small memento. During the meeting Dr. Dinabandhu Sahoo, Director, IBSD and Dr. Md. Aslam, Director, NERP BMC, were also present.

During the short meeting madam Dr. R. Swarup emphasised on the collaborative work between IBSD and DST & CC. Dr. B.C. Basistha Additional Director gave a brief background regarding going research work on biotechnology at DST & CC. Dr. Dinabandhu Sahoo added that Sikkim State Council of Science and Technology can collaborate with IBSD Sikkim for scientific projects in future and directed his scientists to be in constant touch with DST & CC,



Figure 2 Group picture taken with Dr. Renu Swarup at IBSD, Sikkim

### State Level Essay Competition for Young People THEME

*Biotechnology: "Biggest Tool of 21<sup>st</sup> Century"*  
**RESULTS DECLARED**

Advance Level State Biotech Hub, Sikkim organized a state level essay competition on the topic Biotechnology: **"Biggest tool of 21st Century"** for science students of class X, XI and XII. The aim was to inspire upcoming youth to promote Biotechnology and its Application in various fields. Total 94 students participated from all the four districts of Sikkim.

The allotment of marks were based on different skills of the student like definition of topic, literature review, organisation, writing skill, etc. Results were declared on 22nd of May 2018 on the occasion of International day for Biological Diversity. Four students were awarded for the same, the names are as under.

1. Ms. Rajani Chettri, Govt. Sr. Sec. School, Chujachen - 1st Prize
2. Mr. Seesam Pradhan, Govt. Sr. Sec. School, Soreng— 2nd Prize
3. Ms. Tshering Yangzongmit Lepcha, Govt Sr. Sec. Tadong, and

Mr. Rishal Pandey Chettri, Holy Cross School, Tadong.

## Rhizobium as a Biofertilizer

Biofertilizers are living cells or latent cells of efficient strains of microorganisms that help crop plants' uptake of nutrients by their interactions in the rhizosphere through seed or soil. They increase availability of nutrients in the soil which can be assimilated by plants. Microorganisms are not efficient in natural surroundings and therefore artificially multiplied cultures of efficient selected microorganisms play a vital role in accelerating the microbial processes in soil. Use of Biofertilizers is important in integrated nutrient management as it is cost effective. Renewable source of plant nutrients supplement the chemical fertilizers for sustainable agriculture. Several microorganisms and their association with crop plants are being exploited in the production of Biofertilizers and Rhizobium biofertilizer is one among them and was first made in USA and commercialized by private enterprise in 1930s. Rhizobium is a soil habitat bacterium, which can able to colonize the legume roots and fixes the atmospheric nitrogen symbiotically. The morphology and physiology of Rhizobium will vary from free-living condition to the bacteroid of nodules. They are the most efficient biofertilizer as per the quantity of nitrogen fixed concerned.

## ***Biotechnology outreach programme conducted at 20 different schools in Sikkim***

Biotechnology, the technology of 21st Century, which has its potential to feed the world population, cure disease, diagnosis etc. To inculcate interest and enthusiasm among the science students in the field of biotechnology, Advance Level State Biotech Hub of Sikkim, under Sikkim State Council of Science and Technology conducted outreach programmes at 20 different government schools covering all the four districts of Sikkim. The main target group were class X, XI and XII Science students and faculties.

Ms Neelam Gurung, (SRF) Ms Pratima Ghimiray, (SRF) Ms Purna Pradhan (SRF), Dr. Sushen Pradhan, RA and Mr. K.B.Subba, ASO under the guidance of Dr. B.C. Basistha, Additional Director, DST&CC conducted the programme during the month of April and May 2018.

Students were given power point presentation of one hour followed by long interactions and questionnaires. The topic for the presentations were chosen as per the CBSE syllabus of class XII Biology. Thus the topic covered were Introduction to Biotechnology, The basic Principle and Processes involved in Biotechnology, Recombinant DNA Technology and Application of Biotechnology in the field of Medicine, Agriculture, Health care and Industries..

The programme had a positive feedback as the students actively participated during the programme. There was an active questionnaire sessions after each programme. The keen participants were interested to visit our Biotechnology and Molecular Laboratory in near future.



*Figure showing outreach programmes at Kitam Secondary school in south Sikkim*



*Figure showing outreach programmes at Soreng Senior Secondary School, West Sikkim*

## ***Laboratory demonstration for school and college students***

Fifteen Students of Class XII Science standards, of Holy Cross School, Tadong Sikkim visited Molecular and Biotechnology Laboratory of Advanced Level Biotech Hub at SSCS&T on 12th May 2018 followed by the visit of 18 final year students of B.Sc. Agriculture from Post Harvest Agriculture University, Ranipool, Sikkim on 28th April 2018.

The participants wear given a brief introduction to Biotechnology, laboratory safety and ethics. The students were also explained about the principles and use of laboratory instruments. The instruments demonstrated and explained were Hot water bath, Auto-clave, BOD Incubator, Centrifuge, ELISA Reader, UV Spectrophotometer, Nano-drop Spectrophotometer, Gel Electrophoresis, Laminar –Air– Flow, Polymerase Chain Reaction, RT-PCR, Incubator Shaker, Gel Doc, -80 and -20 Deep freezer. The participants were also briefly explained about the C-TAB method of isolation of DNA from plant samples.



*Figure Showing laboratory demonstration of the students of Post Harvest Agricultural University, Ranipool and Holy Cross School, Tadong, Gangtok.*



## UPCOMING EVENTS

1. 15 days hand on training on Bio-technology for the participants of Essay competition.
2. Invited lecture on Microbiology on 29th July 2018 at SSCS&T- Lecturer invited from Kingsborough Community College, Brooklyn, NY, U.S.A.
3. Outreach programme to be conducted
4. Seminars and Poster Presentation to be held at SSCS&T.

### State Biotech Hub Team

Dr. Jayakumar, IAS, Member Secretary  
(Chief Editor)

Dr. B.C. Basistha, Additional Director and  
Coordinator (Editor)

Shri. K.B. Subba, Assistant Scientific Officer  
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Miss Pratima Ghimiray  
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Mr. Inchung Lepcha  
Laboratory Attendant

Mr. Tika Pd. Sharma  
Laboratory Attendant

## Sikkim Indigenous fermented food and associated Microorganisms

*Neelam Gurung and Perna Pradhan*

Fermented foods obtained through process of lacto fermentation in which natural bacteria feed on the sugar and starch present in the food producing lactic acid. The process conserves the food, and generates beneficial enzymes, b-vitamins, Omega-3 fatty acids, and various strains of probiotics.

In Sikkim, traditional fermented foods and beverages (Table 1) have been used as a regular food since time immemorial and became a part of culture. Fermented food preserves nutrients and breaks down food particle into a easily digestible form. Food products after fermentation has enhanced nutritional value and palatable with suitable flavor and texture. Fermented products are reported to possess several therapeutic properties viz anti-cholesteremic, anti-diabetic, bioactive peptides, anti-atopic dermatitis etc. which are validated by *in vivo* experiments. Gundruk and Sinki are considered to be good appetizers, and remedies from indigestion, diarrhea and stomach pain.

Fermented food	Microorganism associated
Chhurpi	<i>Lb.farciminis</i> , <i>Lb. paracasei</i> , <i>Lb. biofermentans</i> , <i>Lb. plantarum</i> , <i>Lb. curvatus</i> , <i>Lb. fermentum</i> , <i>Lb. alimentarius</i> , <i>Lb. kefir</i> , <i>Lb. hilgardii</i> ,
Dahi	<i>Lb.bifermentans</i> , <i>Lb.alimentarius</i> , <i>Lb. paracasei</i> , <i>Lact.lactis</i> , <i>Stre p.cremoris</i> , <i>Strep.lactis</i> , <i>Strep.thermophilus</i> , <i>Lb. bulgaricus</i> , <i>Lb.acidophilus</i> ,
Selroti	<i>Leu-conostoc mesenteroides</i> , <i>Enterococcus faecium</i> , <i>Pediococcus pentosaceus</i> , <i>Lactobacillus curvatus</i> , <i>Saccharomyces cerevisiae</i> , <i>Saccharomyces kluyveri</i> ,
Gundruk	<i>Lb. fermentum</i> , <i>Lb. plantarum</i> , <i>Lb. casei</i> , <i>Lb. casei</i> sub sp. <i>pseudo plantarum</i> , <i>Ped.pentosaceus</i>
Mesu	<i>Lb. plantarum</i> , <i>Lb. brevis</i> , <i>Lb. curvatus</i> , <i>Leu, citreum</i> , <i>Ped. Pentosaceus</i>
Sinki	<i>Lb. plantarum</i> , <i>Lb. brevis</i> , <i>Lb. casei</i> , <i>Leuc. Fallax</i>
Kinema	<i>B. subtilis</i> , <i>B. licheniformis</i> , <i>B. cereus</i> , <i>B. circulans</i> , <i>B. thuringiensis</i> , <i>B. sp haericus</i> , <i>Ent. faecium</i> , <i>Geotrichum candidum</i>
Kodo ko Jaanr	<i>Pichia anomala</i> , <i>Saccharomyces cerevisiae</i> , <i>Candida glabrata</i> , <i>Saccharomycopsis fibuligera</i> , <i>Pediococcus pentosaceus</i> and <i>Lactobacillus bifermentans</i> .
Bhaati jaanr	<i>Saccharomyces bayanus</i> , <i>Candida glabrata</i> <i>Pichia anomala</i> , <i>Saccharomycopsis fibuligera</i> , <i>Saccharomycopsis capsularis</i> and <i>Pichia burtonii</i> .
Rakshi	<i>Mu-coricinelloides</i> , <i>Rhizopus chinensis</i> , <i>R. stolonifer</i> var. <i>lyococcus</i> , <i>Saccharomycopsis fibuligera</i> , <i>Saccharomyces cerevisiae</i> , <i>Hansenula anomala</i> , <i>Pediococcus pentosaceus</i> and <i>Lactobacillus sp.</i>

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