Research Centre in OMICS and Biodiversity Research

Focus Centre:

SDG 2: Zero Hunger, SDG 4: Quality Education, SDG 6: Clean Water and Sanitation
SDG 8: Decent Work and Economic Growth, SDG 12: Responsible Consumption and Production

Vision: Bioprospecting of Himalayan Biodiversity and Sustainability by Omics approach.

Mission:

- Research on origin and maintenance of Biodiversity
- Educate to protect and manage biodiversity
- Biodiversity conservation and Protection
- Globalize Himalayan Biodiversity
- Harnessing Himalayan Biodiversity for Societal Benefits

Location: Block B

Year of Establishment: 2016

Faculty In-charge: Dr. Lokender Kumar

No. of Publications in following SDGs (2018-2023):

Name of SDG	No. of Publications
SDG 2: Zero Hunger	58
SDG 4: Quality Education	8
SDG 6: Clean Water and Sanitation	253
SDG 8: Decent Work and Economic Growth	53
SDG 12: Responsible Consumption and Production	79

Extracted from Scopus Database

Omics is a new research field in which biological data obtained from various studies including genomics, transcriptomics, and proteomics are comprehensively collected, integrated & analyzed to decipher the biological nature of living organisms. Biodiversity constitutes variety of life on Earth, which provides sustainable food, air, water, medicines etc. The Himalayas are hotspot of biodiversity and largely remained unexplored. The Research Centre in OMICS and Biodiversity Research would work to harness the untapped resources for societal development.

Thematic areas:

- DRUG DISCOVERY: Identification of bioactive molecules (antimicrobial, anticancer) from medicinal plants and mushrooms, therapeutics and diagnostics for neglected diseases such as malaria, *Echinococcus granulosus,* and anti-Leishmaniasis.

- MICROBIAL BIODIVERSITY: Genomics/Metagenomics, and enzyme mining from extremophilic (thermophiles, psychrophiles, halophiles and radiation resistant) microorganisms. Analysis of protein expression in extremophiles under varied environmental conditions, Bioprospecting mushrooms etc

- AGROBIODIVERSITY: Host pathogen interaction, Development of agro-active compounds / biocontrol / bioremediant in agriculture research, Molecular tools for engineering desiccation and salinity tolerance in crop plants.

Research Achievements:

Center has made remarkable achievements in exploring unique extremophile from North-West Himalayas, identified novel enzymes and unique biomolecules from extremophiles and mushrooms.

Remarkable progress has been made in bioprospecting phytochemicals from unique medicinal plants of North-West Himalayas to control multidrug resistance. Center has also made progress in genomics, proteomics, and metabolomics studies from different systems.

Resources available

Center for Omics and Biodiversity Research

Yeast Biology Lab

DST-FIST Lab

Research Projects related to Centre theme:

- DST-FIST: Establishment of advanced biological research facility for Proteomics (Rs. 65 Lac, SR/FST/LSI/2016) Completed August 2021.

- Identification and characterization of medicinal plants of north-west Himalayas with synergistic effects on traditional antibiotics to control clinical bacterial

infections (Dr. Anuradha Sourirajan and Dr. Kamal Dev, DST, 24 Lac) –

Completed 31 July 2015.

- Process optimization and up-scale production of lignocellulosic extremozymes from Himalayan microbes for biomass valorization/depolymerization (DBT Network project Under consideration; Total cost 4.5 crore, Shoolini University share Rs 65 lakh)

Patents Filed

S. no	Authors (Year)	Title of Patent	Application no
1.	Kamal Dev, Anuradha Sourirajan, Shruti Sharma, Sonika Gupta (2020).	Halophilic *Halobacillus trueperi* ss1 bacterial strain as plant growth promoting bacteria and potential bio inoculants for sustainable growth of cereal and pulses crops under NaCl stress environment	202011004235
2.	Kamal Dev, Anuradha Sourirajan, Garima Bisht, Ritu Kulshreshtha, Srishti Srivastava (2020)	A method of isolation of red pigments from psychrophilic bacterium *Rhodonellum psychrophilium* GL8 and uses thereof	202011004237
3.	Garima Bisht, Anuradha Sourirajan, Kamal Dev (2019)	Bio-pigment based cotton fabrics with antimicrobial properties and method of uses thereof.	201911048223
4.	Dev, K., Sourirajan, A., Bisht, G (2018)	A strict-halophilic *Salinicoccus roseus* strain GL34 and pigments thereof.	201811021212
5.	Dev, K., Mandal, S., Sourirajan, A., Bisht, G (2018)	Biological decaffeination of coffee by hyper thermoalkaliphile *Parageobacillus toebii* strain SM1 and method thereof.	201811020673

6.	Dev, K., Dogra, MK., Sharma, S., Sourirajan, A. (2018)	Improved process for production of oligosaccharides from agar using novel psychrophilic bacteria isolated from Himalayas.	201811020479
7.	Sourirajan, A, Sharma, D., Dev, K. (2018)	A gene encoding dual enzyme Aminopeptidase/endoglucanase from thermophilic bacterium *Bacillus sp.* PW2 (KU711838).	201811018382
8.	Dev, K., Bisht, G., Sourirajan, A., Kumar, V. (2018)	A psychro-halophilic *Rhodonellum psychrophilum* strain GL8 and pigments thereof.	201811018597
9.	Dev, K., Sharma, D., Sharma, S., Sourirajan, A (2017)	Thermostable antimicrobial peptides and method thereof.	201711034173
10.	Dev, K., Sharma, D., Sourirajan, A., Sharma, S (2017)	Novel gene coding a thermostable glutaminase enzyme.	201711028931
11.	Dev, K., Kumar, V., Rolta, R., Sharma, A (2017)	Herbal pharmaceutical excipient for enhancing antifungal and antibacterial properties of existing drugs.	201711028454
12.	Sourirajan, S., Vaidya, S., Dev, K (2017)	Gene expressing novel microbial protein for engineering salt tolerance in plants and method thereof.	201711018003
13.	Dev, K., and Kumar, T. (2015)	A novel microbe producing extracellular β-galactosidase and method of enzyme production thereof.	1895/DEL/2015
14.	Dev, K., Sourirajan, A.,Suman., R. (2015)	Microbially produced antifreeze protein(s) and method of production thereof.	3886/DEL/2015