

INTERVIEW



DR. DATTA MADAMWAR
Professor, Head
Faculty of Science
BRD School of Biosciences,
Sardar Patel University,
Vallabh Vidyanagar
(Gujarat), INDIA.

Academic Qualifications:

- M.Sc. in Microbiology, Nagpur University, Nagpur
- Ph.D., Birla Institute of Technology and Science, Pilani

Professional Experience:

- Professor at Department of Biosciences, Sardar Patel University, Vallabh Vidyanagar from June 1998 till date
- Reader at Department of Biosciences, Sardar Patel University, Vallabh Vidyanagar from Sept. 1986 to June 1998
- Lecturer at Birla Institute of Tech. & Science, Pilani - 333031 from Aug. 1978 to Sept.1986

Awards / Honors

- Received several awards for research mainly Biotechnology Associateships and Visiting Scientist under European Commission.
- Visited Germany, U.K, Austria, Switzerland, France, Finland, Greece, Malaysia, Singapore, Brazil and U. S. A. under different visiting fellowships.
- Recipient of DBT sponsored project under Center of Excellence and Innovation in Biotechnology on "Molecular & Omics Technologies."
- Nominated by Government of India as one of the expert members of a team for bilateral collaboration on Bioresources and Environmental Biotechnology to visit Helsinki, Finland during May 4-5, 2007 through Department of Biotechnology, New Delhi.
- Recipient of Visiting Professorship at Swiss Federal Institute of Technology of Lausanne, EPFL-ENAC-SGC, Lausanne, Switzerland.

Membership/Honorary Position

Held:

- Member of International Association of Hydrogen Energy, U.K.
- Member of American Association of Microbiologists, U.S.A.
- Life Member of Association of Microbiologists of India.
- Life Member of Society of Biological Chemists (India).
- Life Member of Biotech Research Society of India.

Special Attainments

- Member of Expert Committee under Fast Track Scheme in the area of Life Sciences of young scientist (2004-2007).
- Member of Biotechnology Council of Government of Gujarat.
- Member of Programme Advisory Committee (PAC) of Department of Science & Technology, New Delhi for International Cooperation in the area of Life Sciences.
- Expert Member of Advisory Committee of UGC-SAP-II Programme of Department of Microbiology & Biotechnology Centre, M. S. University of Baroda, Baroda, Department of Microbiology, Kakatiya University, Warangal and Department of Microbiology, Shivaji University, Kholapur.
- Member of Task Force Committee of DBT in the area of Application of Biotechnology for Biodiversity Conservation and Environment.
- Member of Council and Technical Board of Gujarat State Biotechnology Mission.
- Fellow of Gujarat Science Academy.
- Fellow of Biotech Research Society of India.
- Fellow of Association of Microbiologists of India.
- Advisory Board Member of Gujarat Vidyapeeth.
- Editorial Board Member of Bioresource Technology (Elsevier) and many national journals.
- Guest Editor of Special Issue BIOCATALYSIS of Bioresource Technology, Elsevier.

Arzoo: Sir briefly tell us about the research you are doing and how it is beneficial for Indian subcontinent?

Dr. Datta: I am a Microbial Biotechnologist and we are doing research in Environmental Biotechnology especially environmental genomics. As our Honourable Prime Minister Shri. Narendra Modi says, we are trying to develop microorganisms to destroy waste present in the environment.

Gujarat is one of the most industrialized states of the country, where we have large number of small and large scale industries manufacturing dye, dye-intermediates, pigments, pesticides, pharmaceuticals, speciality chemicals, organic and inorganic compounds, petrochemicals, paints, textiles, engineering, plastics, rubbers and packaging, and many more. We cannot have any product without waste generation. The wastes generated by these industries are finding their way into the open environment either in running stream of water which inturn merge with ocean or directly into the atmosphere.

People have been working on environmental microbiology, they are trying to circumvent these kind of problems by developing special type of microorganisms. But this is not working as you go up on industrial scale the paradigm changes and what you get is failure.

Arzoo: What Biotechnology processes do you follow to find your answers ?

Dr. Datta: Our lab is not only trying to recover useful organisms available in the pool, but we are also working on functional genomics to recognize the different aspects of genes. And to capture still better picture, we are also understanding the metatranscriptome, where those genes are studied which expresses under particular environment.

The idea behind that, microorganisms are omnipresent and they found in so called contaminated area, those organisms which cannot sustain

What we face problem is most of the people these days are on internet, they try to get information through internet. Students really don't go in depth and they look for short term achievements. Even for writing the articles, they go mobile and pick selected some lines, where they lack writing practices. If they try to do writing on their own with a pen that would be better.



PHOTO: Dr. Datta Madamwar lab

the pressure of pollution would vanish, but those which are able to survive, try to perpetuate there. Over a period of time they must have evolved some mechanism to adapt and utilize these contaminants, so we are trying to exploit them.

For that we are using Metagenomics, Metatranscriptomics and trying to implement them. At the same time we are trying to understand the different metabolites which have been identified as Metabolome. With the help of that we are in the process of developing a technology which can remediate the highly contaminated soil into the fertile land.

Arzoo: Sir how the expenses incurred during research work are fulfilled?

Dr. Datta: We are supported by DBT, New Delhi India, they have recognized our lab as 'Centre of Excellence and Innovation in Biotechnology'.

Arzoo: Sir please tell us if you are doing research on any other aspects of Biotechnology?

Dr. Datta: We have a diverse group. One of our groups is working in non-aqueous enzymology i.e. use of enzyme in organic solvent. For e.g. Lipase which hydrolyses the esters, fats, oil and convert them into fatty acids. We are interested in reversible reaction using same enzyme, where condensation of fatty acids and alcohols can produce esters. These esters have commercial applications as flavouring agent in food products, fragrance, cosmetics, etc.

To put an enzyme in organic solvent is difficult task, because the reversible hydrolytic enzyme needs non-aqueous environment for reaction. We are preparing surfactants which entraps enzyme and provide them suitable environment. The enzyme can catalysed the reaction on soluble substrate at the interface of surfactant molecule without coming in direct contact with organic solvent. The system is optically transparent, thermodynamically stable, but on the other hand reusing them is a complicated process. So we try to convert them into the gel we call them 'Organogel'.

Another group is working on Phycobiliproteins. It is a light harvesting pigments of Cyanobacteria – earliest form of life. We generally extract these pigments, purify at highest level to crystallize them for structural determination. The structure determination helps in predicting their function and we also carry out *insilico* docking. At the same time we clone genes encoding them to find amino acid sequences. Through various studies in *C. elegans* (genetically very similar to Human) and *Drosophila*, we have observed that these natural pigments have therapeutic properties against diabetes, it has anti-ageing effect and it can also control liver damage in cell lines.

Since the pigment absorb and emit lights in particular spectrum, we are working to make them use as fluorescent tags, which can be said its actual biotechnological application in scientific studies.

Arzoo: Do you enjoy being a scientist?

Dr. Datta: Yes, I do certainly. I am basically a Professor, so I teach also. I am happy with teaching and research. No teaching programme is complete unless it links to research, it add basics

Arzoo: Any challenges you are facing during research regards funding and working?

Dr. Datta: Not much, Gujarat as such having very friendly environment in terms of education and research, so far atleast I am able to get fetch handsome amount of fund needed for my work from different funding agencies. The main sources are DBT, DST and partly I get from UGC and CSIR. I have group of 15 students, I have to take care about their financial need and I generously support them.

Arzoo: Any message to student community?

Dr. Datta: What we face problem is most of the people these days are on internet, they try to get information through internet. Students really don't go in depth and they look for short term achievements. Even for writing the articles, they go mobile and pick selected some lines, where they lack writing practices. If they try to do writing on their own with a pen that would be better.