MHRD | Government of India Ministry of Human Resource Development

सत्यमेव जयते

GIAN GLOBAL INITIATIVE OF ACADEMIC NETWORKS

A short course on

Extremozymes for Carving Better Tomorrow

December17-28, 2018 at National Institute of Technology, Durgapur

Overview

Biochemical processes have been realized as the ideal option for replacing physicochemical processes in an efficient, eco-friendly, and economical manner. The understanding of the enzymes, their catalysis, and their applications are mandate for the scientists and engineers working in the industry. The extremophilic enzymes can operate at lower or higher pH conditions, different range of temperatures, and different pressures etc. The idea of exploring the enzymes from extremophiles is not new. For example, Taq polymerase, a thermostable enzyme with a half-life of greater than 2 hours at 92.5°C and can function at around 70-80°C, was isolated from a thermophilic bacteria *Thermusaquaticus* in 1976. The Taq polymerase is being used for amplification of DNA in polymerase chain reaction for over decades. Extremozymes are promising candidates for carrying out operations in adverse conditions such as space (microgravity), mining (biomining/bioleaching), deep sea (high pressure), and toxic environments (metals, radionuclides, drugs, antibiotics etc.).

The knowledge of extremophilic enzymes is essential for chemists, biochemists, chemical/biochemical/bioprocess engineers, biotechnologists, molecular biologists, genetic engineers, as well as computational biologists. Existing enzymatic technologies (e.g. hydrolysis of lignocellulose into sugars) have several limitations including very slow enzymatic hydrolysis rates, low yields of products (often incomplete hydrolysis), require high dosages of enzymes, and sensitive to microbial contamination problems. These limitations could be overcome using extremophilic enzymes. This course introduces fundamentals of enzymatic processes and in-depth review of extremophilic enzymes which can be used in several industrial processes. In addition, the course provides the knowledge on how to engineer extremozymes for enhanced catalytic activities. This course will be useful for academia, research, and industry.

Objectives

- The primary objectives of the course are to teach the following concepts to participants:
- Fundamentals of Enzymatic Processes
- Introduction to Extremozymes: Types, Advantages, and Applications
- Metagenomics for the Discovery of Extremozymes
- Mechanisms of Extremozymes: Sequences and Structural Biology
- Engineering of Enzymes for Improved Catalytic Rates under Harsh Conditions
- Hands-on Experiences on Catalytic Processes using Thermozymes in Laboratories
- Recognize current trends in extremozymes in response to current demands from various sectors of industry

Familiarize with efficient techniques to solve large **Schedule/Location**	December 17-28, 2018 National Institute of Technology, Durgapur Number of participants limited to 30
Participants	Student students at all levels (BTech/MSc/MTech/PhD) or Faculty from reputed academic institutions and technical institutions. Executives, engineers and researchers from manufacturing, service and government organizations including R&D laboratories.
Fees	Participants from abroad: US $200 Industry/Research Organizations: Rs. 6000/- Academic Institutions: Rs. 4000/- Students/Scholars: Rs. 2000/-
Registration	http://www.gian.iitkgp.ac.in/GREGN Contact course coordinator
Accommodation	Contact course coordinator

Course Co-ordinator

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TheFaculty

Dr. Rajesh Sani Associate Professor, Department of Chemical and Biological Engineering &Chemistry and Applied Biological Sciences, South Dakota School of Mines and Technology (SDSMT). His research includes extremophilic bioprocessing of lignocellulose-based renewables for biofuels and bioproducts and bioprospecting of extremophilic microorganisms for developing more efficient and cost-effective biofuel (bioenergy) production technologies. Over the past 11 years, he has been the PI or co-PI on over $12 million in funded research. He has one patent, five invention disclosures, and published over 55 peer-reviewed articles in high impact factor journals, and has contributed in several book chapters. He also serve the Industrial Microbiology profession as "Biocatalysis Program Committee Member" of the Society for Industrial Microbiology and Biotechnology (SIMB), technical session chair at the Annual American Institute of Chemical Engineers (AIChE) and SIMB, an associate editor.

Dr. Tamal Mandal- Professor of Chemical Engineering Department, NIT Durgapur.He expertises in subjects like Reaction Engineering, Advanced technologies for waste Management, Process development. His research focuses on Biodegradation, Environmental Biotechnology, Advance Oxidation process, Adsorption and Industrial wastewater Treatment for resource recovery and reuse. Prof. Mandal has authored over 25 publications.