Centre of Excellence Biopharmaceutical Technology

DEPARTMENT OF BIOTECHNOLOGY
Ministry of Science & Technology
Government of India

Hands-on Training-
Upstream Processing for Biopharmaceuticals

Description: The two breakthroughs of 20th century, recombinant DNA technology and hybridoma technology, have served as the genesis of the modern biotech era. Large-scale production of protein and protein-based drugs are based on these technologies. Recombinant protein production has provided an approach to manufacture therapeutic and prophylactic protein drugs, which have been used to save uncountable lives from deadly and incurable diseases. Among microbial hosts, *E. coli* is the commonly used industrial host system for heterologous protein production. This two-day course work organized by the DBT Center for Biopharmaceutical Technology and National Biopharma Mission at IIT Delhi will broadly cover important microbial upstream topics including cloning, expression and production of bio therapeutics in *E. coli* and will also include hands on training on some of the key techniques.

Outline:

Day 1 (20-06-2022)		
Session 1		
Timing	**Lectures**	**Teaching Faculty**
8:30- 9:00	Breakfast	
9:00-10:00	Lecture 1: Introduction to Upstream Process Development for Biopharmaceuticals	Sartorius
10:00-11:00	Lecture 2: Cloning and expression of recombinant proteins in microbial cells	Manidipa Banerjee, IIT Delhi
11:00-11:15	Tea Break	
11:15-12:15	Lecture 3: Recent advances in microbial biomass process technology for biopharmaceuticals	James Gomes, IIT Delhi
12:15-13:00	Lecture 4: An overview on methods for cell lysis and evaluation of recombinant proteins	Ravi Mishra, CSIR-IMTECH
13:00-14:00	Lunch	
Session 2		
14:00-18:00	Hands-on Training (5 members in each group) Group 1: Plasmid isolation, transformation and gene amplification by PCR Group 2: Methods for microbial cell lysis (ultrasonication and homogenizer) and protein estimation (Bradford and SDS PAGE) Group 3: Basics of fermentation, set-up of bioreactor and overview of bioreactor components followed by classroom session on intensified processing	 CBT, IIT Delhi CBT, IIT Delhi CBT (IIT Delhi) & Sartorius
18:00-19:30	Dinner	

Day 2 (21-06-2022)		
Session 1		
8:30-9:00	Breakfast	
9:00-10.00	Understanding of DoE using case study (all 15 members)	Sartorius
10:00-13:00	Hands-on Training (5 members in each group) Group 1: Methods for microbial cell lysis and protein estimation (Bradford and SDS PAGE) Group 2: Basics of fermentation, set-up of bioreactor and overview of bioreactor components followed by classroom session on intensified processing Group 3: Plasmid isolation, transformation and gene amplification by PCR	 CBT, IIT Delhi CBT (IIT Delhi) & Sartorius CBT, IIT Delhi
13:00-14:00	Lunch	
Session 2		
14:00-17:00	Hands-on Training (5 members in each group) Group 1: Basics of fermentation, set-up of bioreactor and overview of bioreactor components followed by classroom session on intensified processing Group 2: Plasmid isolation, transformation and gene amplification by PCR Group 3: Methods for microbial cell lysis and protein estimation (Bradford and SDS PAGE)	 CBT (IIT Delhi) & Sartorius CBT, IIT Delhi CBT, IIT Delhi
17:00-18:00	Discussion and wrap-up	