SHORT TERM / SUMMER TRAINING PROGRAMS

The overall goal of the Food Biologist training program is to provide the trainee with the skills they will need to provide appropriate food testing and management for a wide variety of food and beverage products.

DURATION : Training - 100 Hours (3 to 4 Weeks) **Training + Project : 4 to 6 Weeks**

IMPORTANT NOTES :

- **This training program have the potential to make you employable**
- **As a part of our training program, we may suggest your name to our clients against available vacancy**
- **This training is limited to skill development only and we do not assure you for employment or campus interview**
- **Our prime motive is "Bridging Gap Between Industry & Academia"**

NAME OF TRAINING PROGRAM	TRAINING ONLY	TRAINING + PROJECT
Training in Molecular Biology Research	Rs 10,000 / -	Rs 12,000 / -
Training in Genetic Engineering / Gene Cloning	Rs 10,000 / -	Rs 12,000 / -
Training in Genetic Toxicology & Research	Rs 10,000 / -	Rs 12,000 / -
Training in Protein Analysis & Research	Rs 10,000 / -	Rs 12,000 / -
Training in Enzyme Engineering or Enzymology	Rs 10,000 / -	Rs 12,000 / -
Training in Food Analysis & Research	Rs 10,000 / -	Rs 12,000 / -
Training in Beverages Analysis & Research	Rs 10,000 / -	Rs 12,000 / -
Training in Forensic Science & Law	Rs 10,000 / -	Rs 12,000 / -
Training in Pharmaceutical Product Analysis	Rs 10,000 / -	Rs 12,000 / -
Training in Herbal Analysis & Research	Rs 10,000 / -	Rs 12,000 / -
Training For Cosmetic & Perfume Industry	Rs 10,000 / -	Rs 12,000 / -
Training For Analytical Testing & Quality Control	Rs 10,000 / -	Rs 12,000 / -

COURSE CONTENT

UNIT -1 QUALITY CONTROL PROCEDURE FOR ADULTERANTS

Basics of Genetic Engineering , Lab safety and Procedures, Record Maintenance, Handling of Equipments , Sterilisation Techniques , Preparation of Chemical & Reagents, **Discussion of ethical, legal,** and social issues involved in genetic engineerings.

Basics of Gene Expression : PCR & Real Time PCR Applications, Genetic Variation Analysis, SNP Genotyping, Genetic Expression, Exon Analysis, mi RNA Expression Profiling

UNIT -2 PROCEDURE FOR ANALYTICAL TESTING. LABORATORY

Primer Designing, Vectors, Selection of Restriction Sites, Virtual PCR, Bioinformatics tools & Techniques , Bioinformatics tools & Techniques .

UNIT – 3 MICROBIAL ANALYTICAL PROCEDURES

Extraction of Nucleic Acid - Both DNA & RNA Extraction protocols are optimised for different array of analysis Quantitative & Qualitative Analysis of Nucleic Acid - DNA & RNA Electrophoresis, Gel Docking or imaging, Software Analysis

Quantitative analysis by spectrometer – For DNA – DIN Measured by ratio of absorbance at 260 & 280 nm , **For RNA –** RIN Quantitative Analysis by Orisinol Method

UNIT – 4 CHEMICAL ANALYTICAL TESTING PROCEDURES

Isolation of pUC18 plasmid from TOP10-pUC18 E coli cells , Restriction digestion of pUC 18 and λ DNA , Purifying pUC18/Hind III/ EcoR I digest by gel elution , Ligating the linearised plasmid -pUC18 and the insert –λDNA, Preparation of competent cells , Transformation of TOP10 cells with the pUC18-λDNA ligated product

Colony PCR : To amplify the inserted λDNA digest in pUC18 vector

CDNA Library Construction:: Extraction of RNA , Purification of mRNA through Oligo-dT Column Chromatography, cDNA Construction , Incorporation of cDNA into a vector , Cloning of cDNAs

UNIT – 5 CHEMICAL ANALYSIS BY HPLC, GC & SPECTROMETRY

Analytical Methods & Sample Preparation :- Adulterants & Limits, Analytical Methods for the detection of adulterants, Sample Preparation, SPME Sample Extraction, Derivitisation & Hydrolysis of sample, Lambda Max Analysis by Spectrophotometer,

Basics of Chemical / Bio-chemical Assay :- Amino Acid Analysis, Anti Oxidant Assay, Allergens Assay by ELISA, Chromatographic Separations, Protein Assay, Lipid Assay, Heavy Metal or Element Analysis

Basics of HPLC :- Basics of HPLC - Sample Preparation , Gradient Making , Parts of HPLC , Troubleshooting and Maintenance , Operating Procedure of HPLC , Run the sample in HPLC . Data Analysis

Basics of GC :- Basics of GC - Sample Preparation , Parts of GC , Troubleshooting and Maintenance , Operating Procedure of GC , Run the sample in GC , Data Analysis.

Analysis of Food Adulterants by GC :- Basics of GC - Sample Preparation , Parts of GC , Troubleshooting and Maintenance , Operating Procedure of GC , Run the sample in GC , Data Analysis.

UNIT – 6 TEST OF MOLECULAR BIOLOGY COMETANCE & PROFICIENCY

1. **Primer Designing**
2. **PCR & Troubleshooting**
3. **Real Time PCR & Data Analysis**
4. **Bio-Separation by HPLC / GC**

UNIT – 5 PROJECT WORK (Optional)

We will assign a small project to develop skills for relevant industry or research.

FACILITIES REQUIRED FOR TRAINING IN MOLECULAR BIOLOGY

This information is very important for the learners to make them aware of the lab facilities required for the proper compliance of the training program :

UNIT 1: Softwares for data interpretation, Manual for genetic toxicology, Genetic Counselling Strategy, Pedigree Analysis Procedures Primer Designing for conventional PCR, Primer Designing for Real Time PCR, In Silico Mehylation Study, Q-PCR Data Analysis, Data Interpretation

UNIT 2 : Gel Documentation System, Bio Spectrophotometer, Gel Analysis Software, DNA Concentrator, High Speed Refrigerated Centrifuge, Mini Centrifuge, Cycle Mixer, Electrophoresis with Power Supply etc.

UNIT 3 : PCR, Gradient PCR, Real Time PCR , DNA Concentrator, Refrigerated Centrifuge, Ultra Sonnicator, Dry Bath, Bio Spectrophotometer, Gel Documentation System, Gel Analysis Software, Vacuum Mainfold, PCR Cabinet or Working Station, Ice Flaking MachineData Analysis Software for Sequencing

UNIT 5: UV-Vis Double Beam Spectrophotometer with software, **HPLC System -** Degausser, Quaternary Pump, Auto-sampler, Column Oven, Detectors - PDA (UV-Vis Detection), FLD (Fluorescence Detection) , ECD (Detection of inorganic salts) and Software | **GC System -** EPC, Autosampler and Detectors - FID, TCD, FPD and NPD Detectors | Various Column & Accessories

COURSE CONTENT

UNIT 1: INTRODUCTION TO GENETIC ENGINEERING

Basics of Genetic Engineering , Lab safety and Procedures , Record Maintenance, Handling of Equipments , Sterilisation Techniques , Preparation of Chemical & Reagents ,

Discussion of ethical, legal, and social issues involved in genetic engineering

Tools of genetic manipulation: restriction endonucleases, methylases, nucleases, polymerases, ribonucleases, exonucleases, transcriptases, ligases, kinases. Uses of primers, adaptors, linkers

UNIT 2: NUCLEIC ACID EXTRACTION, QUANTITATIVE & QUALITATIVE ANALYSIS

Extraction of both DNA & RNA , Qualitative analysis by electrophoresis, Gel Docking and Image analysis by Gel Analysis Software

Quantitative / DIN or RIN Analysis by Spectrophotometer/ Nano Drop/ Bio-Analyser.

Optimisation of Nucleic Acid Extraction Purity

UNIT 3: BIO INFORMATICS OF GENETIC ENGINEERING

Primer Designing, Plasmid Vectors Design, Selection of Restriction Sites, Virtual PCR, Bioinformatics tools & Techniques, Gel Analysis Software, Real Time PCR Primer Design, Q-PCR Data Handling, Sequence Data Analysis .

Cloning: cleavage of vector and insert, site compatibility, dephosphorylation of ends, ligation protocols and diagnostic techniques; * preparation of transformed cells: transformation and transfection techniques,

UNIT 4 : RECOMBINANT DNA TECHNOLOGY.

Isolation of pUC18 plasmid from TOP10-pUC18 E coli cells Restriction digestion of pUC 18 and λ DNA , Purifying pUC18/Hind III/ EcoR I digest by gel elution ,

Ligating the linearised plasmid pUC18 and the insert –λDNA,

Preparation of competent cells , Transformation of TOP10 cells with the pUC18-λDNA ligated product. Colony PCR : To amplify the inserted λDNA digest in pUC18 vector

UNIT 5 : CLONE CONFIRMITY ASSAY

Blue White Screening of Cloned Colonies, Confirmation By PCR and its Optimisation or Colony PCR,

Extraction of Recombinant Protein, SDS-PAGE and Western Blot

UNIT 6: cDNA LIBRARY CONSTRUCTION

Identification of appropriate celltype over-expressing corresponding gene, Extraction of total RNA and purify mRNA by oligo-dT cellulose chromatography

First Strand cDNA Synthesis - Annealing a free oligo dT-primer or a oligo dT tailed vector to the mRNA by PCR

Second strand synthesis: Prior removal of the RNA strand by either alkaline treatment or by RNaseH treatment followed by reverse transcriptase or *E. coli* DNA polymerase treatment

cDNA species can be inserted in the cloning vector.

UNIT – 5 TEST OF GENETIC ENGINEERING PROGRAM COMPETENCE & PROFICIENCY

1. **Analytical Competence in PCR, Real Time PCR & dHPLC Technologies**
2. **Data Analysis & Result Interpretation**
3. **Basic Understanding of Genetic Engineering**

UNIT – 5 PROJECT WORK (Optional)

We will assign a small project to develop skills for relevant industry or research.

MAJOR FACILITIES REQUIRED FOR TRAINING IN GENETIC ENGINEERING

This information is very important for the learners to make them aware of the lab facilities required for the proper compliance of the training program :

UNIT 2 : Gel Documentation System, Bio Spectrophotometer, Gel Analysis Software, DNA Concentrator, High Speed Refrigerated Centrifuge, Mini Centrifuge, Cycle Mixer, Electrophoresis with Power Supply etc.

UNIT 3 : Primer Designing for conventional PCR, Plasmid Vector, Selection of Restriction Sites, Virtual PCR, Gel Analysis Software, Primer Designing for Real Time PCR, In Silico Mehylation Study, Q-PCR Data Analysis, Data Interpretation

UNIT 4 : PCR, Gradient PCR, Real Time PCR , DNA Concentrator, Refrigerated Centrifuge, Ultra Sonnicator, Dry Bath, Bio Spectrophotometer, Gel Documentation System, Gel Analysis Software, Vacuum Mainfold, PCR Cabinet or Working Station, Ice Flaking MachineData Analysis Software for Sequencing

UNIT 5 : SDS - PAGE Unit with Power Supply, Western Blot Unit, Chiller, Vacuum Dryer, Chemiilluminance Gel Documentation System, Protein Gel Analysis Software

UNIT 6 : Purification Columns, DNA Concentrator, High Speed Centrifuge, Vortex Mixer, Gradient PCR , Real Time PCR

COURSE CONTENT

UNIT 1: BASICS OF GENETIC TOXICOLOGY

Diagnosis of genetic disorders: Gather essential and accurate information about patients in whom a genetic disorder is being considered .

Screening for genetic disorders: Pedigree Analysis , Screen for known familial genetic disorder , Understand prenatal screening methods .

Genetic counselling: Understand the role of the medical geneticist in informing families about genetic disorders Discussion of ethical, legal, and social issues involved in genetic testing

UNIT 2 : BIOINFORMATICS OF GENETIC TOXICOLOGY STUDIES

Methylation Primer Designing, Mutation Primer Designing , Selection of Restriction Sites, Virtual PCR, Real Time PCR Primer Design, Real Time Data Analysis, Bioinformatics tools & Techniques .

UNIT 3 : PCR & REAL TIME PCR ASSAY FOR GENETIC TOXICOLOGY STUDIES

Extraction of both DNA & RNA , Qualitative analysis by electrophoresis, gel Docking and image analysis. Quantitative / DIN or RIN Analysis by Spectrophotometer/ Nano Drop/ Bio-Analyser.

PCR & Optimisation for the Expression of Lethal Gene :- Optimisation of Conventional , Nested and PCR , PCR Multiplexing Methods , Run of Conventional PCR , Data Analysis .

Real Time PCR & Applications: Introduction to Real-time PCR & Applications , Real-time PCR reaction setup , Construction of a standard curve: Biostatistics principles; Linear regression , Standard melt curve analysis ,High resolution melt curve analysis . Analysis of SYBR Green real-time PCR results

Methylation in DNA : Bisulfites modification of DNA , Bisulfites modification in nanogram quantities of DNA , DNA Methylation PCR array

DNA Extraction, Quantitation & Optimisation :- DNA Extraction, Optimisation, Purification of DNA, Gel Docking & Data Analysis, Quantitative or DIN Analysis by Spectrophotometry / Bio-analyser

Methylation Specific PCR Technology :- PCR & Applications, Optimisation of PCR, Troubleshooting in PCR applications , Single Nucleotide Prime Extension

UNIT 4 : BIO- SEPARATION OR BIOASSAY DEVELOPMENT FOR GENETIC TOXICOLOGY STUDIES

Bio-Analytical Methods in Genetic Mutation Study :- Denaturing High-Performance Liquid Chromatography (dHPLC) is probably the most versatile and one of the most widely used mutation screening technologies , Sample Preparation for dHPLC Analysis, Method Development for dHPLC, Data Analysis

Basics of HPLC For dHPLC Sample Run :- Basics of HPLC, Sample Preparation , Gradient Making , Parts of HPLC , Troubleshooting and Maintenance , Operating Procedure of HPLC , Types of Detectors, Column Selection For dHPLC, Sample Run and Data Analysis

Basics of HPLC :- Basics of HPLC - Sample Preparation , Gradient Making , Parts of HPLC , Troubleshooting and Maintenance , Operating Procedure of HPLC , Run the sample in HPLC . Data Analysis

Basics of GC :- Basics of GC - Sample Preparation , Parts of GC , Troubleshooting and Maintenance , Operating Procedure of GC , Run the sample in GC , Data Analysis.

Analysis of Food Adulterants by GC :- Basics of GC - Sample Preparation , Parts of GC , Troubleshooting and Maintenance , Operating Procedure of GC , Run the sample in GC , Data Analysis.

UNIT – 5 TEST OF GENETIC TOXICOLOGY PROGRAM COMPETENCE & PROFICIENCY

1. **Analytical Competence in PCR, Real Time PCR & dHPLC Technologies**
2. **Data Analysis & Result Interpretation**
3. **Basic Understanding of Genetic Toxicology**
4. **Innovative Methodology or Idea For Genetic Mutation Study**

UNIT – 56 PROJECT WORK (Optional)

We will assign a small project to develop skills for relevant industry or research.

FACILITIES REQUIRED FOR TRAINING IN GENETIC TOXICOLOGY

This information is very important for the learners to make them aware of the lab facilities required for the proper compliance of the training program :

UNIT 1: Softwares for data interpretation, Manual for genetic toxicology, Genetic Counselling Strategy, Pedigree Analysis Procedures

UNIT 2 : Primer Designing for conventional PCR, Primer Designing for Real Time PCR, In Silico Mehylation Study, Q-PCR Data Analysis, Data Interpretation

UNIT 3 : PCR, Gradient PCR, Real Time PCR , DNA Concentrator, Refrigerated Centrifuge, Ultra Sonnicator, Dry Bath, Bio Spectrophotometer, Gel Documentation System, Gel Analysis Software, Vacuum Mainfold, PCR Cabinet or Working Station, Ice Flaking MachineData Analysis Software for Sequencing

UNIT 5: UV-Vis Double Beam Spectrophotometer with software, **HPLC System -** Degausser, Quaternary Pump, Auto-sampler, Column Oven, Detectors - PDA (UV-Vis Detection), FLD (Fluorescence Detection) , ECD (Detection of inorganic salts) and Software | **GC System -** EPC, Autosampler and Detectors - FID, TCD, FPD and NPD Detectors | Various Column & Accessories

COURSE CONTENT

UNIT 1: INTRODUCTION TO PROTEIN ANALYSIS

Acid Base Equilibrium, pH, Buffer System, Charge, pI and pKa Value, Quantitative determination of biomolecule, mini scale bacterial protein extraction, protein extraction from plant source or other biological source

UNIT 1: INTRODUCTION TO PROTEIN PURIFICATION

Sample solvents, Column selection, Partition coefficient, Mobile phase selection, Gradients, Effect of flow rate, Temperature effects and Sample preparation.

Challenges in Protein Purification

UNIT -2 PROTEIN PURIFICATION BY AFFINITY & REVERSE PHASE CHROMATOGRAPHY

Protein / Antibody Purification by Affinity Chromatography :- Affinity Chromatography (IMAC, GST Tagged Purification, Talon resin, Glutathione Sepharose, Heparin Sepharose, Streptavidin Sepharose, anti-Flag, Protein A, Protein G)

Ion Exchange Protein Purification :- Ion Exchange Chromatography (Mono-Q / Q Sepharose Fast Flow / Resource Q / Q Sepharose XL / DEAE Sepharose / SP Sepharose / CM Sepharose)

Reverse Phase Protein Purification : - Reverse-Phase HPLC Separation of Enzymatic Digests of Proteins

UNIT – 4 PROTEIN ANALYSIS AND CHARACTERISATION

Unit 1 : Protein Estimation :- Protein Estimation by Lowry Method / BCA Method / Bradford Method

Unit 2: Protein Characterisation by SDS-PAGE:- Basics of SDS-PAGE, Acetic-Acid Urea Polyacrylamide Electrophoresis of basic proteins

Unit 3 : Iso Electric Focusing of Proteins :- Iso Electric Focusing of Proteins in Ultra-Thin Polyacrylamide Gels

Unit 4: 2-D Protein Electrophoresis : - Preparation of Protein sample for **2-D Electrophoresis,** Protein solubility in 2-D Electrophoresis, Disruption of Di-sulphide bridges, Two Dimensional Polyacrylamide Gel Electrophoresis of Proteins using pH Gradient in First Dimension.

Unit 5 : Western Blot Analysis : Protein Analysis by Western Blot

UNIT – 4 AMINO ACID ANALYSIS

Sample Preparation For Amino Acid Analysis :- A preliminary step, required for the proper separation of amino acids and peptides, consists in finding a suitable, partitioning scheme of the extract between various solvents, in order to remove the unwanted compounds, such as: polysaccharides, lipids, phenols and others.

Hydrolysis and Derivitisation of Amino Acid :- Liquid Phase Hydrolysis, Vapour Phase Hydrolysis, Pre Column Derivitisation Post Column Derivitisation

Separation of Amino Acids :- Separation of derivative amino acids, Separation of non Derivitisation amino acids, Separation of Amino Acid by Chromatography

Determination of Amino Acid :- Determination of amino acid after hydrolysis, Determination of amino acid before hydrolysis, Protein & Peptide Quantitation by spectrometry, Total Amino Acid Analysis, Free Amino Acid Analysis

UNIT – 5 TEST OF ANALYTICAL COMPETANCE & PROFICIENCY

UNIT – 5 PROJECT WORK (Optional)

We will assign a small project to develop skills for relevant industry or research.

FACILITIES REQUIRED FOR TRAINING IN PROTEIN ANALYSIS

This information is very important for the learners to make them aware of the lab facilities required for the proper compliance of the training program :

UNIT 1: Softwares for data interpretation, Log Book Format , Quality Control Manuals, Monographs, Pharmacopeia, Q.C Data Keeping

UNIT 2 : Ph. Meter, Ion Meter, Precision Analytical Balance, Analytical Balance, Vacuum Filtration Unit, Cyclo Mixers, Sonicator Bath, Gas Supply; Nitrogen, Oxygen, Hydrogen etc, Hood etc.

UNIT 3 : Protein Purification System, Affinity Chromatography System, Ion Exchange Chromatography System, Peristaltic Pump, Preparative HPLC System with Fraction Collector, Various Purification Column , Media for Protein Purification etc.

UNIT 4: Spectrophotometer, Iso Electric Focusing Unit, SDS-PAGE Unit with Chiller, High Voltage Power Supply, Western Blot Unit, Dry Blot, Dry Bath, Gel Documentation System with Chemi Illuminance Facility, Data Analysis Software (1D & 2D)

UNIT 5: UV-Vis Double Beam Spectrophotometer with software, **HPLC System -** Degausser, Quaternary Pump, Auto-sampler, Column Oven, Detectors - PDA (UV-Vis Detection), FLD (Fluorescence Detection) , ECD (Detection of inorganic salts) and Software | **GC System -** EPC, Autosampler and Detectors - FID, TCD, FPD and NPD Detectors | Various Column & Accessories

PROGRAM 5 : TRAINING IN ENZYME ENGINEERING OR ENZYMOLOGY

COURSE CONTENT

UNIT 1: INTRODUCTION TO ENZYME ANALYSIS

Record Maintenance, Handling of Equipments , Sterilisation Techniques , Preparation of Chemical & Reagents. Discussion of ethical, legal, and social issues involved in enzyme study and research.

Acid Base Equilibrium, pH, Buffer System, Charge, pI and pKa Value, Quantitative determination of biomolecule, mini scale bacterial protein extraction, protein extraction from plant source or other biological source

UNIT 2: ENZYME EXTRACTION AND ENZYME ASSAY

Enzyme Database Search, Enzyme source selection, optimisation of extraction procedures or growth requirement procedures, submerged and solid state fermentation (Lab Scale)

Extraction of Enzyme of Your Choice - Food Enzyme, Industrial Enzyme, Pharmaceutical Enzyme etc.

UNIT 3: ENZYME ASSAY, SIMULATION AND KINETICS OF ENZYME

Simulation Software handling, In- silico Experiment Designing, Enzyme Kinetics, Inhibition Studies,

Effect of pH, Temperature, Substrate Concentration, Enzyme Concentration, Determination of Kmax, Vmax, Enzyme Inhibitors & Activators.

UNIT 4: ENZYME PURIFICATION STRATEGIES

Purification of Enzyme by Size Exclusion Chromatography, Affinity Chromatography, Ion Exchange Chromatography, Purification of Enzyme by HPLC, Centrifugation, Dialysis and Electrophoresis.

Sample solvents, Column selection, Partition coefficient, Mobile phase selection, Gradients, Effect of flow rate, Temperature effects and Sample preparation.

Enzyme Purification by Affinity Chromatography :- Affinity Chromatography (IMAC, GST Tagged Purification, Talon resin, Glutathione Sepharose, Heparin Sepharose, Streptavidin Sepharose, anti-Flag, Protein A, Protein G)

Reverse Phase Protein Purification : - Reverse-Phase HPLC Separation of Enzymatic Digests of Proteins

UNIT 5 : ENZYME ESTIMATION AND QUANTITATION

Enzyme estimation by Spectrophotometry & Chromatography - Bradford or BCA Assay , HPLC or FPLC Quantitation

UNIT 6 : PROTEIN ENZYME ANALYSIS AND CHARACTERISATION

Protein Estimation :- Protein Estimation by Lowry Method / BCA Method / Bradford Method

Protein Characterisation by SDS-PAGE:- Basics of SDS-PAGE, Acetic-Acid Urea Polyacrylamide Electrophoresis of basic proteins

Zymography of Enzymes, Iso Electric Focusing of Proteins in Ultra-Thin Polyacrylamide Gels

Western Blot Analysis : Protein Analysis by Western Blot

UNIT 7 : TEST OF COMETANCE & PROFICIENCY

UNIT – 5 PROJECT WORK (Optional)

Product Development – We will assign a small project to develop skills for relevant industry or research.

FACILITIES REQUIRED FOR TRAINING IN ENZYME ANALYSIS

This information is very important for the learners to make them aware of the lab facilities required for the proper compliance of the training program :

UNIT 1: Softwares for data interpretation, Log Book Format , Quality Control Manuals, Monographs, Pharmacopeia, Q.C Data Keeping

UNIT 2 : Ph. Meter, Ion Meter, Precision Analytical Balance, Analytical Balance, Vacuum Filtration Unit, Cyclo Mixers, Sonicator Bath, Gas Supply; Nitrogen, Oxygen, Hydrogen etc, Hood etc.

UNIT 3 : Bio Safety Cabinet, BOD Incubator, Incubator - Shaker, Colony Counter with software, Microscope with imaging CMOS Camera and software, PCR, Gradient PCR, Real Time PCR , Data Analysis Software for Sequencing

UNIT 4 : Protein Purification System, Affinity Chromatography System, Ion Exchange Chromatography System, Peristaltic Pump, Preparative HPLC System with Fraction Collector, Various Purification Column , Media for Protein Purification etc.

UNIT 5: Spectrophotometer, Iso Electric Focusing Unit, SDS-PAGE Unit with Chiller, High Voltage Power Supply, Western Blot Unit, Dry Blot, Dry Bath, Gel Documentation System with Chemi Illuminance Facility, Data Analysis Software (1D & 2D)

UNIT 6 & 7 : UV-Vis Double Beam Spectrophotometer with software, **HPLC System -** Degausser, Quaternary Pump, Auto-sampler, Column Oven, Detectors - PDA (UV-Vis Detection), FLD (Fluorescence Detection) , ECD (Detection of inorganic salts) and Software | **GC System -** EPC, Autosampler and Detectors - FID, TCD, FPD and NPD Detectors | Various Column & Accessories

COURSE CONTENT

UNIT -1 QUALITY CONTROL PROCEDURE AND FOOD ADULTERANTS

Food Safety & Standards Act, 2006, Function, Duties & Responsibilities of Food Safety Regulators, Food Safety Management System

UNIT -2 PROCEDURE FOR FOOD TESTING. LABORATORY

General Guidelines on Sampling, Sampling Plan & Procedures, Recognition of Food Testing laboratories, Food Safety & Laboratory Procedures, Preparation of Buffers, Acid-Base Equilibrium, pH, Buffer System, Charge, pI and pKa, Value, Quantitative & Quantitative determination of Food Products, Lab safety protocol of pharmaceutical lab

Standard Procedures & Protocols : BIS, FSSAI, AOAC

UNIT – 3 FOOD MICROBIAL ANALYTICAL PROCEDURES

Microbial Contaminants in Food Products : E.coli, .Staphylococcus aureus, Salmonella & Shigella, Vibrio cholerae, V. parahaemolyticus, Clostridium perfringens, C. botulinum, Listeria monocytogenes etc.

Quality Control Checks in Food Microbiology : New Methods , Comparison of Plate Counts , Duplicate Analysis ,

Sterility Check : Procedural Blank , Media Blank , Field Blank , Positive & Negative Control Cultures **Total Coliforms Analysis in Food & Documentation of Coliform Data**

Aerobic Mesophlic Plate Count – Preparation of Food homogenate , Dilution , Pour Plating , Incubation , Counting Colonies , Calculation , Result Analysis. , **Analysis of Aciduric Flat Sour Spore Formers in Food**

Detection of Food Pathogens by PCR & Real Time Technology :

Introduction to PCR , Primer Designing & Selection , PCR Optimisation & Troubleshooting , PCR Multiplexing, **PCR Run for Reactions** , Analysis of PCR Results, I**ntroduction to Real Time PCR** , Primer Designing for Real Time PCR , application of Real Time PCR in Food Genetics , **Real Time PCR Run For Food Samples** , Data Analysis

UNIT – 4 CHEMICAL ANALYSIS OF FOOD PRESERVATIVES

Qualitative assay of carbohydrate: Molisch, Fehling, Benedict, Barfoed, mucic acid, Iodine, Seliwanoff, Bial, Osazone **Quantitative determination** of carbohydrate , Determination of disaccharide, Lactose , Sucrose , Determination of Lipids; triglycerides , Test of Fatty Acids , Determination of Vitamin C , Determination of Vitamin E , Determination of serum phosphate .

UNIT – 5 ANALYSIS OF FOOD ADULTERANTS & AUTHENTICATION ASSAY

Basics of HPLC :- Basics of HPLC - Sample Preparation , Gradient Making , Parts of HPLC , Troubleshooting and Maintenance , Operating Procedure of HPLC , Run the sample in HPLC . Data Analysis

Basics of GC :- Basics of GC - Sample Preparation , Parts of GC , Troubleshooting and Maintenance , Operating Procedure of GC , Run the sample in GC , Data Analysis.

Analysis of Food Adulterants by GC :- Basics of GC - Sample Preparation , Parts of GC , Troubleshooting and Maintenance , Operating Procedure of GC , Run the sample in GC , Data Analysis.

Analysis of Food Preservative by HPLC & GC – Quantitative Assay of **BHT / Benzoic Acid as food preservative by HPLC-PDA Detection**,

Quantitative Assay of **Aflatoxin** or **Mycotoxin or Pesticide by Gas Chromatography**, **Quantitative Assay of Vitamin by HPLC - FLD Detection, Authenticity Assay by PCR Multiplexing –** Food Authenticity Assay by PCR Multiplexing, **Analysis of Food Preservative by Real Time PCR –** Q-PCR Assay of Food Product

UNIT – 6 TEST OF ANALYTICAL COMETANCE & PROFICIENCY

1. **Determination of Aflaotoxin by Gas Chromatography**
2. **Determination of BHT by HPLC**
3. **Determination of Vit. B12 By HPLC - FLD**
4. **Determination of Acitic Acid by HPLC / GC**

UNIT – 7 PROJECT WORK (Optional)

Product Development – We will assign a small project to develop skills for relevant industry or research.

FACILITIES REQUIRED FOR TRAINING IN FOOD ANALYSIS

This information is very important for the learners to make them aware of the lab facilities required for the proper compliance of the training program :

UNIT 1: Softwares for data interpretation, Log Book Format , Quality Control Manuals, Monographs, Pharmacopeia, Q.C Data Keeping

UNIT 2 : Ph. Meter, Ion Meter, Precision Analytical Balance, Analytical Balance, Vacuum Filtration Unit, Cyclo Mixers, Sonicator Bath, Gas Supply; Nitrogen, Oxygen, Hydrogen etc, Hood etc.

UNIT 3 : Bio Safety Cabinet, BOD Incubator, Incubator - Shaker, Colony Counter with software, Microscope with imaging CMOS Camera and software, PCR, Gradient PCR, Real Time PCR , Data Analysis Software for Sequencing

UNIT 4: Spectrophotometer, Viscometer, Flame Photometer, Auto Karl Fisher Titrator, Auto Titrator, Dissolved Oxygen Meter, TDS Meter, Potentiometer, , Elemental Analysis - Lead, Calcium, Mercury , Column Purification of Natural Compound, **TLC Unit with** Sprayer, Visualizer, Spotter, Developing Chamber and data analysis software, Pump for column chromatography, Different size columns, Flash Chromatography System

UNIT 5: UV-Vis Double Beam Spectrophotometer with software, **HPLC System -** Degausser, Quaternary Pump, Auto-sampler, Column Oven, Detectors - PDA (UV-Vis Detection), FLD (Fluorescence Detection) , ECD (Detection of inorganic salts) and Software | **GC System -** EPC, Autosampler and Detectors - FID, TCD, FPD and NPD Detectors | Various Column & Accessories

COURSE CONTENT

UNIT -1 QUALITY CONTROL PROCEDURE FOR ADULTERANTS

Food Safety and Standards (Alcoholic Beverages Standards) Regulations, 2016, Function, Duties & Responsibilities of Food Safety Regulators, Food Safety Management System , Regulatory Compliance of Beverages Products, Types & Understanding of Product, Sources of information, Cost Effective Recipe Development, Product Stability & Preservation, Sources of Information for Beverage Formulation Development, Organic Beverage Formulations, Review of New Technology

UNIT -2 PROCEDURE FOR ANALYTICAL TESTING. LABORATORY

General Guidelines on Sampling, Sampling Plan & Procedures, Recognition of Food Testing laboratories, Food Safety & Laboratory Procedures, Preparation of Buffers, Acid-Base Equilibrium, pH, Buffer System, Charge, pI and pKa, Value, Quantitative & Quantitative determination of Food Products, Lab safety protocol of pharmaceutical lab

UNIT – 3 MICROBIAL ANALYTICAL PROCEDURES

Microbiology Lab Safety & Documentation, Regulatory Compliance of Cosmetics: Microorganisms in raw materials, Risk assessment, Microorganisms in manufacturing environment, current GMP, Microbial contamination in cosmetic products. Microbial considerations in product formulation. Microbiological evaluation specified in BIS guidelines from cosmetic products and raw materials & Determination of Microbial Load in Beverages .

Microbial Limit Test in Beer : Total Aerobic Bacteria, E.coli, Total Yeast and Mold Concentration, .Staphylococcus aureus, Streptococci faecal, Pseudomonas aeruginosa, Clostridium perfringens etc.

Quality Control Checks in Food Microbiology : New Methods , Comparison of Plate Counts , Duplicate Analysis ,

Sterility Check : Procedural Blank , Media Blank , Field Blank , Positive & Negative Control Cultures **Total Coliforms Analysis in Food & Documentation of Coliform Data.**

UNIT – 4 CHEMICAL ANALYTICAL TESTING PROCEDURES

Chemical Assays by Titration, Elemental Analysis by Ion Meter & Flame Photometer, Viscosity, ELISA, Dissolved Oxygen Analysis, TDS, Nitrogen Potentiometric Analysis, Column Chromatography, Analysis by HPLC, GC, Thin Layer Chromatography, Estimation of other organic compounds.

UNIT – 5 CHEMICAL ANALYSIS BY HPLC, GC & SPECTROMETRY

Analytical Methods & Sample Preparation :- Adulterants & Limits, Analytical Methods for the detection of adulterants, Sample Preparation, SPME Sample Extraction, Derivitisation & Hydrolysis of sample, Lambda Max Analysis by Spectrophotometer,

Basics of Chemical / Bio-chemical Assay :- Amino Acid Analysis, Anti Oxidant Assay, Allergens Assay by ELISA, Chromatographic Separations, Protein Assay, Lipid Assay, Heavy Metal or Element Analysis

Basics of HPLC :- Basics of HPLC - Sample Preparation , Gradient Making , Parts of HPLC , Troubleshooting and Maintenance , Operating Procedure of HPLC , Run the sample in HPLC . Data Analysis

Basics of GC :- Basics of GC - Sample Preparation , Parts of GC , Troubleshooting and Maintenance , Operating Procedure of GC , Run the sample in GC , Data Analysis.

Analysis of Food Adulterants by GC :- Basics of GC - Sample Preparation , Parts of GC , Troubleshooting and Maintenance , Operating Procedure of GC , Run the sample in GC , Data Analysis.

UNIT – 6 TEST OF ANALYTICAL COMETANCE & PROFICIENCY

1. **Determination of Methyl alcohol by Gas Chromatography**
2. **Determination of Sorbic or Benzoic Acid by HPLC**
3. **Determination of Vanillin By HPLC**
4. **Determination of Acitic Acid by HPLC / GC**

UNIT – 5 PROJECT WORK (Optional)

We will assign a small project to develop skills for relevant industry or research.

FACILITIES REQUIRED FOR TRAINING IN BEVERAGES ANALYSIS

This information is very important for the learners to make them aware of the lab facilities required for the proper compliance of the training program :

UNIT 1: Softwares for data interpretation, Log Book Format , Quality Control Manuals, Monographs, Pharmacopeia, Q.C Data Keeping

UNIT 2 : Ph. Meter, Ion Meter, Precision Analytical Balance, Analytical Balance, Vacuum Filtration Unit, Cyclo Mixers, Sonicator Bath, Gas Supply; Nitrogen, Oxygen, Hydrogen etc, Hood etc.

UNIT 3 : Bio Safety Cabinet, BOD Incubator, Incubator - Shaker, Colony Counter with software, Microscope with imaging CMOS Camera and software, PCR, Gradient PCR, Real Time PCR , Data Analysis Software for Sequencing

UNIT 4: Spectrophotometer, Viscometer, Flame Photometer, Auto Karl Fisher Titrator, Auto Titrator, Dissolved Oxygen Meter, TDS Meter, Potentiometer, , Elemental Analysis - Lead, Calcium, Mercury , Column Purification of Natural Compound, **TLC Unit with** Sprayer, Visualizer, Spotter, Developing Chamber and data analysis software, Pump for column chromatography, Different size columns, Flash Chromatography System

UNIT 5: UV-Vis Double Beam Spectrophotometer with software, **HPLC System -** Degausser, Quaternary Pump, Auto-sampler, Column Oven, Detectors - PDA (UV-Vis Detection), FLD (Fluorescence Detection) , ECD (Detection of inorganic salts) and Software | **GC System -** EPC, Autosampler and Detectors - FID, TCD, FPD and NPD Detectors | Various Column & Accessories

PROGRAM 8 : TRAINING IN ANALYTICAL TESTING & QUALITY CONTROL

COURSE CONTENT

UNIT -1 QUALITY CONTROL PROCEDURE FOR ADULTERANTS

Regulatory Compliance of Microorganisms in raw materials, Risk assessment, Microorganisms in manufacturing environment, current GMP, Microbial contamination in products. Microbial considerations in product formulation. Microbiological evaluation: Total microbial count, Isolation and identification of microorganisms specified in BIS guidelines from cosmetic products and raw materials & Determination of Microbial Load in finished product

UNIT -2 PROCEDURE FOR ANALYTICAL TESTING. LABORATORY

General Guidelines on Sampling, Sampling Plan & Procedures, Recognition of Food Testing laboratories, Food Safety & Laboratory Procedures, Preparation of Buffers, Acid-Base Equilibrium, pH, Buffer System, Charge, pI and pKa, Value, Quantitative & Quantitative determination of Food Products, Lab safety protocol of pharmaceutical lab

UNIT – 3 MICROBIAL ANALYTICAL PROCEDURES

Regulatory Compliance of Microorganisms in raw materials, Risk assessment, Microorganisms in manufacturing environment, current GMP, Microbial contamination in cosmetic products. Microbial considerations in product formulation. Microbiological evaluation: **Total microbial count, Isolation and identification of microorganisms** specified in BIS guidelines from products and raw materials & Determination of Microbial Load in finished product Analysis.

Sterility Check : Procedural Blank , Media Blank , Field Blank , Positive & Negative Control Cultures **Total Coliforms Analysis in Food & Documentation of Coliform Data**

UNIT – 4 CHEMICAL ANALYTICAL TESTING PROCEDURES

Chemical Assays by Titration, Elemental Analysis by Ion Meter & Flame Photometer, Karl Fisher Titration for moisture, Dissolved Oxygen Analysis, TDS, Nitrogen Potentiometric Analysis, Column Chromatography, Thin Layer Chromatography, Estimation of other organic compounds.

UNIT – 5 CHEMICAL ANALYSIS BY HPLC, GC & SPECTROMETRY

Analytical Methods & Sample Preparation :- Adulterants & Limits, Analytical Methods for the detection of adulterants, Sample Preparation, SPME Sample Extraction, Derivitisation & Hydrolysis of sample, Lambda Max Analysis by Spectrophotometer

Analysis of Food Adulterants by HPLC :- Basics of HPLC - Sample Preparation , Gradient Making , Parts of HPLC , Troubleshooting and Maintenance , Operating Procedure of HPLC , Run the sample in HPLC . Data Analysis

Analysis of Food Adulterants by GC :- Basics of GC - Sample Preparation , Parts of GC , Troubleshooting and Maintenance , Operating Procedure of GC , Run the sample in GC , Data Analysis.

UNIT – 6 TEST OF ANALYTICAL COMETANCE & PROFICIENCY

1. **Analysis the sample of your choice with HPLC**
2. **Linearity, LOD & LOQ Analysis**
3. **Preparation of Analytical Report**
4. **Quality Control Documentation of any sample**
5. **Record Keeping Protocols**
6. **Lab Safety Protocols & Compliance**

UNIT – 5 PROJECT WORK (Optional)

We will assign a small project to develop skills for relevant industry or research.

FACILITIES REQUIRED FOR ANALYTICAL TESTING & QUALITY CONTROL TRAINING

This information is very important for the learners to make them aware of the lab facilities required for the proper compliance of the training program :

UNIT 1: Softwares for data interpretation, Log Book Format , Quality Control Manuals, Monographs, Pharmacopeia, Q.C Data Keeping

UNIT 2 : Ph. Meter, Ion Meter, Precision Analytical Balance, Analytical Balance, Vacuum Filtration Unit, Cyclo Mixers, Sonicator Bath, Gas Supply; Nitrogen, Oxygen, Hydrogen etc, Hood etc.

UNIT 3 : Bio Safety Cabinet, BOD Incubator, Incubator - Shaker, Colony Counter with software, Microscope with imaging CMOS Camera and software, PCR, Gradient PCR, Real Time PCR , Data Analysis Software for Sequencing

UNIT 4: Spectrophotometer, Viscometer, Flame Photometer, Auto Karl Fisher Titrator, Auto Titrator, Dissolved Oxygen Meter, TDS Meter, Potentiometer, , Elemental Analysis - Lead, Calcium, Mercury , Column Purification of Natural Compound, **TLC Unit with** Sprayer, Visualizer, Spotter, Developing Chamber and data analysis software, Pump for column chromatography, Different size columns, Flash Chromatography System

UNIT 5: UV-Vis Double Beam Spectrophotometer with software, **HPLC System -** Degausser, Quaternary Pump, Auto-sampler, Column Oven, Detectors - PDA (UV-Vis Detection), FLD (Fluorescence Detection) , ECD (Detection of inorganic salts) and Software | **GC System -** EPC, Autosampler and Detectors - FID, TCD, FPD and NPD Detectors | Various Column & Accessories

COURSE CONTENT

UNIT -1 QUALITY CONTROL PROCEDURE OF PHARMA PRODUCTS

Regulatory Compliance of Microorganisms in raw materials, Risk assessment, Microorganisms in manufacturing environment, current GMP, Microbial contamination in products. Microbial considerations in product formulation. Microbiological evaluation: Total microbial count, Isolation and identification of microorganisms specified in BIS guidelines from cosmetic products and raw materials & Determination of Microbial Load in finished product

UNIT -2 PROCEDURE FOR PHARMA PRODUCT ANALYSIS

General Guidelines on Sampling, Sampling Plan & Procedures, Recognition of Food Testing laboratories, Food Safety & Laboratory Procedures, Preparation of Buffers, Acid-Base Equilibrium, pH, Buffer System, Charge, pI and pKa, Value, Quantitative & Quantitative determination of Food Products, Lab safety protocol of pharmaceutical lab

UNIT – 3 MICROBIAL ANALYTICAL PROCEDURES

Microbiology Lab Safety & Documentation, Regulatory Compliance of Cosmetics: Microorganisms in raw materials, Risk assessment, Microorganisms in manufacturing environment, current GMP, Microbial contamination in cosmetic products. Microbial considerations in product formulation. Microbiological evaluation specified in BIS guidelines from cosmetic products and raw materials & Determination of Microbial Load in Beverages .

Microbial Limit Test in Pharma Products : Total Aerobic Bacteria, E.coli, Total Yeast and Mold Concentration, .Staphylococcus aureus, Streptococci faecal, Pseudomonas aeruginosa, Clostridium perfringens etc.

Quality Control Checks in Pharmaceutical Microbiology : New Methods , Comparison of Plate Counts , Duplicate Analysis ,

Sterility Check : Procedural Blank , Media Blank , Field Blank , Positive & Negative Control Cultures **Total Coliforms Analysis in Food & Documentation of Coliform Data.**

UNIT – 4 CHEMICAL ANALYTICAL TESTING PROCEDURES

Chemical Assays by Titration, Elemental Analysis by Ion Meter & Flame Photometer, Viscosity, ELISA, Dissolved Oxygen Analysis, TDS, Nitrogen Potentiometric Analysis, Column Chromatography, Analysis by HPLC, GC, Thin Layer Chromatography, Estimation of other organic compounds.

UNIT – 5 CHEMICAL ANALYSIS BY HPLC, GC & SPECTROMETRY

Analytical Methods & Sample Preparation :- Adulterants & Limits, Analytical Methods for the detection of adulterants, Sample Preparation, SPME Sample Extraction, Derivitisation & Hydrolysis of sample, Lambda Max Analysis by Spectrophotometer,

Basics of Chemical / Bio-chemical Assay :- Amino Acid Analysis, Anti Oxidant Assay, Allergens Assay by ELISA, Chromatographic Separations, Protein Assay, Lipid Assay, Heavy Metal or Element Analysis

Basics of HPLC :- Basics of HPLC - Sample Preparation , Gradient Making , Parts of HPLC , Troubleshooting and Maintenance , Operating Procedure of HPLC , Run the sample in HPLC . Data Analysis

Basics of GC :- Basics of GC - Sample Preparation , Parts of GC , Troubleshooting and Maintenance , Operating Procedure of GC , Run the sample in GC , Data Analysis.

Analysis of Food Adulterants by GC :- Basics of GC - Sample Preparation , Parts of GC , Troubleshooting and Maintenance , Operating Procedure of GC , Run the sample in GC , Data Analysis.

UNIT – 6 TEST OF ANALYTICAL COMETANCE & PROFICIENCY

1. **Determination of Aspirin by HPLC**
2. **Analysis of Antibiotic**
3. **Analysis of Syrup by HPLC / GC**

UNIT – 5 PROJECT WORK (Optional)

We will assign a small project to develop skills for relevant industry or research.

FACILITIES REQUIRED FOR TRAINING IN PHARMACEUTICAL ANALYSIS

This information is very important for the learners to make them aware of the lab facilities required for the proper compliance of the training program :

UNIT 1: Softwares for data interpretation, Log Book Format , Quality Control Manuals, Monographs, Pharmacopeia, Q.C Data Keeping

UNIT 2 : Ph. Meter, Ion Meter, Precision Analytical Balance, Analytical Balance, Vacuum Filtration Unit, Cyclo Mixers, Sonicator Bath, Gas Supply; Nitrogen, Oxygen, Hydrogen etc, Hood etc.

UNIT 3 : Bio Safety Cabinet, BOD Incubator, Incubator - Shaker, Colony Counter with software, Microscope with imaging CMOS Camera and software, PCR, Gradient PCR, Real Time PCR , Data Analysis Software for Sequencing

UNIT 4: Spectrophotometer, Viscometer, Flame Photometer, Auto Karl Fisher Titrator, Auto Titrator, Dissolved Oxygen Meter, TDS Meter, Potentiometer, , Elemental Analysis - Lead, Calcium, Mercury , Column Purification of Natural Compound, **TLC Unit with** Sprayer, Visualizer, Spotter, Developing Chamber and data analysis software, Pump for column chromatography, Different size columns, Flash Chromatography System

UNIT 5: UV-Vis Double Beam Spectrophotometer with software, **HPLC System -** Degausser, Quaternary Pump, Auto-sampler, Column Oven, Detectors - PDA (UV-Vis Detection), FLD (Fluorescence Detection) , ECD (Detection of inorganic salts) and Software | **GC System -** EPC, Autosampler and Detectors - FID, TCD, FPD and NPD Detectors | Various Column & Accessories

COURSE CONTENT

UNIT -1 QUALITY CONTROL PROCEDURE FOR ADULTERANTS

Basics of Forensic Lab, Lab safety and Procedures, Forensic Record Maintenance, Documentation of Scientific evidence : Evidence Collection methodology , Evidence containers , Biological lab Safety , Chemistry Lab Safety, Understand the importance of the maintenance of forensic records from crime science to court ,

Forensic Record Formats, Draft petition with the admission of scientific evidence , prosecution strategy

UNIT -2 PROCEDURE FOR ANALYTICAL TESTING. LABORATORY

General Guidelines on Sampling, Sampling Plan & Procedures, Recognition of Food Testing laboratories, Food Safety & Laboratory Procedures, Preparation of Buffers, Acid-Base Equilibrium, pH, Buffer System, Charge, pI and pKa, Value, Quantitative & Quantitative determination of Food Products, Lab safety protocol of pharmaceutical lab

UNIT – 3 FORENSIC BIOLOGY PROCEDURES

DNA Extraction, Quantitation & Optimisation :- DNA Extraction, Optimisation, Purification of DNA, Gel Docking & Data Analysis, Quantitative or DIN Analysis by Spectrophotometry // Bio-analyser

Primer Design, PCR reaction setup, Troubleshooting & Optimisation :- Basics of DNA Fingerprinting, Primer Designing for STR Analysis, PCR Reaction setup & optimisation

STR Analysis of Forensic Samples :- Basics of DNA Profiling, Advantage of STR Marker, Position of STR Marker in Human Chromosome, STR Analysis, Variation of STR among individuals.

UNIT – 4 FORENSIC CHEMISTRY ANALYSIS

Extraction of Fire / Arson Forensic Analysis - Detection and identification of inflammable materials or their residues in the exhibits of fire/arson cases like ; petrol, kerosene, diesel, alcohols, thinners, solvents etc.

Analysis of Trap Cases : Detection and identification of phenolphthalein, sodium ions, carbonate ions, calcium ions, anthracene etc

Test for Phenolphthalein : Chemical Assay , *Folin*-Ciocalteu's reagent test , Spectroscopic Determination , Extraction and TLC of Phenolphthalein , HPLC Analysis.

Separation and purification of Anthracene : TLC , UV and HPLC Analysis of anthracene

Analysis of Alcohol in Liquor & Drinks : Analysis of various types of alcoholic drinks/liquor in crime exhibits., Qualitative analysis of Liquor - Iodoform Test , Dichromate Test , Chromotropic Acid Test for methanol ., Quantitative analysis of alcohols by Spectroscopy , TLC , HPLC & Gas Chromatography.

UNIT – 5 FORENSIC TOXICOLOGY ANALYSIS

Biochemical Assay or Preliminary Screening for Toxins: Spectroscopy of Toxins : Assays of Benzene , Paracetamol , Antibiotic etc.

Chemical Assay - Colour Test for various compounds , Test for acetone , Test for acetaldehyde, Test for acids , Test for Alcohol , Test For Chloroform.

Basics of Forensic Toxicology :- Introduction of Pharmacology, Drug, Poison & Metabolite, Pharmacokinetics of Drug (Liberation, Absorption, Distribution, Metabolism & Elimination), Drug Actions in human body, Forensic Toxicology Analytical Tools & Techniques

Basic principles of HPLC & GC : Introduction to HPLC Pump , Introduction to Auto Samplers and Injectors , Introduction to HPLC Detectors , Introduction to GC, GC Detectors, GC Columns, HPLC Columns , Tubing , Injectors , Introduction to Chromatography Software .

Sample Preparation for HPLC Analysis : Liquid – Solid Extraction, Liquid – Liquid Extraction, Solid Phase Extraction, Automation .

Sample Run and Data Analysis : Run samples for the analysis of toxins through HPLC & GC

UNIT – 6 TEST OF ANALYTICAL COMETANCE & PROFICIENCY

UNIT – 7 PROJECT WORK (Optional)

We will assign a small project to develop skills for relevant industry or research.

FACILITIES REQUIRED FOR TRAINING IN FORENSIC SCIENCE & LAW

This information is very important for the learners to make them aware of the lab facilities required for the proper compliance of the training program :

UNIT 1: Softwares for data interpretation, Log Book Format , Quality Control Manuals, Monographs, Pharmacopeia, Q.C Data Keeping

UNIT 2 : Ph. Meter, Ion Meter, Precision Analytical Balance, Analytical Balance, Vacuum Filtration Unit, Cyclo Mixers, Sonicator Bath, Gas Supply; Nitrogen, Oxygen, Hydrogen etc, Hood etc.

UNIT 3 : Bio Safety Cabinet, BOD Incubator, Incubator - Shaker, Colony Counter with software, Microscope with imaging CMOS Camera and software, PCR, Gradient PCR, Real Time PCR , Data Analysis Software for Sequencing

UNIT 4: Spectrophotometer, Viscometer, Flame Photometer, Auto Karl Fisher Titrator, Auto Titrator, Dissolved Oxygen Meter, TDS Meter, Potentiometer, , Elemental Analysis - Lead, Calcium, Mercury , Column Purification of Natural Compound, **TLC Unit with** Sprayer, Visualizer, Spotter, Developing Chamber and data analysis software, Pump for column chromatography, Different size columns, Flash Chromatography System

UNIT 5: UV-Vis Double Beam Spectrophotometer with software, **HPLC System -** Degausser, Quaternary Pump, Auto-sampler, Column Oven, Detectors - PDA (UV-Vis Detection), FLD (Fluorescence Detection) , ECD (Detection of inorganic salts) and Software | **GC System -** EPC, Autosampler and Detectors - FID, TCD, FPD and NPD Detectors | Various Column & Accessories

PROGRAM 11 : TRAINING IN HERBAL ANALYSIS & RESEARCH

COURSE CONTENT

UNIT 1: QUALITY CONTROL PROCEDURE OF HERBAL PRODUCTS

Regulatory Compliance of Microorganisms in raw materials, Risk assessment, Microorganisms in manufacturing environment, current GMP, Microbial contamination in products. Microbial considerations in product formulation. Microbiological evaluation: Total microbial count, Isolation and identification of microorganisms specified in BIS guidelines from cosmetic products and raw materials & Determination of Microbial Load in finished product

UNIT 2 : PROCEDURE FOR ANALYTICAL TESTING. LABORATORY

General Guidelines on Sampling, Sampling Plan & Procedures, Recognition of Food Testing laboratories, Herbal Safety & Laboratory Procedures, Preparation of Buffers, Acid-Base Equilibrium, pH, Buffer System, Charge, pI and pKa, Value, Quantitative & Quantitative determination of Food Products, Lab safety protocol of pharmaceutical lab

UNIT 3 : QUALITATIVE AND QUANTITATIVE ASSAY OF HERBALS

Extraction Procedures : Soxhlet Extraction, Drying the solvent by Vacuum Rotary Evaporator, Vaccum Drying of Herbals

Qualitative assay of Herbals - Assay of Alkaloids, Flavonoids, Terpines, Glycosides, Free Glucose, tannins, Anthraquinone, Saponins, Phenols etc.

Quantitative assay of Herbals - Assay of Alkaloids, Flavonoids, Terpines, Glycosides, Free Glucose, tannins, Anthraquinone, Saponins, Phenols etc.

UNIT 4 : BIOCHEMICAL & ANTIOXIDANT ASSAY OF HERBALS

Analytical Assays For Bio-Pharmaceuticals

Assay of carbohydrate, Determination of disaccharide, Lactose , Sucrose , Determination of Lipids; triglycerides , Test of Fatty Acids , Determination of Vitamins & Minerals

Assay For Herbals For Alkaloids, Flavonoids, Glycosides, Free Glucose, tannins, Anthraquinone, Saponins, Toxicity Analysis

UNIT 5: ANTIMICROBIAL ASSAY OF BOTANICALS

Microbial Analysis for different bio-pharmaceutical Products , Biochemical Characterization and data analysis , Microbial Detection through PCR (16S rDNA)

UNIT 6: CHEMICAL ANALYTICAL TESTING PROCEDURES

Chemical Assays by Titration, Elemental Analysis by Ion Meter & Flame Photometer, Viscosity, ELISA, Dissolved Oxygen Analysis, TDS, Nitrogen Potentiometric Analysis, Column Chromatography, Analysis by HPLC, GC, Thin Layer Chromatography, Estimation of other organic compounds.

UNIT 7: ANALYSIS OF HERBALS BY CHROMATOGRAPHY & SPECTROMETRY

Introduction to Chromatography & Spectrometry

Introduction to HPLC, GC & Spectrometry,Sample Preparation, Method Development for analysis, Analytical method validation : LOD, LOQ , Specificity, Reproducibility etc.

❖**Fingerprint Analysis of Herbal Product**

UNIT 8: TEST OF ANALYTICAL COMETANCE & PROFICIENCY

UNIT 9: PROJECT WORK (Optional)

We will assign a small project to develop skills for relevant industry or research.

FACILITIES REQUIRED FOR TRAINING IN HERBAL ANALYSIS

This information is very important for the learners to make them aware of the lab facilities required for the proper compliance of the training program :

UNIT 1: Softwares for data interpretation, Log Book Format , Quality Control Manuals, Monographs, Pharmacopeia, Q.C Data Keeping

UNIT 2 & 3: Vacuum Rotary Evaporator, Soxhlet Unit, Vacuum Pump, Drying Oven, Spectrophotometer Ph. Meter, Ion Meter, Precision Analytical Balance, Analytical Balance, Vacuum Filtration Unit, Cyclo Mixers, Sonicator Bath, Gas Supply; Nitrogen, Oxygen, Hydrogen etc, Hood etc.

UNIT 4 : Bio Safety Cabinet, BOD Incubator, Incubator - Shaker, Colony Counter with software, Microscope with imaging CMOS Camera and software, PCR, Gradient PCR, Real Time PCR , Data Analysis Software for Sequencing

UNIT 5: Spectrophotometer, Viscometer, Flame Photometer, Auto Karl Fisher Titrator, Auto Titrator, Dissolved Oxygen Meter, TDS Meter, Potentiometer, , Elemental Analysis - Lead, Calcium, Mercury , Column Purification of Natural Compound, **TLC Unit with** Sprayer, Visualizer, Spotter, Developing Chamber and data analysis software, Pump for column chromatography, Different size columns, Flash Chromatography System

UNIT 6 & 7 : UV-Vis Double Beam Spectrophotometer with software, **HPLC System -** Degausser, Quaternary Pump, Auto-sampler, Column Oven, Detectors - PDA (UV-Vis Detection), FLD (Fluorescence Detection) , ECD (Detection of inorganic salts) and Software | **GC System -** EPC, Autosampler and

PROGRAM 12 : TRAINING IN COSMETIC & PERFUME ANALYSIS

COURSE CONTENT

UNIT 1: REGULATORY & QUALITY CONTROL PROCEDURE FOR COSMETIC INDUSTRY

Regulatory Compliance of Cosmetic Products, Types & Understanding of Product, Sources of information, Cost Effective Recipe Development, Product Stability & Preservation, Sources of Information for Cosmetic Formulation Development, Organic Cosmetic Formulations, Review of New Technology

UNIT 2: PRODUCT DEVELOPMENT FOR FRAGRANCE AND COSMETIC INDUSTRY

Record Maintenance, Handling of Equipments , Sterilisation Techniques , Preparation of Chemical Reagent, Buffers, Acid-Base Equilibrium, pH, Buffer System, Charge, Pi and pKa, Value, Quantitative determination of pharmaceuticals

UNIT 3: MICROBIAL ANALYTICAL PROCEDURES OF COSMETIC SAMPLES

Microbiology Lab Safety & Documentation, Regulatory Compliance of Cosmetics: Microorganisms in raw materials, Risk assessment, Microorganisms in manufacturing environment, current GMP, Microbial contamination in cosmetic products. Microbial considerations in product formulation. Microbiological evaluation: Total microbial count, Isolation and identification of microorganisms specified in BIS guidelines from cosmetic products and raw materials & Determination of Microbial Load in Cosmetics .

Microbial Limit Test : Total Aerobic Bacteria, E.coli, Total Yeast and Mold Concentration, .Staphylococcus aureus, Streptococci faecal, Pseudomonas aeruginosa, Clostridium perfringens etc.

Quality Control Checks in Cosmetic Microbiology : New Methods , Comparison of Plate Counts , Duplicate Analysis ,

Sterility Check : Procedural Blank , Media Blank , Field Blank , Positive & Negative Control Cultures **Total Coliforms Analysis in Food & Documentation of Coliform Data.**

UNIT – 4: DISTILLATION & ANALYSIS OF FRAGRANCE OIL

Distillation : Simple Distillation, Vapor Pressure & Boiling, Fraction Distillation, Steam Distillation, Collection of Essential Oil, Water Distillation, Vaccum Distillation, Distillation of High-boiling and/or air sensitive materials etc.

Analysis of Essential Oil : Estimation of Essential Oil by Clevenger apparatus,Specific gravity, Solubility in Alcohol,Refractive index,Acid value,Ester value, Carbonyl value

Purity Analysis of Essential Oil : Purity Analysis By - **GC & HPLC**

Viscosity Analysis, Refractive Index, Test of Allergens, ph analysis, moisture analysis in cosmetic products, Test of Amino Acids, Analysis of antioxidants used in cosmetic products, Determination of preservatives in cosmetics

UNIT – 5: FORMULATION DEVELOPMENT (COSMETICS & FRAGRANCES)

Fragrance creation Strategies - Top, Middle & Base Notes, Blending, Formulation of Blends,Essential Oil Blend to Perfume, Fragrance creation by natural oils, fragrance creation by synthetic compound, Novel Product Strategies, Quality analysis, Packaging Strategy, Marketing of Cosmetics

UNIT 6: TOXICOLOGY ANALYSIS OF COSMETICS & FRAGRANCES

Analytical Methods & Sample Preparation :- Adulterants & Limits, Analytical Methods for the detection of adulterants, Sample Preparation, SPME Sample Extraction, Derivitisation & Hydrolysis of sample, Lambda Max Analysis by Spectrophotometer,

Basics of HPLC :- Basics of HPLC - Sample Preparation , Gradient Making , Parts of HPLC , Troubleshooting and Maintenance , Operating Procedure of HPLC , Run the sample in HPLC . Data Analysis

Basics of GC :- Basics of GC - Sample Preparation , Parts of GC , Troubleshooting and Maintenance , Operating Procedure of GC , Run the sample in GC , Data Analysis.

Test of BHA & Test of BHT in finished cosmetic product, essential oil or fine fragrances **Method** – Spectroscopy , HPLC , GC

UNIT – 7 TEST OF ANALYTICAL COMETANCE & PROFICIENCY

UNIT – 8 PROJECT WORK (Optional)

Product Development – We will assign a small project to develop skills for relevant industry or research.

FACILITIES REQUIRED FOR TRAINING IN COSMETIC & PERFUME ANALYSIS

This information is very important for the learners to make them aware of the lab facilities required for the proper compliance of the training program :

UNIT 1: Softwares for data interpretation, Log Book Format , Quality Control Manuals, Monographs, Pharmacopeia, Q.C Data Keeping

UNIT 2 : Ph. Meter, Ion Meter, Precision Analytical Balance, Analytical Balance, Vacuum Filtration Unit, Cyclo Mixers, Sonicator Bath, Gas Supply; Nitrogen, Oxygen, Hydrogen etc, Hood etc.

UNIT 3 : Bio Safety Cabinet, BOD Incubator, Incubator - Shaker, Colony Counter with software, Microscope with imaging CMOS Camera and software, PCR, Gradient PCR, Real Time PCR , Data Analysis Software for Sequencing

UNIT 4: Spectrophotometer, Viscometer, Flame Photometer, Auto Karl Fisher Titrator, Auto Titrator, Dissolved Oxygen Meter, TDS Meter, Potentiometer, , Elemental Analysis - Lead, Calcium, Mercury , Column Purification of Natural Compound, **TLC Unit with** Sprayer, Visualizer, Spotter, Developing Chamber and data analysis software, Pump for column chromatography, Different size columns, Flash Chromatography System

UNIT 5: UV-Vis Double Beam Spectrophotometer with software, **HPLC System -** Degausser, Quaternary Pump, Auto-sampler, Column Oven, Detectors - PDA (UV-Vis Detection), FLD (Fluorescence Detection) , ECD (Detection of inorganic salts) and Software | **GC System -** EPC, Autosampler and Detectors - FID, TCD, FPD and NPD Detectors | Various Column & Accessories

TRAINING FEE FOR SHORT TERM / SUMMER TRAINING (FOR INDIAN NATIONAL ONLY)

NAME OF TRAINING PROGRAM	TRAINING ONLY	TRAINING + PROJECT
Training in Molecular Biology Research	Rs 10,000 / -	Rs 12,000 / -
Training in Genetic Engineering / Gene Cloning	Rs 10,000 / -	Rs 12,000 / -
Training in Genetic Toxicology & Research	Rs 10,000 / -	Rs 12,000 / -
Training in Protein Analysis & Research	Rs 10,000 / -	Rs 12,000 / -
Training in Enzyme Engineering or Enzymology	Rs 10,000 / -	Rs 12,000 / -
Training in Food Analysis & Research	Rs 10,000 / -	Rs 12,000 / -
Training in Beverages Analysis & Research	Rs 10,000 / -	Rs 12,000 / -
Training in Forensic Science & Law	Rs 10,000 / -	Rs 12,000 / -
Training in Pharmaceutical Product Analysis	Rs 10,000 / -	Rs 12,000 / -
Training in Herbal Analysis & Research	Rs 10,000 / -	Rs 12,000 / -
Training For Cosmetic & Perfume Industry	Rs 10,000 / -	Rs 12,000 / -
Training For Analytical Testing & Quality Control	Rs 10,000 / -	Rs 12,000 / -

HOW TO APPLY –

Details of Documents For Registration :

1. Scan copy of Any identity proof along with University / College Identity Card / Aadhar Card etc.
2. Filled **Registration form** with photograph (Given in Last Page of Brochure)
3. **Registration fee** will be Rs 1000 / - paid through on line
4. After payment send all documents with payment receipt at : allelelifesciences@gmail.com or Whatsapp - 9891179928
5. We will send confirmation within specified time through e.mail or remind us if not received at our email.

ON LINE PAYMENT METHOD :

Payment By Internet Banking	Scan PAY TM Code
Beneficiary Name - Allele Life Sciences Private Limited **Account Number - 61071508494** **IFSC Code - SBIN0031811** **Bank Name - State Bank of India** **Bank Address - SBI, 14/15, Sector-18, Noida, UP - 201301** **Or Pay Through UPI** **Address - allelelifesciences@upi**	allelelifesciences@upi

ALLELE LIFE SCIENCES®

Photograph

Registration Form

Name of Training Program :

Expected Date of Joining :
Candidate Details :

Name: ……
Father's Name: ……
Address : ……..
Contact No : ……..
Email: ……..
Institution : ……
Qualification : ……

Terms & Conditions :

1. The admission to training / internship programs will be confirmed after the payment of registration fee along with documents.
2. The registration fee deposited is completely non refundable.
3. The industrial training fee includes the cost of chemical , reagents and study material costs.
4. I will deposit the service charges as decided by the company at the time of joining date of training program.
5. Students have to bear their own boarding/lodging /conveyance charges. We facilitate students in finding proper paying guest arrangements.
6. The trainees will have to bring their own lab coat and wear them all the time in the campus.
7. Trainees are selected on first come first serve basis
8. Trainees will maintain adequate discipline inside the lab premises.
9. Company will not be responsible for any medical, legal issues during the internship tenure.

DECLARATION

I_____from_____
hereby declare that all statement/information given in the application form are true to the best of my knowledge and belief . I will strictly abide by the norms/lab etiquette during the training

Signature

Place: _____ Date: _____

For office use only

LAB FACILITY :

Our State of art facility is located in Industrial Area of Noida (NCR) . The lab / research facility is Total : 6000 Sq Feet

Affymatrix & Agilent Microarray Platform	Gene Expression Studies, Biomarker, Sequencing
Real Time PCR (ABI)	Gene Expression, Sequence Detection
PCR (ABI, Biorad , Eurofins) - 5 in numbers	Amplification of nucleic acids
Bioanalyser & Spectrophotometer (Thermo)	Quantification of Nucleic Acids
Gel Documentation System	Visualisation of Nucleic Acids, PCR Products etc.
Electrophoresis & Power Supply (Biorad) - 7 Sets	Separation of Nucleic Acids & Other Arrays
DNA Concentrator (Thermo Speedvac)	Nucleic Acid Extraction
Centrifuge, High Speed Centrifuge - 8 Nos	Sample Preparation
PCR Station and other accessories	

Biorad Profinia Affinity Chromatography	Affinity Chromatography - IMAC, GST, Antibody
Biorad Biologic Low Pressure Chromatography	Size Exclusion, Ion Exchange, Affinity etc.
Preparative HPLC (Thermo) , Agilent 1100	Bulk Protein Purification & Analysis
GE Amersham 2-D Electrophoresis System	Protein Characterisation
Immunoblot, SDS-PAGE , Biorad HV Powerpac	Visualisation of Nucleic Acids, PCR Products etc.
Mass Spectrometry , ELISA, Immunoassay	Protein Identification
Cryo Preservation Facility & Common Facility	Sample Storage & Preparation

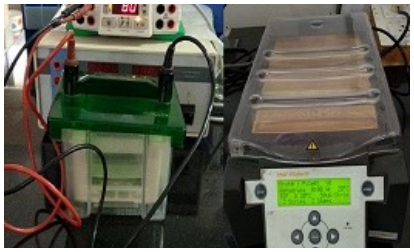
Agilent HPLC System - PDA, FLD & ECD Detector	Separation and analysis of molecules
Agilent GC with FID & FPD Detectors	Separation and analysis of molecules
Thermo Prep HPLC with Dual Pump & UV-Vis	Bulk Purification & Analysis
Shimadzu GC with FID & NPD Detector	Separation and analysis of molecules
Triple Quad GC-MS System (Agilent)	Analysis of Semi Volatile & Volatile Compound
LC-MS-MS (API Sciex)	Analysis of Non Volatile Compound
Varian Carry Spectrophotometer	Analytical Tool for various purpose
Thermo Helios Spectrophotometer	Analytical Tool for various purpose
Vacuum Rotary Evaporator (Buchi)	Sample Preparation

OTHER ANALYTICAL FACILITY :

Refractometer , Flame Photometer (Toshniwal), Karl Fisher Titrator (Sistronics), Potentiometer, Polarimeter , Tintometer ,Viscometer , Kjeldahl Distillation Unit , Kjeldahl Digestion Unit , Ion Selective for Fluoride Analysis (Thermo Orion) , Nephalometer , Soxhlet Extraction , Rotatory Vaccum Evaporator with chiller , etc.






Microbiology & Cell Culture Facility : Vertical Laminar Air Flow (4x2x2) , Horizontal Laminar Air Flow (2x2x2) B.O.D. Incubator (Julabo) , CO2 Incubator (Jauan) , Orbital Incubator Shaker, UV Chamber , Incubator, Colony Counter , Colorimeter , Muffle Furnace , Hot Air Oven , Desiccators, Binocular Microscopes and , Lypholizer

Biochemistry / Organic Synthesis Chemistry Lab :

Spectrophotometer (Thermo Heleus Alpha) , Analytical Balance (Sartorius), Ph Meter (Thermo Orion) , Ion Selective (Thermo Orion) , Conductivity Meter (Thermo Orion), Dissolved Oxygen Meter (Thermo Orion) , Turbidity Meter, Autoclaves, Hot Air Oven , Hot Plate , Magnetic Stirrers , Pipette Washer , Shaking Machine , Water Bath , Colorimeter , Flame Photometer , etc.

Lab Water Purification : Millipore Milli Q System

Clinical Biology Lab : Haematology Analyser , Automatic Immunoassay, Haematology HPLC Biorad Variant II

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