



Laxmi

ANALYTICAL LABORATORIES

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[AN ISO 9001:2008 CERTIFIED]

LAXMI ANALYTICAL LABORATORIES [LAL] is an Analytical

Consultancy Service provider which was established with the Sole aim to provide Total Analytical Solution to the customers.

LAL Provides accurate and Timely Analytical & Microbiological Testing Services with access to Analytical Instruments like GC, GCMS, HPLC, LCMS, Ion Chromatography, GPC, AAS, ICP, NMR, UV, FTIR, DSC, TGA, SEM, TEM, XRD, XRF.

We also provide Analytical services of Method Development, Method Validation, Interpretation of Data, Project Work, RoHS, REACH, & Unknown Product Identification.

LAXMI ANALYTICAL LABORATORIES [LAL] is founded by a

Visionary technocrat having decades of technical experience with the intention to provide One Stop Analytical Solution with Latest Instrumentation Technology available.

At **LAL**, We listen to clients requirements and provide them with satisfactory solution of their Analytical needs.

With Growing needs of Industries & Researchers we add on our Analytical Services from time to time so that they can get all analysis done under one place.

LAL caters to Major **Instrumental, Chemical and Microbiological Analysis** in the area of

- 1) Speciality Chemicals
- 2) Pharmaceutical Intermediates
- 3) Dyes & Intermediates
- 4) Textile Auxiliaries and Chemicals
- 5) Paint, Polymers & Pigments
- 6) Flavours, Fragrance, Essential Oil & Perfumery
- 7) Cementious Materials & Fly Ash
- 8) Plastic & Polymers
- 9) Petroleum Products, Oil, Coal, Fuel
- 10) Environmental / Water
- 11) Electric components / PCB Board

INSTRUMENTAL ANALYSIS :-

◆ Chromatography

- **Gas Chromatography (GC)**
Gas Chromatography- Head Space (GC-HS)

Detectors – FID / ECD

Purity / Impurity Profiling

Fatty Acid Methyl Esters

Method Development / Method Validation

Quantification of Organic Volatile Impurities / Residual Solvents by Head Space.

- **High Performance Liquid Chromatography (HPLC)**

Detectors - UV- Vis / PDA / RI

Purity / Impurity Profiling

Method Development / Method Validation

- **Gas Chromatography Mass Spectrometry (GCMS)**

Unknown Volatile Organic Components Identification having melting / Boiling Point of < 300 °C and Molecular Wt upto 600 m/z

Poly Chlorinated Biphenyls, Poly Aromatic Hydrocarbons, Organotin, BHT, Bisphenol A, Aryl Amines by GCMS

- **Liquid Chromatography Mass Spectrometry (LCMS & MS-DIP)**

Unknown Non Volatile Organic Components Identification having melting / Boiling Point of More than 300 °C and Molecular Wt upto 20000 m/z

- **Gel Permeation Chromatography (GPC)**

Determination of Molecular Weight, Molecular Number & Polydispersity of Polymer Sample

Sample solubility – Water / Chloroform / THF

- **Ion Chromatography**

Anions –Chloride, Bromide, Fluoride, Nitrite, Nitrate, Phosphate, Sulphate, Chlorite, Chlorate, Carbonate

Cations –Sodium, Lithium, Potassium, Calcium, Magnesium, Ammonium, Manganese

◆ Thermoanalytical Techniques

- **Thermogravimetry Analysis (TGA)**
(From Ambient to 900 deg C)

- **Differential Scanning Colorimetry (DSC)**
(- 75 deg C to 490 deg C)

Melting Behavior, Glass Transition, Heat of Fusion, Thermal Stability, Specific Heat.

◆ Spectroscopy

- **UV - Visible Spectroscopy (UV-Vis)**
- **Fourier Transform Infra-Red Spectroscopy (FTIR & FTIR - ATR)**
- **Inductive Couple Plasma - Optical Emission Spectroscopy (ICP-OES)**

Elements : Al, As, Ag, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, Hg, In, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, S, Se, Si, Sn, Sr, Ti, Tl, V, Zn, Zr

- **Atomic Absorption Spectrophotometry (AAS)**

Fe, Co, Ni, Cu, Zn, Cr, Cd, Pb, Al, Mn, Na, K, Ca, Mg, Al, Si, Sb, Hg, AS, Se, Pd etc.

- **Energy Dispersive X - Ray Fluorescence Spectroscopy (ED - XRF)**

Qualitative Detection of Elements from Sodium to Uranium in the Periodic Table

- **Nuclear Magnetic Resonance Spectroscopy (NMR)**

¹H, ¹³C, ¹⁹F, ³¹P NMR

- **Colour Measurement by Macbeth Spectrophotometer**

Colour Measurement [L, a, b Values] or Reflectance / Whiteness / Brightness / Yellowness Index
Colour Difference [K/S, Delta E] Sample Vs. Standard

◆ Particle Size Analysis

- **Particle Size Analysis By Malvern Mastersizer (Laser Diffraction based with Dry Powder Feeder Attachment).**

Particle Size from 0.02 um to 2000 um

- **Particle Size Analysis By Sympatec**

Particle Size from 0.1 um to 875 um

- **Particle Size Analysis By Sedigraph**

Particle Size from 0.1 um to 45 um

- **Nano Particle Size Analysis By Malvern Zetasizer Nano ZS System**

Particle Size from 0.3 nm to 5 um

- **Zeta Potential Analysis By Malvern Zetasizer Nano ZS System**

◆ Microscopy

- SEM - EDAX
- Scanning Electron Microscopy (SEM)
- Transmission Electron Microscopy (TEM)

◆ Crystal Phase & Surface Analysis Techniques

- X - Ray Diffraction (XRD)
2 Theta Range – 4 to 60 & 4 to 80 / % Crystallinity / Crystal Size
- Surface Area & Pore Volume Analysis by BET
- Porosity Measurement by Mercury Porosimeter
- Surface Tension by Surface Tensiometer – Platinum Ring Method

◆ Elemental Analysis Using Elemental Analyzer

C, H, N, S,O Analysis.

◆ Total Organic Carbon Analysis [TOC]

OTHER ANALYSIS :-

- pH
- Loss on Drying
- Moisture Content by K.F. (Karl Fischer)
- Bulk Density / Specific Gravity
- Pour Point / Cloud Point
- Melting Point / Boiling Point
- Refractive Index by Abbe Refractometer
- Flash Point / Aniline Point
- Color by APHA / Gardner Scale
- Specific Optical Rotation
- Calorific Value by Bomb Calorimeter
- Ash / Sulphated Ash / Acid Insoluble Ash
- Acid Value / Sap Value / Iodine Value / Ester Value
- COD / BOD
- Total Dissolved Solid
- Viscosity by Brook Field Viscometer / Ford Cup / Red Wood / U Tube
- Kinematic Viscosity at 40 & 100 Deg C
- Oil Absorption
- Mesh Size by Sieving
- % Filler Content for Plastics
- Hexa Valent Chromium by UV
- Nitrogen Content by Kjeldhal
- Copper Corrosion Test
- Free Formaldehyde [ISO 14184 - Part 1]
- Release Formaldehyde [ISO 14184 - Part 2]
- Izo Impact
- Flexular Strength
- Melt Flow Index
- Elongation at Break
- Softening Point of Grease
- Titration & Gravimetric Analysis

MICROBIOLOGICAL ANALYSIS :-

Textile Material

- Antibacterial activity of fabrics assessment of textile materials- Parallel Streak Method [AATCC-147-2004]
- Antibacterial Finishes on textile materials [AATCC-100-2004]
- Determining the Antimicrobial activity of Immobilized Antimicrobial agents under Dynamic contact conditions [ASTM: E2149-01]
- Evaluation of Antibacterial activity of textile Materials: Agar Diffusion Plate Test [ISO 20645-2004]
- Testing of antibacterial activity and Efficacy on Textile products [JIS L 1902:2002]
- Determination of population of Microorganism on Product [IS; ISO/FDIS 11737-1; Part 1; 2005]
- Mosquito Repellency [U.S. Patent 5,198,287]
- Mosquito Repellency [Modified WHO/CTD/WHO - PES/IC/96.1]
- Assessment of Dust Mite Properties of Textiles [AATCC Test Method Draft 5, Jan 2005]
- Assessment of Antifungal Activity of Textile Materials [MIL-STD-810F Method 508.5.1-12 January 2000]
- Assessment of Antifungal Activity of Textile & other Materials [AATCC Test Method 30 III]

Non Textile Material such as Plastic Glazed Surfaces

- Antimicrobial Products- Test for antimicrobial activity and Efficacy [JIS Z 28.1-2000]

Polymeric Materials

- Determining Resistance of Synthetic Polymeric Materials to Fungi [ASTM: G-21]

Any Surface or Material Contaminated with Microbes

- Identification of Pathogenic Bacteria/ Fungi / Protozoa, Cysts [Bergy's Manual of Determinative Bacteriology, 2000; ASM Manual]

Chemicals / Any Antimicrobial Formulations

- Minimum Inhibitory Concentration (MIC) for any one organism; Tube Method [ASM Methods]
- Minimum Bactericidal Concentration (MBC) for any one organism; Plate Method [ASM Methods]
- Antifungal Activity by Plate Method [ASM Methods]
- Time Kill Test using Bacteria, Fungi & Algae [API RP-38 Method 2002]
- Preservative Effectiveness for organisms - Preservative Challenge Test
- In Vitro Cytotoxicity Test. This test is done on Mouse Kidney Cell Line L929. It can be done Qualitatively and Quantitatively. Quantitatively can be done by MMT Assay. Test Method is EN ISO 10993-5:2009

Paints

- Resistance to growth of mold on the surface of interior paint coatings in an environmental chamber (Evaluation of Antifungal activity of paint samples on applied surfaces) [ASTM D 3273-05]
- Evaluating Degree of Surface Disfigurement of Paint Films by Microbial Growth (Fungal or Algal) on soil & Dirt Accumulations [ASTM D 3274-2002]
- To assess the performance of in-can Oxford Cylinder cup Preservatives; Qualitative method bioassay
- To assess the performance of preservative Filter Paper Method in exterior paint; Qualitative method

Water Samples - Drinking Water/ Swimming Pool water

- Total Plate Count [IS 1622 - 1981]
- Enumeration of coliforms by MPN Method [IS 1622 - 1981]
- Enumeration of coliforms by Membrane Filter Assembly [IS 1622 - 1981]
- Enumeration of Escherichia coli by MPN Method [IS 1622 - 1981]
- Enumeration of Clostridium welchii [IS 1622 - 1981]
- Faecal Streptococci [IS 1622 - 1981]

**Food Samples – Cereals, Pulses & Cereal Products, Herbs, Spices & Condiments,
Canned & Processed Food, Milk & Dairy Products, Fruit & Fruit Products,
Animal Feeds**

- Total Bacterial Count
[IS 5402: 2002 / ISO 4833:1991 / Reaffirmed 2007]
- Total Yeast & Mould Count
[IS 5403: 1999, Reaffirmed 2005 / Reaffirmed 2009]
- Enumeration of Coliforms
[IS 5401 (Part 1): 2002 / ISO 4832 : 1991 / Reaffirmed 2007]
- Detection & Identification of Escherichia coli
[IS 5401 (Part 1): 2002 / ISO 4832 : 1991 / Reaffirmed 2007]
- Enumeration of Escherichia coli by Plate Method
[IS 5401 (Part 1): 2002 / ISO 4832 : 1991 / Reaffirmed 2007]
- Enumeration of Escherichia coli by MPN Method
[IS 5401 (Part 1): 2002 / ISO 4832 : 1991 / Reaffirmed 2007]

- Detection of Salmonella
[IS 5887 (Part 3): 1999 / ISO 6579 : 1993 / Reaffirmed 2009]
- Detection of Shigella
[IS 5887 (Part 7): 1999 / Reaffirmed 2009]
- Detection / Enumeration of S.aureus by Plate Method
[IS 5887 (Part 2): 1999 / Reaffirmed 2009]
- Enumeration of Faecal Streptococci by Plate Method
[IS 5887 (Part 2): 1999 / Reaffirmed 2009]
- Enumeration of Faecal Streptococci by MPN Method
[IS 5887 (Part 2): 1999 / Reaffirmed 2009]
- Enumeration & Confirmation of Bacillus cereus
[IS 5887 (Part 6): 1999 / ISO 7932 / Reaffirmed 2009]
- Detection / Enumeration of Clostridium perfringens
[IS 5887 (Part 4): 1976 / Reaffirmed 2009]
- Enumeration of Pseudomonas aeruginosa
[IS 14843 : 2000 / ISO 13720 : 1995 / Reaffirmed 2009]
- Detection of Vibrio cholerae
[IS 5887 (Part 5): 1976 / Reaffirmed 2009]
- Detection of Listeria monocytogenes – Part 1
[IS 14988 (Part 1) : 2001 / ISO 11290-1 : 1996 / Reaffirmed 2007]
- Detection of Listeria monocytogenes – Part 2
[IS 14988 (Part 2) : 2001 / ISO 11290-1 : 1996 / Reaffirmed 2009]

PRODUCT WISE ANALYSIS

◆ PIGMENT ANALYSIS

- pH
- Density
- Oil absorption
- Light Fastness
- Strength & Tone measurement
- Particle Size Analysis
- Polychlorinated bihenyls (PCBs)
- Polyaromatic Hydrocarbons (PAHs)
- Hexachlorobenzene (HCB)
- Pentachlorophenol, Tetra chlorphenol (PCP & TeCP)
- Aromatic amines(24 Banned amines)
- Sulphonated aromatic amines
- Unsulphonated aromatic amines
- Extractable heavy metals
- Carbon black
- Dimethyl acetamide(DMAc)
- Dichlorobenzene
- Dinitrotoluene & Chlorotoluene
- Nitrobenzene
- Phthalimide
- 4-Nitro biphenyl(4NBP)
- Purity by acid pasting

◆ TEXTILE ANALYSIS

- Identification of Fiber
- Ends & Peaks per unit length
- Light Fastness, Weathering Fastness
- Colour Fastness against rubbing under Wet & Dry Conditions
- Colour Fastness to Perspiration, Water & Sea Water

◆ CEMENTIOUS MATERIAL & FLY ASH ANALYSIS

- Chemical Composition
- Bulk Density / Specific Gravity
- LOI
- XRF
- Finesse [Retention on 45 u Sieve]
- Particle Size Analysis
- Compressive Strength
- Water Absorption
- Abrasive Resistance

◆ **PERFUME / FLAVOURS / FRAGRANCE/ ESSENTIAL OIL ANALYSIS**

- GC / GCMS – Identification of Components eluted in GC.
- Density / Specific Gravity
- Colour by APHA
- Solubility
- Optical Rotation
- Refractive Index

◆ **PLASTIC & POLYMER ANALYSIS**

- Identification of Plastic Material by DSC
[PP, LDPE, HDPE, Polyacetal, PET, PBT, Nylon 6, Nylon 66, Nylon 610, PVC, PS, PMMA, Teflon)
- % Filler Content & Identification of Filler
- Specific Gravity
- Glass Transition(Tg)
- Heat Capacity
- Melting Peak
- Elongation at Break
- Melt Flow Index
- Flexural Strength
- Izod Impact

◆ **COAL ANALYSIS**

- Total Moisture
- Inherent Moisture
- Ash Content
- Volatile Matter
- Fixed Carbon
- Total Sulfur by ICP
- Ultimate Analysis (C,H,N,S)
- Gross Calorific Value

◆ **FERRILIZER & SOIL ANALYSIS**

- pH
- Moisture
- Bulk Density
- Acidity
- Alkalinity
- Total Phosphate
- Water Soluble Phosphate
- Water soluble Potash
- Particle size
- Sieve Test
- Micronutrient [Iron, Copper, Zinc, Magnesium, Manganese, Arsenic, Sulfur]

◆ ENVIRONMENTAL / WATER ANALYSIS

- Colour
- Odour
- pH
- Turbidity (NTU)
- Conductivity
- Salinity
- Total Solids
- Total Dissolved Solids
- Total Suspended Solids
- Organic Solids
- Inorganic Solids
- Total Hardness as CaCO₃
- Acidity
- Total Alkalinity
- Dissolved Oxygen
- Chloride
- Sulphate
- Nitrate
- Nitrite
- Sulfide
- Phosphate
- Residual Free Chlorine
- Silica
- Ammonical Nitrogen
- Total Nitrogen
- Free Ammonia
- COD / BOD
- TOC
- Phenolic Compound
- Mineral Oil
- Ca, Mg, Ba, Cu, Fe, Mn, Zn, Ag, Al, Se, Na, Sb, Hg, Cd, As, Pb, Cr, Ni, V
- Poly Chlorinated Biphenyls
- Poly Aromatic Hydrocarbons
- Total Pesticide Residue
- Standard Plate Count
- Escherichia coli
- Coliform Bacteria
- Faecal streptococci
- Staphylococcus aureus
- Sulphite reducing anaerobes
- Pseudomonas aeruginosa
- Aerobic Microbial Count
- Yeast and Mould
- Salmonella
- Shigella
- Vibrio cholera
- Vibrio parahaemolyticus
- Proteolytic and Lipolytic organisms

◆ THERMIC FLUID / WASTE OIL / TRANSFORMER OIL ANALYSIS

- Specific Gravity
- Boiling Point
- Moisture content
- Flash Point
- Sediment
- Kinematic Viscosity at 40 & 100 °C
- Viscosity Index.
- Copper Strip Corrosion
- Neutralization Number – mg KOH /gm
- Specific Heat
- Sulphur, Lead, Cadmium, Chromium, Nickel, Arsenic by ICP
- Dissipation Factor at 90 °C
- Resistivity at 90 °C
- Electric Breakdown Voltage
- Interfacial Tension
- Sludge
- PCBs by GCMS
- Dissolved Gas Analysis

◆ VEGETABLE OIL & FATS ANALYSIS

- Density
- Kinematic Viscosity at 40 °C
- Moisture
- Flash Point
- Iodine Number
- Acid Value
- Saponification Value
- Ash Content
- Calorific Value
- Sulfur Content
- Phosphorus Content
- Fatty Acid Methyl Esters Profiling by GC

◆ PETROLEUM PRODUCTS & FUEL ANALYSIS

- Density
- Ash
- Water Content
- Sediment
- Carbon Residue
- Carbon Nos. by GC-Capillary
- Flash Point / Aniline Point
- Cloud Point / Pour Point
- Kinematic Viscosity at 40 & 100 °C
- Copper Corrosion Test
- Sulfur Content
- Gross Calorific Value

◆ MINERAL & ORES ANALYSIS

- Moisture Content
- LOI
- Metals Content by ICP
- XRF

◆ METAL & METAL ALLOY ANALYSIS

- Ferrous & Non Ferrous Metals
- MS, SS, Al, Cu, Ni Based Alloy –Chemical Composition & Grade Confirmation
- Hardness
- Tensile Strength

◆ SOAPS & DETERGENT ANALYSIS

- pH
- Total Fatty Matter
- Surface Tension
- Time Killed Test
- Preservative Challenge Test
- Effectiveness

◆ FOOD ANALYSIS

- Energy
- Carbohydrates
- Proteins
- Fats
- Fibre
- Moisture
- Ash
- Cholesterol
- Trans Fat
- Saturated Fat
- Iron
- Calcium
- Sodium
- Vitamin A
- Vitamin C

◆ ELECTRIC COMPONENTS ANALYSIS

- Chloride, Bromide, Phosphate, Sulphate by Ion Chromatography
- Pb, Cd, Hg by ICP
- Hexavalent Chromium by U.V
- PBB & PBDE by GCMS