Indian Institute of Toxicology Research, Lucknow, a multidisciplinary pioneering research institute in the field of Toxicology and Environmental Safety, is a constituent laboratory of Council of Scientific and Industrial Research (CSIR), New Delhi. The institute in consonance with its proactive policies towards safety to environment and health has taken initiatives with the state of the art facilities and expertise to provide services using national and international guidelines conforming to OECD, USEPA, BIS, ISO to public and private sectors.

A. GLP Certified pre-clinical studies

CSIR-Indian Institute of Toxicology Research (CSIR-IITR), Lucknow received the GLP Compliance Certification from the National GLP Compliance Monitoring Authority (NGCMA), Government of India for undertaking the following pre-clinical toxicity studies:

- Acute toxicity in rodents (oral/dermal/parenteral) (single sex)
- Sub-acute toxicity in rodents (oral/dermal/parenteral) (28-Day)
- *In vivo* Micronucleus test in bone marrow (as per OECD474)
- *In vivo* Chromosomal Aberration in bone marrow (as per OECD475)

B. Safety/toxicity evaluation of chemicals/finished products

- **Toxicity evaluation in mice, rat, guinea pig and rabbit**
  - Acute (< 14 days)
    - Oral: mice, rat
    - Dermal: rat, rabbit
    - Inhalation: rat
  - Sub acute (14-30 days)
    - Oral: rat
    - Dermal: rat
  - Chronic (51-104 weeks)
    - Dietary toxicity: rat
  - Sub chronic (30-90 days)
    - Oral: rat
- **Neurobehavioral Toxicity**
  - Spontaneous locomotor activity
  - Grip strength
  - Catalepsy
  - Active learning ability using shuttle box
- **Neurotoxicity**
  - Rapid screening of chemicals / herbal extracts to assess their neurotoxic / psychoactive potential. Assays for neurotransmitter receptor type / subtype (Dopamine - D1, D2*, D3*, Serotonin - 1A*, 2A, muscarinic-cholinergic and benzodiazepine receptors conducted using radioligand receptor binding
- **Teratogenicity**
  - Rats

- **Gastrointestinal Toxicity**
  - Test for loss of Appetite: mice, rat
  - In situ evaluation of gastrointestinal toxicity
- **Immunotoxicity**
  - Cell mediated immunity
  - Humoral immunity
  - Cytokines
- **Dermal Toxicity**
  - Primary skin irritation: rabbit
  - Irritation to mucous membrane: female rabbit
  - Skin sensitization: guinea pig
- **Reproductive Toxicity**
  - General reproductive performance and fertility test: rat
  - Two generation reproduction study: rat
- **Carcinogenicity and Genotoxicity (*in vivo*)**
  - Chromosomal aberrations in bone marrow: mouse / rat
  - Micronucleus test in bone marrow: mouse / rat
  - Bone marrow sister chromatid exchange assay
  - DNA damage by Comet assay
  - DNA damage by Comet assay: Drosophila
  - Cytogenetic assay: Allium cepa
  - Cytogenetic assay: Vicia faba
  - Dominant lethal test: rat
  - Ames Test: Salmonella typhimurium
  - Carcinogenicity: mouse skin
    - i. Complete carcinogenicity
    - ii. Tumor initiation
    - iii. Tumor promotion
  - Carcinogenicity: Rats
    - i. Complete carcinogenicity
    - ii. Tumor initiation
    - iii. Tumor promotion
- **Carcinogenicity and Genotoxicity (*in vitro*)**
  - Micronucleus: CHO cells/human lymphocyte
  - Chromosomalaberration: CHO/human lymphocytes
  - DNA damage by Comet assay
- **Safety evaluation of plastics**
  - Global Migration test
  - Physicochemical and biochemical test (systemic injection test) on LDPE/PP Sheets
  - Combustion test using Atlas Flame Chamber for determination of toxicity index as per NCD 1409/NES 713
  - Cytotoxicity Test & Endotoxin test on Plastic Biomedical Devices/pharmaceuticals
- **Cytotoxicity**
  - Neutral red uptake assay
  - MTT assay
  - LDH leakage assay
  - Total protein turnover
  - Abnormal DNA synthesis

        - Apoptopic/necrotic cell death
    - **Phototoxicity of chemicals/cosmetics**
        - In vivo (chemicals)
        - Duckweed (Spirodella sp.) fond test
        - In vitro
        - NIH3T3 cell line
    - **Food Contamination and Adulteration Monitoring**
        - Qualitative analysis of Aflatoxin in food and feed samples
        - Qualitative analysis of argemone oil in edible oils
        - Analysis of permitted colors in food products

C. Analytical Services

- **Metals in soil, air, water, food, biological samples and other matrices (24 metals)**
    - Cadmium, Chromium, Iron, Nickel, Copper, Lead, Arsenic, Mercury, Calcium, Magnesium, Manganese, Zinc, Aluminum, Sodium, Potassium, Silver, Gold, Cobalt, Molybdenum, Titanium, Antimony, Vanadium, Boron and Selenium (by ICP/AAS)
- **Pesticides in water, soil, food and biological samples**
    - Organochlorine
        - α-HCH, β-HCH, γ-HCH (Lindane), δ-HCH, α-Endosulfan, β-Endosulfan, Endosulfan sulfate, pp-DDT, op-DDT, pp-DDE, pp-DDD, Aldrin, Dialdrin, Alachlore, Butachlor (by GC/GCMS)
    - Organo-phosphorous
        - Monochrotophos, Malathion, Methylparathion, Chlorpyrifos, Ethion, Phorate (by GC/GCMS)
    - Other pesticides
        - Atrazine, Isoproturon (by GC/GCMS)
- **PAHs in water, food and biological samples**
    - Naphthalene, Acenaphthaylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)Pyrene, Indeno(1,2,3-cd)Pyrene, Dibenz(a,h)anthracene, Benzo(ghi)pyrelene (by HPLC)
- Scanning of spectra and kinetics on spectrophotometer and spectrofluorometer
- Measurement of beta counts on scintillation counter
- Analysis of total organic carbon (TOC) in water/effluents

D. Environmental Monitoring and Impact Assessment

- Environmental impact assessment (EIA) and environmental management plan (EMP)
- Particle size analysis
- Stack/process emission evaluation and environmental audit
- Ambient air quality monitoring
- Physical and chemical characterization of soil
- Evaluation of work environment (Industrial hygiene) Industrial, community and traffic noise

- Micro meteorology
- **Fibre Toxicology**
  - Monitoring of asbestos in air, water and industrial sludge

E. Water Quality Assessment and Monitoring

- **Drinking water (as per IS10500)**
  - Physicochemical test (total 24 parameters) Colour, odour, turbidity, specific conductivity, total solids, dissolved solids, suspended solids, pH, COD, silicates as SiO2, phosphates as P, phenolic compounds, total nitrogen as N, ammonical nitrogen as NH3-N, total hardness as CaCO3, calcium hardness as CaCO3, magnesium hardness as CaCO3, chloride as Cl- sulphate as SO4--, nitrate as NO3-N, fluoride as F-, free residual chlorine, total alkalinity as CaCO3, phenoptheline as CaCO3
  - Analysis of metals Cadmium, Chromium, Iron, Nickel, Copper, Lead, Arsenic, Mercury, Calcium, Magnesium, Manganese, Zinc, Selenium, Boron.
  - Pesticides (organochlorine or organophosphates)
  - Bacteriological test: Total and fecal coliform (pathogenic bacteria detection on request)
- **Raw water (sewage/industrial effluents) as per Pollution Board**
  - Physicochemical test (total 24 parameters) Colour, odour, suspended solids, total solids, dissolved solids, specific conductivity, oil and grease, pH, BOD, COD, volatile solids, fixed solids, total nitrogen as N, chloride as Cl- sulphate as SO4--, nitrate as N, phenolic compounds as phenol, fluoride, cyanide, phosphates as P, free residual chlorine, ammonical nitrogen, sulphide as S--, tannin and lignin
  - Bacteriological test: Total and fecal coliform
  - Analysis of metals Cadmium, Chromium, Iron, Nickel, Copper, Lead, Arsenic, Mercury, Selenium
  - Pesticides (organochlorine and organophosphates)

F. Epidemiological Studies

- Environmental health studies
- Occupational health studies in organized and unorganized industries
- Human data generation for safety evaluation
- Disease burden studies
- Qualitative and quantitative review of epidemiological data
- Workplace monitoring for noise, dust, temperature, radiant heat etc.
- Monitoring of toxicants in blood, hair, urine etc. of exposed subjects

G. Environmental Monitoring and Impact Assessment

- **Multi species tests for ecotoxicity evaluation**
  - Bioassay test for acute toxicity to fresh water fish
  - 21 days prolonged toxicity in fish
  - Acute toxicity in algae (algae growth inhibition test)
  - Acute immobilization toxicity test in Daphnia
  - Daphnia reproduction test (chronic toxicity)

        - Acute toxicity in earthworms
    - Seed germination test Environmentally safe reuse of effluents for agriculture and aquaculture
    - Safety evaluation and management of industrial solid wastes