



Mukesh Kumar Singh, Scientist(OPCW)

E-mail: mukesh.singh.ipft@ipft.gov.in;

mukeshsinghacpmd@yahoo.co.in

Google Scholar link:

https://scholar.google.com/citations?view_op=list_works&hl=en&user=kiehSeYAAAAJ

Academic background

Education:

- Intermediate, 1999 (BIEC Patna), First Class (67% Marks)
- B.Sc (Honours) Chemistry 2002, (LNMU Darbhanga) First Class, (65% Marks)
- M.Sc. Agrochemical & Pest Management, 2007 (Delhi University), First Class (60% Marks)
- Ph.D (Chemistry) Reg. 2023 (Delhi Technological University, Delhi) Pursuing

Professional:

- Scientist, Organization for the Prohibition of Chemical Weapons (OPCW) at Institute of Pesticide Formulation Technology, Gurugram, Department of Chemicals & Petro-Chemicals, Ministry of Chemicals and Fertilizers, Government of India, from 2nd March 2012 to till date.
- Worked as a Research Associate (RA) in Ministry of Agriculture and Corporation funded project entitled "Monitoring of pesticide residue at a national level" at Division of Agricultural Chemicals, Indian Agricultural Research Institute, New Delhi, India from 12th August 2011 to 1st March 2012.
- Worked as a Senior Research Fellow (SRF) in Ministry of Chemicals and Fertilizer sponsored project entitled "Studies on pesticide formulation from Basil and Turmeric oil for household and Agricultural purposes" at Institute of Pesticide Formulation Technology, Gurugram, Haryana, India from 11th June 2010 to 11th Aug 2011
- Worked as a Junior Research Fellow (JRF) in DBT funded project entitled "Chemo-enzymatic synthesis of environmental friendly amphiphilic co-polymer for the crop protection" at Division of Agricultural Chemicals, Indian Agricultural Research Institute, New Delhi, India from 2nd Feb 09 to 14th May 2010
- Worked as an R&D Scientific Officer (Organic Synthesis and Analytical Development) at Bharat Rasayan Limited, 2 km, Stone, Madina Mokhra Road, Mokhra, Maham (Rohtak, Haryana) India from 13th August 2007 to 31st December 2008.
- Teaching experience in Post graduate diploma in analytical chemistry programme (PGDAC) as an Academic Counselor at IGNOU from March 2015 to December 2019

Research Interests

My research work is directed at understanding the Chemical Warfare Agents their degradation products and precursor, their chemistry for identification by different instrumental techniques. To be dream a smallest micro element in the OPCW's mission is to implement the provisions of the Chemical Weapons Convention to achieve our vision of a world free of chemical weapons and the threat

of their use, and in which chemistry is used for peace, progress, and prosperity

Pesticides play a great importance in the Agriculture, and household uses with several advantages and disadvantages to environment and human health. The analysis in technical and their different type's formulations, residue analysis and their impurities to regulate for safe and judicious use of pesticide and promotion of bio botanical pesticide as a futuristic alternative of chemical pesticides.

We build concepts on the basis of pesticides residual data obtained in our lab with a view to aware the public, government and at national level.

I devote my time in field of CWA analysis, pesticide and their residue analysis by various latest updated extraction and sophisticated instrumental techniques 'on different matrices' and 'in different matrices '.


I am having keen interest to develop the several instrumental method of analysis and their validation for pesticides, CWA as per standards guidelines and maintain the designation of the laboratory like NABL, OPCW, and GLP as per International quality system.

- OPCW PT sample preparation and Qualitative analysis of CWC related from different matrices like Soil, Water, Organic, metal sheet, sanitizer etc. using GC (NPD, FPD) and GC-MS and their report preparation.
- Synthesis of derivatives of CWC related chemicals via Silylation, Methylation and Thiolation
- Extraction of complicated sample matrix via silica SAX/SCX clean up procedure.
- Synthesis of precursors, degradation products and by products of scheduled chemical
- Identification and confirmation of compounds, mainly by gas , liquid chromatography and Gas chromatography - mass spectroscopy
- Study director, Deputy study director & study personnel in GLP in Analytical Division , IPFT
- Preparation of Technical SOP for the determination of pesticides physio -chemical parameters / Multiresidue analysis /A.I. content related as per OECD/CIPAC/WHO/FAO/SANTE guidelines.
- Preparation of technical SOP for the all minor and major equipment related to the study and their operation calibration and maintenance,
- Preparation of study plan, study schedule study report.
- Guide the scientists, research associates and other project staff of the division.
- Arrangement of Study related chemicals, glassware, equipment etc.
- Incorporate QA comments related to study plan and schedule and report in the study.
- Performing the study, recording the raw data sheet, calculation of results, preparation of study report and submission for final report and archive in GLP facility.

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- Deputy quality manager in NABL at Analytical Division, IPFT
 - Method development and validation for pesticide residue analysis by LC MS QTOF (HRMS),
 - Molecular mass determination and their probable structural determination by LC MS QTOF (HRMS) of unknown molecule.
 - Multi residue method development and validation of pesticides by TSQ Quantum Access LC MS/ MS
 - Internal calibration of UV, FTIR, GC, HPLC, GC MS, GC MS MS , LC MS MS, LC MS QTOF and others sophisticated major/minor equipment's.
 - Qualitative and quantitative analysis of pesticides formulation as well as Technical using GC, HPLC, FTIR, NMR, UV and Classical methods.
 - Multi Pesticide Residue analysis from Food, Grains, Vegetables, Soil, Water etc. using GC and GC-MS/MS and LC MS/MS.
 - Maintenance of Instruments and other assignment (calibration, testing, record maintenance) as per NABL/GLP requirement.
 - Participate in PT and ILC programme for the evaluation of laboratory quality assessment.
 - Generation of pesticides residues data of field trail crops samples from different Industry sponsored projects and their report preparation
 - Method development for the analysis of pesticides formulation, Technical, pesticide residues.
 - To provide training on qualitative and qualitative analysis of pesticides and their formulations to trainee from Indian pesticide industries and abroad.
 - To provide training on pesticide residue analysis to trainee from Indian pesticide Industries and abroad.
 - Developments of synthetic pesticide and Bio- pesticide conventional as well as new generation formulation (GEL, Microemulsion, Emulcifiable concentrate) and their Physio-chemical and Bio-efficacy studies.
 - Extraction, Isolation and Bio efficacy of plants extracts and their development of Nano-formulation/new generation formulation
 - Bio-efficacy evaluation (Antifungal), Seed coating & Encapsulation of bioactive molecules
 - Synthesis, isolation, purification and structural elucidation of organic compound by PREP HPLC-MS, LC-QTOF-MS, FTIR, NMR and UV.
 - Process development of Agrochemicals (tech), Intermediates and Pharmaceuticals Intermediates
 - To participate active members for execution of different training programme in or by our organisation.
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Some of the research highlights of our work as follows,

OPCW work:



- O-Alkyl ($\leq C10$, incl. cycloalkyl) alkyl (Me, Et, n-Pr or i-Pr)-phosphonofluoridates

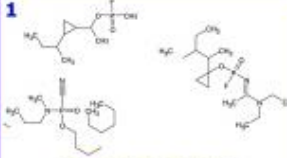
- O-Alkyl ($\leq C10$, incl. cycloalkyl) N,N-dialkyl (Me, Et, n-Pr or i-Pr) phosphoramidocyanidates

- O-alkyl (H or $\leq C10$, incl. cycloalkyl) N-(1-(dialkyl($\leq C10$, incl. cycloalkyl)amino)alkylidene (H or $\leq C10$, incl. cycloalkyl) phosphoramidofluoridates and corresponding alkylated or protonated salts

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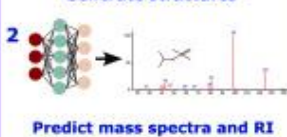
Millions of covered compounds

1



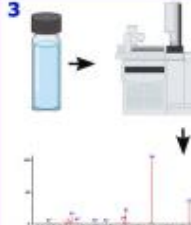
Generate structures

2



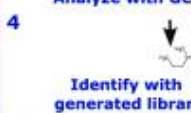
Predict mass spectra and RI

3



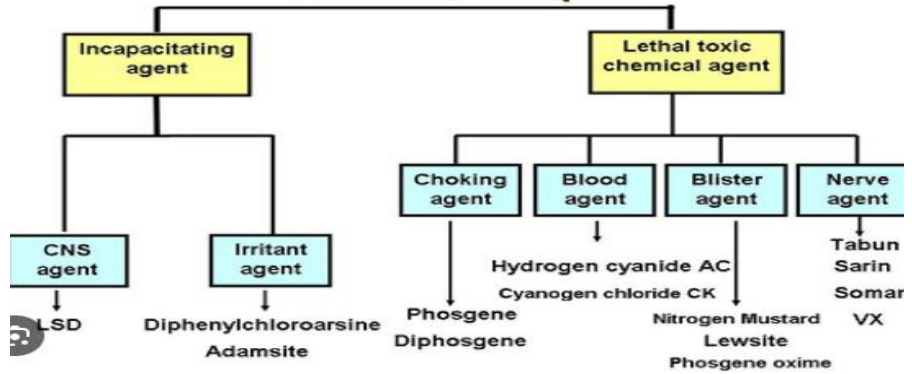
Analyze with GC-MS

4

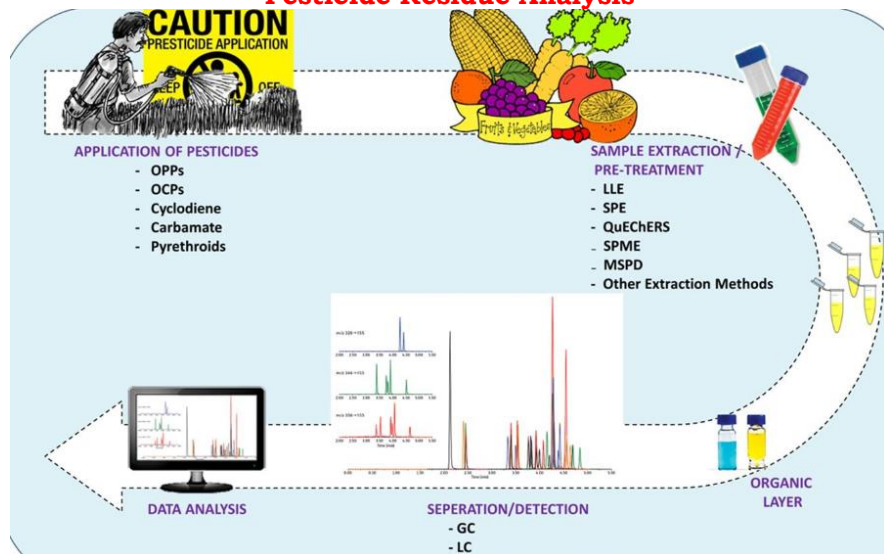


Identify with generated library

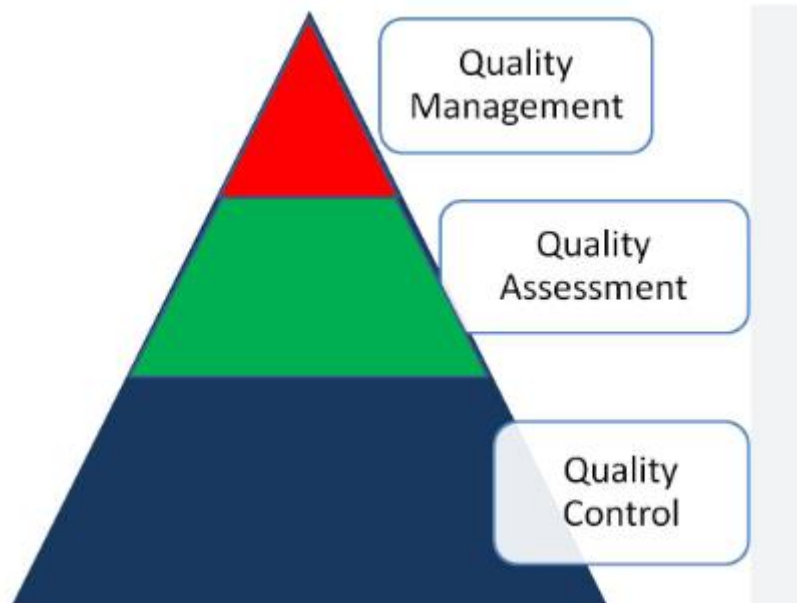
Chemical Weapon



Pesticide Residue Analysis



Laboratory Quality System



Selected publication

- N. A. Shakil, Manish K. Singh, Jitendra Kumar, M. Sathiyendiran, Gaurav Kumar, Mukesh K. Singh, Ravi Prakash Pandey, Alka Pandey, V. S. Parmar.(2010) Microwave synthesis and antifungal evaluations of some chalcones and their derived diaryl-cyclohexenones. Journal of Environment Science and Health, Part B, 45: 6, 524 - 530.
 - Jitendra kumar, Najam A. Shakil, Manish K. Singh, Pankaj, Mukesh K. Singh, Alka Pandey, Ravi P. Pandey.(2010)
-

Development of controlled release formulations of Azadirachtin-A employing poly (ethylene glycol) based amphiphilic co-polymers *Journal of Environment Science and Health, Part B*, 45: 4, 310 - 314.

- Najam A Shakil, Alka Pandey, Manish K. Singh, Jitendra Kumar, Satish K. Awasthi, Pankaj, Chitra Srivastava, Mukesh K. Singh and Ravi P. Pandey.(2010) Synthesis and bioefficacy evaluation of new 3-substituted-3,4-dihydro-1,3-benzoxazines. *Journal of Environmental Sciences and Health, Part B*, 45: 2, 108 - 115.
 - Najam Akhtar Shakil, Mukesh K. Singh, Alka Pandey, Jitendra Kumar, Pankaj, Virinder S. Parmar, Manish K. Singh, Ravi P. Pandey and Arthur C. Watterson. (2010) Development of Poly (ethylene glycol) based Amphiphilic copolymers for controlled release delivery of Carbofuran. *Journal of Macromol. Sci., Pure & Appl. Chem., Part A*, 47:3, 241 - 247.
 - Pankaj, Najam Akhtar Shakil, Jitendra Kumar, Mukesh K. Singh and Khajan Singh. (2012) Bioefficacy evaluation of controlled release formulations based on amphiphilic nanopolymer of carbofuran against *Meloidogyne incognita* infecting Tomato. *Journal of Environmental Sciences and Health, Part B*, 47:6, 520-528.
 - Prasant kaushik, Najam Akhtar Shakil, Jitendra kumar, Mukesh K. Singh, Manish K. Singh and Shiv kumar Yadav. (2012) Development of controlled release formulation of Thiram employing amphiphilic polymer and their bioefficacy evaluation in seed quality enhancement studies. *Journal of Environmental Sciences and Health Part B*, 48:8, 677-685.
 - L. K. Thakur, Sunita Roy, Rajmani Prajapati, Mukesh K. Singh S. K. Raza, B. D. Mangave, Alka Singh and Sanjay Jha. (2014) Development and evaluation of environmental user Friendly Turmeric oil Emulsifiable concentrate formulations for post harvest quality and life in Rose Cv. poison. *International Journal of Recent Scientific Research*, 5:1, 178-185.
 - L. K. Thakur, Sunita Roy, Rajmani Prajapati, Mukesh K. Singh, S. K. Raza. (2014) Development and evaluation of Basil oil Emulsifiable concentrate African *Journal of Science and Research*, 3:1, 06-09.
 - L .K. Thakur, Mukesh K. Singh, Kuldeep Ravivanshi, Savita Yadav, S. K. Raza. (2014) Solubilization of Eugenol and Methyl eugenol in single and mixed micellar solution and their evaluation. *Journal of Multidisciplinary Scientific Research*, 2: 4, 04-08.
 - K. K. Krishnani, V. Kathiravan, N. A. Shakil, Manish Kumar Singh, M. P. Brahmane, K. K. Meena, Biplab Sarkar, K. Choudhary, Mukesh Kumar Singh, Jitendra Kumar.(2015) Bactericidal activity of Nanopolymers against shrimp pathogenic bacterium *Vibrio harveyi*, *Proc. National Academy of Sciences India, Section B, Biological Science* .
 - Sudeep Mishra, Mahesh K Saini, M.K. Singh, S. Alam, L. K. Thakur, S. K. Raza, Shibendhu Mukharjee.(2015) Method development and validation for identification of 2-phenyl phenol in Ciapton 10L by GC -MS. *World Journal of Pharmacy and Pharmaceutical Sciences*, 4 : 12, 783-789.
 - Sudeep Mishra, Vinod Deotale, Mangesh Pandey, Mahesh K Saini, M.K. Singh, S. Alam , B. S. Sehrawat, L. K. Thakur,
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S.K.Raza.(2016) GC-MS Analysis of multiclass pesticide residue found in farmland water of Haryana districts, World Journal of Pharmaceutical Research, 5 :8 744-752.

- Sudeep Mishra, Vinod Deotale, Mahesh K Saini, M.K. Singh, Mangesh Pandey , S. Alam, L. K. Thakur, B. S. Sehrawat, S. K. Raza.(2017) Monitoring of multiclass pesticide residues in farmland soil from different district of Haryana by GC-MS. Agriculture Research Journal, 54 :1 47-52
 - Sudeep mishra, Neelam Richhariya, Akriti agarwal, Lalitesh k. Thakur, Mukesh k. Singh, Rachana Rani (2017) Method Validation for Determination of 23 Organophosphorus Pesticide Residues In Chilli By Gas Chromatography. World Journal of Pharmaceutical Research, 6:6 1183-1197.
 - Ranju Sharma, Arpana kumari, Ngangbam Sarat Singh, Mukesh Kumar Singh, Saurabh Dubey, Nusrat Iqbal, P.K.Patanjali (2019) Development and stability enhancement of neem oil based microemulsion formulation using botanical synergist, Journal of Molecular Liquids, 296, 112012.
 - Sudeep Mishra, Mukesh K Singh, Mahesh K Saini, Vikash, Samsul Alam, B S Sehrawat and Lalitesh K Thakur,(2019) Pesticide Residues in Vegetable, Soil and Water Samples Collected from Some Districts of Haryana, Agriculture Research Journal, 56 (2), 261-266.
 - Sudeep Mishra, Mahesh K Saini, Mukesh K Singh, Samsul Alam, Lalitesh K Thakur, Jitendra Kumar,(2021) Residual and health risk assessment of pesticides in commonly consumed vegetables of Panipat, Haryana, India International Journal of Pharm Tech Research, 14(1), 74-89.
 - Sudeep Mishra, Samsul Alam*, Mahesh Kumar Saini, Mukesh Kumar Singh, Akriti Agarwal and Lalitesh Kumar Thakur, Persistence behaviour of fipronil 80%WG on grapes. Agricultural Research Journal, PAU 58(2),340-343, April 2021
 - Sudeep Mishra, Mukesh K. Singh, Mahesh K. Saini, Mangesh A. Pande, Vinod D. Doetale, Samsul Alam, Vivek Ahluwalia, B. S. Sherawat, Lalitesh K. Thakur, Evaluation of Pesticide Residues in Vegetables from the Eight Districts of Haryana State (Northern India), International Journal of Agricultural Sciences and Veterinary Medicine 2021, Vol 9,28
 - Sudeep Mishra, Mahesh K Saini, Mukesh K Singh, Samsul Alam, Lalitesh K Thakur, Jitendra Kumar, Residual Contamination of Pesticides in Irrigation Water of Some of the Districts of Haryana, India, International Journal of Agricultural Sciences and Veterinary Medicine2022,10(1),1-7
 - Sudeep Mishra, Mahesh K Saini, Mukesh K Singh, Samsul Alam, Lalitesh K Thakur, Jitendra Kumar, "Monitoring of pesticide residue in soil samples from agricultural field of Haryana, India," , International Journal of Agricultural Sciences and Veterinary Medicine2022,10(2),1-7
 - Sudeep Mishra, Mukesh K Singh, Mahesh K Saini, Samsul Alam, Lalitesh K Thakur, Irani Mukherjee and Jitendra Kumar, Temporal Assessment of Crop Protection Agents in
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Water Bodies of Haryana Districts, Bhartiya Krishi Anusandhan Patrika, Vol. 38 (3), page 250-266.

- Sudeep Mishra, Vikash, Mukesh K Singh, Mahesh K Saini, Shubham Bansal, Vineet K Pandey, Ajay Singh, Samsul Alam, Irani Mukherjee, Lalitesh K Thakur and Jitendra Kumar, Dissipation of Azoxystrobin 23% SC residue in/on chilli fruits and soil, Agricultural Research Journal . 60(1), 74-79
- Smriti Kala, Cheatan K. D. Jawle, Mukesh Kr. Singh, Nisha Sogan, Himmat Singh, Gaurav Shukla, Amrish Agarwal, L.K. Thakur & Jitendra Kumar, Pomegranate Resembling Design of Starch Sago Beads Encapsulates Nanopyriproxyfen, Enabling Slow Release And Improved Bio-Activity, Applied Materials & Interfaces Journal of ACS Applied Materials and Interfaces (published online) 2023 Jan 11;15(1):1843-1858
- Smriti Kala, Nisha Sogan Cheatan Jawle, Santanu Bista , Deepak Kumar Hazra , Kusal Ray, Aparna nautyyal, Ajay singh Sengar, Mukesh Kr. Singh, Amrish Agarwal, L.K. Thakur & Jitendra Kumar , Waste And Biomass Volarization : Volarization of Grape Pomace Derived Bio-Pesticides via yeast Capsules Nano Carriers With Entomotoxic Potential (published online 02 May 2024)
- Poornima Saxena, Sudeep Mishra, Akriti Agarwal, Mukesh Kumar Singh, Smriti Kala, Ved Prakash Verma, Lalitesh Kumar Thakur Method Development and Validation in Water Matrix Employing Tandem Mass Spectrometry: Quantitative Analysis of 76 Multiclass Pesticides in Groundwater Samples Collected From Delhi NCR Region by Quechers Based Liquid-Liquid Extraction Method. International Journal for Multidisciplinary Research (IJFMR) Volume 6, Issue 1, 2024

**Awards / Honours
/ Affiliations**

- International Six months (1ST Sep 2017 - 28th Feb 2018) fellowship as a synthetic fellow at VERIFIN, Finland under the OPCW (Organization for the Prohibition of Chemical Weapon) fellowship programme 2017, The Hauge, the Netherland. Tittle-Synthesis of valine adduct of Nitrogen Mustard (NH-3)
 - First prize in poster presentation the 3rd International IUPAC Conference on Agrochemicals Protecting Crops, and Natural Environment 6th -9th April, 2016, New Delhi, India.
 - First prize in speech debate against corruption at IPFT Gurugram
 - 3rd Prize in Nibandh ,Lori, and other pratiyogita (4 times) at IPFT Gurugram
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