

## *Curriculum-Vitae*

### Personal

Dr. Manjeet Aggarwal, born on September 14, 1960, is a Ph.D in Analytical Chemistry

### ***Educational Qualification*** :

**2006** : Degree of Ph.D entitled “**Chromatographic and Spectroscopic Methods for the determination of residual contaminants in complex matrices of food, pharmaceuticals and textiles**”

**1984** : M.Sc, Analytical Chemistry, University of Liverpool, England

**1981** : B.Sc. General with Botany, Zoology, Chemistry and Physics; University of Delhi

**1978** : Higher Secondary ; Central Board of Secondary Education, India

### ***Professional Trainings***

**1988** –Three months advanced course in Computer Science from NIIT Delhi

**2005** – A two week Training course on “Functional Foods for ASEAN Countries” at Bandung , Indonesia organized by Indonesian Institute of Science (IIS) , LEMBAGA ILMU PENGETAHUAN INDONESIA (LIPI), Pusat Penelitian Kimia, Research Centre for Chemistry, Indonesia.

**2008** –Training on applications and trouble shooting of LC-MS/MS at VARIAN application Center in France

**2009** - Training on applications and trouble shooting of GC-MS AGILENT at application Center in Singapore

**2009** - Training on GLP for test facilities organized by National GLP Compliance Monitoring Authority, Department of Science and Technology

**Job Experience** : **29 Years**

**Positions held**

**Present Designation**

**January 2013 till date**

:Professor and Dean (Research), Head of the Deptt, Basic & Applied sciences, National Institute of Food Technology and Entrepreneurship management (NIFTEM). A deemed to be university (De-novo category) under section 3 of the UGC Act, 1956 and an autonomous institution under Ministry of Food Processing Industries, Kundli, Haryana

2011-2012

**Deputy Director**, Shriram Institute for Industrial Research, 19, University Road, Delhi 110007

2008-2011

**Sr. Assistant Director & Chief**, Shriram Institute for Industrial Research, Delhi

2004-2008

**Assistant Director & Chief**, Shriram Institute for Industrial Research, Delhi

1996-2004

**Senior Scientist**, Shriram Institute for Industrial Research, , Delhi

1994-1996

**Scientist**, Shriram Institute for Industrial Research, 19, University Road, Delhi

1990-1994

**Senior Research Assistant**, Shriram Institute for Industrial Research, Delhi

1985-1990

**Research Assistant**, Shriram Institute for Industrial Research, Delhi

## **Capabilities and Areas of Expertise**

### **I. Analytical Research and Analytical Sciences :**

**Specialization : Analytical chemistry, Bio-Analytical chemistry, Method development and Validation, Process up-gradation, Quality Inspection & Certification**

- ❖ Management of analytical facilities to support R&D, Quality and Accreditations
- ❖ Operation of state-of-the-art analytical instrumentation in the area of :
  - ◆ **Chromatography (GC, HPLC, IC, GC-MS, GC-MS/MS LC-MS/MS )** for :
    - Studies on macro- components, micro-components, residues and contaminants, identification of degradation products and residual impurities etc in various raw and processed foods, drugs and

pharmaceuticals, agrochemicals, functional foods, nutraceuticals, environmental matrices, packaging materials etc.

- Structure-Activity Co-relation
- ◆ **Thermal methods of analysis (TGA, DTA, DSC) for :**
  - Studies on Thermal behavior of materials
  - Quality certification of packaging materials
- ◆ **Atomic & Molecular Spectroscopy (UV-VIS, IR, AAS, AES, ICP-OES) for:**
  - Studies on compositional parameters of products and materials
  - Studies on the presence of trace metals present as nutrients and minerals in food & pharmaceutical products
  - Studies on presence of residues of toxic metals present in various products such as food, pharmaceuticals, herbal products, environment, textiles, packaging materials etc.
- ❖ .Analytical studies of various raw & processed food & farm products for the presence of toxicants, residual, contaminants, adulterants, nutritional labeling and other constituents.
- ❖ Shelf-life and stability studies and Enhancement of shelf–life of food and farm products, agro-chemicals, drugs and pharmaceuticals
- ❖ Studies on Sensory evaluation of food products and beverages
- ❖ Container compatibility studies and Studies for Food – Packaging Interactions
- ❖ Quality standardization of raw herbs & herbal formulations and identification of active phyto-constituents in herbal products
- ❖ New analytical method development and validation for different analytes present at both macro & micro levels in varied matrices of raw & processed food, Drugs & Pharmaceuticals, environment, materials, gasses and refineries etc.
- ❖ Environmental studies with respect to the presence of various residual pollutants and their analysis
- ❖ Quality control of Drugs & Pharmaceutical under various systems of medicine (IP, BP, USP & other international pharmacopoeias

## **II. Quality & Quality Systems**

**Specialization : Development of systems of accreditations, Management of Quality systems and continuous quality improvement systems**

- ❖ Up-gradation of Quality systems
- ❖ Quality management and accreditations as per ISO 9000, ISO/IEC17025, ISO14000
- ❖ Compliance to quality systems

### III. Teaching

- ❖ Invited regularly as a guest faculty by Universities and Institutes for delivering lectures on different aspects of Analytical Chemistry including state-of-art Instrumental analysis and Food safety & Health safety
- ❖ .Project co-ordinator and a senior faculty for conducting distant learning programme by Indira Gandhi National Open University for Post graduate Diploma in Food Safety & Quality Management for last five years
- ❖ As a regular faculty member for conducting training programmes and workshops on Food safety, Pharmaceutical analysis and Quality Systems (Details of training programmes conducted are given below)
- ❖ As a research co-guide to several research scholars for successful completion of their research degrees (Ph.D/ M.Tech) in the field of Analytical, Applied Chemistry, using state-of-the-art advanced analytical techniques.
- ❖ Invited for evaluation of Ph.D. Thesis and conducting viva-voce examination of Ph.D students by different Universities
- ❖ Teaching and Supervision of undergraduate classes in Chemistry at the Department of Chemistry & Bio-chemistry University of Liverpool, Liverpool, U.K.

### IV. **Setting up of Laboratories:**

**Specialization : Conceptualization, Designing, Setting up, Designing specifications for equipments, Evaluation of quotes, Establishing and making self-sustainable Center of Research**

Have been actively involved in:

- ❖ Setting up of Center of Excellence for Food safety and Health safety with state - of- art facilities at Shriram Institute
- ❖ Setting up of State-of- art Food testing Laboratory for MARKFED in Mohali
- ❖ Setting up of laboratory for studies on Petroleum Products and Water Analysis for Gas Authority of India Limited, Pata, U.P.
- ❖ Preparation of DPR for a food testing laboratory in Chindwara, Madhya Pradesh

### V. **Managerial**

**Specialization : Conflict management, Team building, Value addition and Value creation, Optimization of resource utilization, Mentoring**

#### **VI. Other**

- ◆ Development of Course Curriculum with various Universities for specialized courses such as Post graduate diploma and degree courses in food safety, B.Tech Food Technology, Post graduate diploma and Post graduate Degree courses in Analytical Chemistry
- ◆ Organization of Conferences, Workshops, Sensitization programmes and Capability building programmes

#### **Recognitions**

- ◆ Approved by Central Drug Control Authorities for Instrumental, Chemical and Microbiological Analysis of Drugs and Pharmaceuticals
- ◆ As an expert member on the board of several committees:
  - High Court for residual pesticides in fruits and vegetables in Delhi
  - Association of Analytical Chemists (AOAC), USA, for residual pesticides in Beverages
  - Study Director on the board of Association of Analytical Chemists (AOAC), USA, for new analytical method development and validation
  - Member on one of the committees on Food Safety and Standards Authority of India (FSSAI)
  - CODEX
- ◆ Regular reviewer of scientific papers for publication in peer reviewed scientific journals
- ◆ Member on the Board of Studies for various Institutes and Universities

#### **Awards :**

- ◆ Received the award for the best presentation during an International conference organized by Aligarh Muslim University in the area of Analytical Chemistry
- ◆ Academic Excellence Award by Director, Shriram Institute for Industrial Research, Delhi

#### **Publications :**

a) **Papers** : More than 15 research papers in addition to about 10 popular articles.

b) **Books authored** : 2

1. **“Chromatographic and Spectroscopic Methods for the determination of residual contaminants in complex matrices;** Published by Lambert Academic Publishers, Germany, 2010, ISBN : 9783838338743

2. **Training Manual on Water Quality Evaluation: Monitoring and Mapping**, An SRI Publication

c) **Books Co-Edited : 2**

1. Radiation Processing Technology Applications: Volume I, An SRI Publication ISBN No.978-81-910772-0-9
2. Radiation Processing Technology Applications: Volume II, An SRI Publication ISBN No. 978-81-910772-1-6

**Some International and National projects handled in the area of Food, Farm and Health care products:**

1. Effect of gamma radiation processing for enhancement of shelf life of raw herbs and herbal formulations
2. Effect of gamma radiation processing for enhancement of shelf life of bamboo shoots used for culinary purposes
3. Studies on macro and micro compositional parameters of transgenic and non-transgenic corn and corn meal
4. Identification and characterization of residual impurities and degradation products using state of art sensitive and hyphenated techniques (GC-MS, LC-MS/MS) in various Agrochemical technicals (About 32) for the purpose of five batch analysis
5. Analytical method development and validation for Multi-residues of pesticides in raw and processed food products: Milk and Dairy, Meat and Poultry, Fruits and Vegetables, Cereals and grains, using QUECHERS Technique followed by GC-MS and LC-MS-MS
6. Analytical method development and validation for Determination of Multi-residues of antibiotics and veterinary drugs in raw and processed food products of animal origin using LC-MS-MS
7. Analytical method development and validation for determination of Multi-residues of antibiotics and veterinary drugs in ground water and sludge in the areas in the vicinity of Hospitals
8. Determination of Multi-residues of pesticides in soft-drinks and other beverages using GC-MS and LC-MS-MS
9. Analytical method development for Multi-residues of banned dyes (Sudan I-VIII) in chillies, spices and different processed hot food products using LC-MS-MS
10. Analytical method development and validation for estimation of Benzo (a) pyrene in coal-tar pitch.

11. Analytical method development and validation for determination of Melamine in Milk, Dairy milk chocolates, Guar meal, Guar flakes, using GC-MS
12. Determination of Buprofezin residues in various foods using GC-MS
13. LC-MS-MS method for determination of cordycepin content in medicinal mushrooms
14. Validation studies for the packaged drinking water fortified with mineral nutrients: Chromium (as Chromium 454), Boron (as Fruitex B) and Copper (as Nutribond)
15. Studies for the presence of allopregnanolone (hormone) in blood and serum using LC-MS-MS after HPLC column clean up
16. Development and validation of HPTLC method for residues of Estradiol and Progesterone in polio vaccines
17. Investigation for the cause of mass mortality of Gharials in National Chambal Sanctuary
18. Studies on Persistence of Boom Flower 20% EW (A Nitrobenzene emulsion in water formulation) in Tomatoes (crop), Soil and Water
19. Residual determination of total hydrocarbons using head-space GC in fish from river water to estimate the level of water pollution and its bio-accumulative effect on the food chain
20. Residual determination of heavy metals by ICP in fish from river water to estimate the level of water pollution and its bio-accumulative effect on the food chain
21. Multi-element analysis of toxic metals in food and farm products including beverages using ICP-OES
22. Method for determination of residues of Persistent Organic Pollutants (POPs) in air, water and food products using GC-MS
23. Residues of Poly-aromatic hydrocarbons and Polychlorinated biphenyls in air, water and food products using GC-MS
24. Method for Chromatographic determination of Pentachlorophenol used as preservative in leather and textiles by GC
25. Method for determination of Brominated Vegetable Oil in cloudy Carbonated beverages by HPLC
26. Method for determination of adulteration of Argemone in mustard by HPLC
27. Simultaneous determination of multi-vitamins in herbal drinks using HPLC

28. Residual determination of Vinyl Chloride monomer in packaging materials using head- space GC
29. Bio-availability studies for various drug molecules in blood and serum using sensitive and hyphenated chromatographic techniques
30. Analytical method development for determination of multi – nucleotides in infant milk formulae by HPLC

### **Some of the Papers Presented during International and National Conferences and Workshops**

1. **“Chromatographic Methods for Analysis and Quality Control of Additives in Foods and Plastics”**. Paper presented in the Seminar on Additives and Packaging Material for Food Products in Delhi in March, 1987 by The Indian Institute of Chemical Engineers.
2. **“Solid Phase Extraction of Water Soluble Vitamins from Multivitamin Syrups Prior to their determination by HPLC”**, Paper presented at the Indian Pharmaceutical Congress held at Madras in December 1987.
3. **Assay of Ranitidine HCl and Impurities by HPLC** in pharmaceutical formulations and body fluids” Paper presented at the Indian Pharmaceutical Congress 1988 held in Calcutta.
4. **“Quantitative Determination of Anthelmintic Levamisole in Pharmaceutical Formulations and Plasma by RP-HPLC”**, Paper presented in the Symposium organised by the Indian Association of Analytical Chemists at Madras in December 1989.
5. **“Residual Determination of Pentachlorophenol – An anti-termite agent using Gas Chromatography”** Paper presented at the 1<sup>st</sup> International Symposium organised by Muslim Aligarh University at Aligarh in March 1996. (Awarded the best presentation award)
6. **“Instrumental Methods of Analysis for quality of functional foods”**, paper presented during Training course on “Functional Foods for ASEAN Countries” from November 22 –December 4, 2004 at Bandung , Indonesia organized by Indonesia Institute of Science (IIS) , LEMBAGA ILMU PENGETAHUAN INDONESIA (LIPI), Pusat Penelitian Kimia, Research Centre for Chemistry, Indonesia.



7. **“Country Report on Status of Functional Foods in India”**, paper presented during Training course on “Functional Foods for ASEAN Countries” from November 22 –December 4, 2004 at Bandung , Indonesia organized by Indonesia Institute of Science (IIS) , LEMBAGA ILMU PENGETAHUAN INDONESIA (LIPI), Pusat Penelitian Kimia, Research Centre for Chemistry, Indonesia.
8. **“Quality Aspects of Pickles and Murabba”**, paper presented during National Seminar on Achar and Murabba organised by National News Services held on April 4, 2004 at Pragati Maidan, New Delhi.
9. **“Quality Control Aspects of Milk and Milk Products”**, paper presented during National Seminar on “Milk and Milk Products” organised by National News Services on September 5, 2004 at FICCI Auditorium, New Delhi.
10. **“Quality Issues of Spices: Challenges for Exports”**, paper presented during 2<sup>nd</sup> National Seminar on “Spices and Herbs” Organised by National News Services on December 19, 2004 at FICCI Auditorium, , New Delhi.
11. **“Presence of Steroids in Ayurvedic Products; Scenario as on today”** paper presented at an International Conference organised by Banaras Hindu University in September, 2005.
12. **“Challenges and Opportunities for Indian Herbal Industry”**, paper presented at International Conference of ISAH, organized by Banaras Hindu University, September, 2005.
13. **“Critical Issues related to Residues in Processed Food”**, paper presented at the National Seminar on Challenges for Processed Food Industry organised by Indian Food processors Association at India International Centre, New Delhi on December 18, 2005.
14. **“Quality Standardization of Herbo-Metallic Preparations”**, paper presented at the National Consultation on “Herbo-Metallic Preparations of Indian Systems of Medicines; Safety & Quality Standardization” held at INSA, New Delhi on March 3-4, 2006 Organized by Shriram Institute for Institute for Industrial Research in collaboration with DST, Department of AYUSH and Department of Biotechnology.
15. **“Challenges in Herbo-Metallics Preparations; Need for Concerted Action Plan”**, paper presented at the National Consultation on “Herbo-Metallic Preparations

in Indian Systems of Medicines; Safety & Quality Standardization” held at INSA, New Delhi on March 3-4, 2006 Organised by Shriram Institute for Institute for Industrial Research in collaboration with DST, Department of AYUSH and Department of Biotechnology.

16. **“Emerging Rapid Analytical Techniques for Food Analysis and Testing”**, presented during a conference on ‘Food Safety & Quality – Future directions’, organized by Confederation of Indian Industries in March, 07.
17. **“Challenges in Environmental safety of surfactants”** paper presented during a seminar on surfactants: Recent Developments and Applications organized by Indian Institute of Chemical Engineers on 10-11 August, 2007.
18. **“Effects of gamma irradiation processing on Raw Herbs and Herbal formulations”**, paper presented at the National Symposium on Radiation processing of foods, food products & feeds, organized by Bhaba Atomic Research Center(BARC) in Hyderabad.in October 2008
19. **Method development for the determination of Aflatoxins in food in Asia; Use of comparative techniques to take care of nuances involved** : Paper presented during a SELAMAT (Safety enhancement of edible products, Legislation analysis and management with AAA countries by mutual training & research) Conference on Risk Assessment and Risk management of Aflatoxins for food safety held in Ghana during May 2008
20. **"Food safety parameters and analytical challenges involved in ascertaining food safety risks"** paper presented during Go GLOBAL seminar (an EU FP7 project ) held at Delhi during November 2008 and organized by Shriram Institute for Industrial Research
21. **"Residues in Food and their determination"**, paper presented at Bhaskaracharya College (University of Delhi) during a workshop on Food safety during August, 2008
22. **"Quality control aspects of Meat and poultry"** paper presented at the ILDEX (International Livestock and Dairy Expo) India 2008 seminar at Pragati Maidan, New Delhi from 22-24 August 2008
23. **'Seabuckthorn:A wonder plant for Environment protection; Certain remarkable facts'**; paper presented at the National conference on Seabuckthorn and Environment: High Altitude Perspectives from 25-27, September 2009 at DIHAR,Leh

24. "Quality control of pulses and their salient features" paper presented during a workshop on Identification and quality control of pulses; organized by DRDO, Delhi

### Research Publications, Chapters in Books and Articles

1. Manjeet Aggarwal, R.K. Khandal “**Quality evaluation of Wheat and Wheat flour**” **Indian Miller**, Vol. XXXII, Jan.-Feb. 2002, No. 4.
2. Sapna Kaushik, Rajesh K. Raina, Manjeet Aggarwal & R.K. Khandal, “**Study on Techniques for estimation of Benzo(a)pyrene in coal tar pitch**, Analytical Chemistry, Volume 3, Issue 2, 3, October 2006.
3. A. Tyagi, T.Sharma, M. Singh, K.Fatima, V.S. Rawat, Manjeet Aggarwal and R.K. Khandal, “**Studies on Deltamethrin treated Mosquito nets**” E Journal of Chemistry, Volume 7 (2010), S1. 315-322
4. Indrajeet Sen, Monica Singh, V. S. Rawat, Manjeet Aggarwal & R. K. Khandal, “**Simultaneous Gas Chromatographic determination of Lindane and Carbaryl in combined Agrochemical Formulations**, Pestology, , Volume 8 (2011), Issue 1, 391-399
5. Geeta Mathur, Sangeeta Sharma, Manjeet Aggarwal and R.K. Khandal, “**Fortified Foods: Challenges & Opportunities**” Food and Beverage News, May 1-15, 2012
6. Smita, Radhika Sharma, Manjeet Aggarwal and R.K. Khandal,” **Packaging Foods in India: Challenges & Opportunities**, Food and Beverage News, April 1-15, 2012
7. Smriti Sharma, Rajvally Prem, V.S. Rawat, Manjeet Aggarwal and R.K. Khandal, “**Food Safety Issues Related to Residues and Contaminants: Emerging Scenario in India**” Food and Beverage News, December 16-31, 2011
8. Rachna Joshi, Abhishek Chauhan, Pankaj Goel, Manjeet Aggarwal and R.K. Khandal, “**Radiation processing technology: A boon for food processing sector**” , Food and Beverage News, March 1-15, 2012

9. Premlata Kumari, Naresh Sharma, Meenakshi Dahiya, V.S. Rawat, Manjeet Aggarwal and R.K. Khandal, “**Analytical determination of Niacin in corn: A case study to show advantages of LC-MS/MS**”
10. Vishal Diwan, Ashok J. Tamhankar, , Shanta Sen, Manjeet Aggarwal, R.K. Khandal and Cecilia Stalsby Lundborg, “ **Detection of antibiotics in hospital effluents in India**” Current Science, 2009, Vol. 97, No.12, pp 1752-1754
11. Vishal Diwan, Ashok J. Tamhankar, R.K. Khandal, Shanta Sen, Manjeet Aggarwal, Yogyata Marothi, Rama V Iyer, Karin Sundblad-Tonderski and Cecilia Stalsby Lundborg, “**Antibiotics and antibiotic resistant bacteria in water associated with a hospital in Ujjain, India**” BHC Public Health 2010,10:414
12. Manjeet Aggarwal, R.K. Khandal; **Quality of drugs and pharmaceuticals**, Medical Buyer, 10, 2, February 2012
13. Mithilesh Rajput, Meenakshi Dahiya, Premlata Kumari, Kamini Kalra, Manjeet Aggarwal and R. K. Khandal, **Method development and validation for determination of voglibose content in tablet formulation using LC-MS-MS technique**, E-Journal of Chemistry, Volume 8 (2011), Issue 4
14. **Instrumentation in Food Analysis**, Manjeet Aggarwal, R.K,Khandal, Chapter published in Course material for Post graduate diploma course in Food Safety and Quality Management by IGNOU
15. **Physical and Chemical Analysis of Food**, Manjeet Aggarwal, R.K,Khandal, Chapter published in Course material for Post graduate diploma course in Food Safety and Quality Management by IGNOU
16. **Sensory evaluation of Food products**, Manjeet Aggarwal, R.K,Khandal, Chapter published in Course material for Post graduate diploma course in Food Safety and Quality Management by IGNOU
17. **Chemical Analysis and Quality Assurance, A laboratory Manual** for Post graduate diploma course in Food Safety and Quality Management by IGNOU
18. Indrajeet Sen, Monica Singh, Ajay Kumar Shandil, V. S. Srivastava, Manjeet Aggarwal & R. K. Khandal, ‘**Studies related to the quality of chlorpyrifos 20EC formulation**’, Pestology, 33, 1, 2009

19. **“Radiation processing technology for eliminating mycotoxins in food and feed”**; Neelima Garg, Manjeet Aggarwal, R.K. Khandal, Radiation Processing Technology Applications: Vol I, A SRI Publication
20. **“Effect of  $\gamma$ -radiation on enhancement of shelf life of herbal products”** ; Manjeet Aggarwal, Pradeep Sharma, R.K. Khandal; **Radiation Processing Technology Applications: Vol I, A SRI Publication**
21. **“Gamma irradiation of dehydrated carrots : A case study”** ; Radiation Processing Technology Applications: Vol I, A SRI Publication
22. **“Degradation of persistent organic pollutants (POPs) by gamma irradiation : A case study on removal of PCBs from petroleum oils’**; R.K. Singh, Manjeet Aggarwal, R.K. Khandal; Radiation Processing Technology Applications: Vol I, A SRI Publication
23. Meenakshi Dahiya, Shanta Sen, Kiran Lamba, Manjeet Aggarwal, R.K.Khandal; **“Quantitative determination of Ivermectin in raw milk using positive ESI LC/MS-MS”**; E-Journal of Chemistry, Volume 7 (2010), S1, Pages S267-S277;doi:10.1155/2010/249542
24. Mithlesh Rajput, Vinay Kumar Jain, Dharam pal Jain, Manjeet Aggarwal and Rakesh Kumar Khandal; **“Quantitative determination of Boron content in Tamsulosin hydrochloride using Inductively Coupled Plasma Optical Emission Spectroscopy”**; International Journal of Pharmacy and Pharmaceutical Sciences, Issn- 0975-1491 Vol 2, Issue 4, 2010
25. Khandal Dhriti, Geetha Seshadhri, A. Manjeet, R.K.Khandal, **“Water quality issues needing technological interventions: Sustainable availability for all”**Water and Health, DOI:10.1007/978-81-322-1029-0\_20, Springer India, 2014

## Contact Details

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