

## Research Areas

1. Interpretation of spectroscopic and LC-MS data for characterization of unknown and known impurities or degradation products in drug substances.
2. Development and of RP-HPLC Stability-indicating Assay Methods for drugs.
3. Stability testing of herbal drugs.

**Industrial Research Experience** 2 years (Research Executive in Analytical, Formulation Research and Development and Documentation for two years during Sept. 1998 to Sept. 2000 in Panacea Biotec Ltd., Lalru, Punjab).

**Total Research Experience** 19 years

**Teaching Experience** 17 years

## Research Projects

1. UGC (2010-2013, Title: ICH prescribed forced degradation studies on drugs for rheumatoid arthritis for development of impurity standards. Completed, Total grant ₹ 8.71 lacs)
2. CSIR (2013-2016, Title: Development of anticancer drugs from *Nyctanthes arbotristis* and *Teminallia bellerica* and their chemoprofiling and stability studies by use of art of instrumentation. In progress, Total grant ₹ 19.2 lacs)
3. AICTE (2014-2017, Title: Forced degradation studies on anthracycline derived anticancer drugs: Development of impurity standards and stability-indicating assay methods In progress, Total grant ₹ 19.9 lacs)

## Patents

1. Dhvanit I. Shah, Navneet Kaur, Yogita Bansal, **Gulshan Bansal** and Manjeet Singh. Synthesis of benzimidazole derivatives as angiotensin II receptor antagonists. *Indian Patent No.* 269611
2. Dhvanit I. Shah, Gagandeep Kaur, Sarabjot Singh, Parikshit R. Java, **Gulshan Bansal**, Nirmal Singh, Dimple Chopra, Manjeet Singh. Statin loaded brain permeable nanoparticles and method of preparation. *Indian Patent No.* 286818, Grant Date 30.08.2017, Application No. 87/DEL/2007, Date of Filing 12/01/2007.
3. Dhvanit I. Shah, Gagandeep Kaur, Arun Chaudhary, Parikshit R. Java, **Gulshan Bansal**, Nirmal Singh, Dimple Chopra, Manjeet Singh. Rosiglatzone loaded brain permeable nanoparticles and method of preparation. *Indian Patent No.* 286815, Grant Date 30.08.2017, Application No. 86/DEL/2007, Date of Filing 12/01/2007.

## Book Chapters

1. Parul Grover, Shashank Kumar Singh, **Gulshan Kumar Bansal**. Phytochemical investigations and systematic exploration of anticancer potential of leaves of *Terminalia bellerica*. In *Promotion and Globalisation of Indian Herbal Products*, Ed M. Garg, LAP LAMBERT Academic Publishing, Germany, 2014, pp 13-21 (ISBN: 978-3-659-59033-7)
2. **Gulshan Bansal**, Nancy. Role of biotechnology in improving shelf life of herbal drugs. In *Biotechnology in Medicine and Herbal Drug Development*, Eds P. Bansal and S N Das, Basera Verlag, Germany, 2014, pp 248-262 (ISBN: 978-81-92064-0-4)
3. **Gulshan Bansal**, Jasmeen Kaur, Yogita Bansal. Shelf life assessment and clinical trials of herbal drugs: Pre-requisites, challenges and perspectives. In *Potentials and Bottlenecks in Clinical Trials of Herbal Drugs*. Eds P. Bansal and S. Eswara Reddy, Gulab Publishers, India, 2015, pp 97-119 (ISBN: 978-81-920643-9-0)

## Publications

1. Gulshan Bansal, Ishtdeep Kaur, Jasmeen Kaur. Herbal health products quality through stability studies: A global regulatory concern. *Applied Clinical Research, Clinical Trials, and Regulatory Affairs*. 2017, 4(1), 26-35.
2. Renu Chadha, Alka Bali, Gulshan Bansal. Bioanalytical method validation for dronedarone and duloxetine in blood serum. *Journal of AOAC International*. 2017, 100(1), 45-50.
3. Jasmeen Kaur, Yogita Bansal, Gulshan Bansal. Understanding unconventional routes to impurities from drugs in hydrolytic conditions. *Indian Journal of Pharmaceutical Education and Research*, 2016, 50(3s), S161-S190.
4. Ishtdeep Kaur, Nancy Suthar, Jasmeen Kaur, Yogita Bansal, Gulshan Bansal. Accelerated stability studies on dried extracts of *Centella asiatica* through chemical, HPLC, HPTLC, and biological activity analyses. *Journal of Evidence-based Complimentary & Alternative Medicine*. 2016, 21(4), NP127-NP137.

5. Gulshan Bansal, Nancy Suthar, Jasmeen Kaur, Astha Jain. Stability testing of herbal drugs: Challenges, regulatory compliance and perspectives. *Phytotherapy Research*, 2016, 30, 1046-1048. (IF: 3.15) <sup>1099-1573</sup>
6. Shagoon Tabin, R.C. Gupta, Gulshan Bansal, Azra. N. Kamili. Comparative HPLC analysis of emodin, aloe emodin and rhein in *Rheum emodi* of wild and in vitro raised plants. *Journal of Pharmacognosy and Phytochemistry*, 2016, 5(2), 121-130.
7. Sandeep Singh Sahota, Jaswinder Singh, Gulshan Bansal, Rakesh Kumar Garg. Extraction and analysis of ketamine (a rave drug) from spiked fruit juices using MEPS-MS for forensic purposes. *Current Science*, 2016, 110(6), 1059-1062.
8. Renu Chadha, Alka Bali, Gulshan Bansal. Characterization of stress degradation products of duloxetine hydrochloride employing LC-UV/PDA and LC-MS/TOF studies. *Journal of Pharmaceutical and Biomedical Analysis*, 2016, 121, 39-55.
9. Dhiraj Kaushik, Jasmeen Kaur, Vaneet Paul Kaur, Balraj Saini, Yogita Bansal, Gulshan Bansal. Forced degradation, LC-UV, MS<sup>n</sup> and LC-MS-TOF studies on azilsartan: Identification of a known and three new degradation impurities. *Journal of Pharmaceutical and Biomedical Analysis*, 2016, 120, 202-211.
10. Renu Chadha, Alka Bali, Gulshan Bansal. Identification and characterization of stress degradation products of dronedarone hydrochloride employing LC-UV/PDA, LC-MS/TOF and MS<sup>n</sup> studies. *Journal of Pharmaceutical and Biomedical Analysis*, 2016, 118, 139-148.
11. Nancy, Yogita Bansal, Gulshan Bansal. HPLC-UV/FD methods for scopoletin and asiatic acid: Development, validation and application in WHO recommended stability testing of herbal drug products. *Biochemistry & Analytical Biochemistry*, 2015, 4(4), 1000207.
12. Dheeraj Kaushik, Balraj Saini and Gulshan Bansal. Identification of four new degradation products of epirubicin through forced degradation, LC-UV, MS<sup>n</sup> and LC-MS-TOF studies. *Journal of Chromatographic Science*, 2015, 53(10), 1737-1748. (IF: 1.32)
13. Dheeraj Kaushik and Gulshan Bansal. Four new degradation products of doxorubicin: An application of forced degradation study and hyphenated chromatographic techniques. *Journal of Pharmaceutical Analysis*, 2015, 5(5), 285-295. (IF: 0.72)
14. Bharat Bhushan, Satish Sardana, Gulshan Bansal. Anti-diabetic potentials of *Clerodendrum inerme*, *Jasminum mesnyi* Hance and *Callistemon citrinus* on nicotinamide-streptozotocin induced type 2 diabetic rats. *International Journal of Phytomedicine*, 2015, 7, 136-141
15. Parul Grover, Shashank Kumar Singh, K.A. Suri, Gulshan Bansal. Phytochemical investigations and systematic exploration of anticancer potential of leaves of *Nyctanthes arbortristis*. *Medicinal Plants. An International Journal of Phytomedicine and Related Industries*, 2015, 7(3), 227-232.
16. Parul Grover, KA Suri, Gulshan Bansal. A comprehensive review on *Nyctanthes arbortristis*. *International Journal of Drug Development and Research*, 2015; 7(1): 183-193.
17. Manjinder Kaur, Swarandeep Kohli, Sonali Sandhu, Yogita Bansal, Gulshan Bansal. Coumarin: A promising scaffold for anticancer agents. *Anti-Cancer Agents in Medicinal Chemistry*, 2015, 15(8), 1032-1048. DOI: [10.2174/1871520615666150101125503](https://doi.org/10.2174/1871520615666150101125503) (IF: 2.47).
18. Balraj Saini, Gulshan Bansal. Isolation and characterization of a degradation product in leflunomide and a validated selective stability-indicating HPLC-UV method for their quantification. *Journal of Pharmaceutical Analysis*, 2015, 5(3), 207-212.
19. Bharat Bhushan, Satish Sardana, Gulshan Bansal. Phytochemical and pharmacognostical studies of leaves of *Jasminum mesnyi* Hance. *Journal of Chemical and Pharmaceutical Research* (2015) 7(4), 922-926.
20. Bharat Bhushan, Satish Sardana, Gulshan Bansal. Phytochemical and pharmacognostical studies of leaves of *Clerodendrum inerme*. *Der Pharmacia Lettre* (2015) 7(4), 157-161
21. Narinder Kumar, Balraj Saini, Gulshan Bansal. Validated recovery and HPLC methods for quantification of mirtazapine in human whole blood. *The Pharmacos* (2014) 39, 47-51.
22. Bharat Bhushan, Satish Sardana, Gulshan Bansal. Acute and sub-acute toxicity study of *Clerodendrum inerme*, *Jasminum mesnyi* Hance and *Callistemon citrinus*. *Journal of Acute Disease*, 2014, 3(4), 324-327. ISSN: 2221-6189
23. Sonali Sandhu, Yogita Bansal, Om Silakari, Gulshan Bansal. Coumarin hybrids as novel therapeutic agents. *Bioorganic & Medicinal Chemistry*, 2014, 22(15), 3806-3814.
24. Radha Krishan Arora, Navneet Kaur, Yogita Bansal, Gulshan Bansal. Novel coumarin-benzimidazole derivatives as antioxidants and safer anti-inflammatory agents. *Acta Pharmaceutica Sinica B* 2014, 4(5), 368-375. DOI: 10.1016/j.apsb.2014.07.001

25. Balraj Saini and Gulshan Bansal. Degradation study on sulfasalazine and a validated HPLC-UV method for its stability testing. *Scientia Pharmaceutica*, 2014, 82, 295-306. DOI /10.3797/scipharm.1311-15, [\*\(IF: 1.2\)\*](#).
26. Neeraj Kumar, Shishu Goindi and Gulshan Bansal. Physicochemical evaluation and in vitro release studies on itraconazolium sulfate salt. *Asian Journal of Pharmaceutical Sciences*, 2014, 9, 8-16; DOI 10.1016/j.ajps.2013.12.003. [\*\(IF: 0.284\)\*](#).
27. Gurmeet Singh, Yogita bansal, Gulshan Bansal and Rajesh Kumar Goel. Design, synthesis and PASS assisted evaluation of novel 2-substituted benzimidazole derivatives as potent anthelmintics. *Medicinal Chemistry*, 2014, *10(4)*, 418-425.
28. Neeraj Kumar, Shishu, Rohit Bansal and Gulshan Bansal. Evaluation of compatibility of itraconazole with excipients used to develop vesicular colloidal carriers. *Journal of Thermal analysis and Calorimetry*, 2014, 115, 2415–2422; DOI 10.1007/s10973-013-3326-6 [\*\(IF: 1.982\)\*](#)
29. Neeraj Kumar, Shishu Goindi, Balraj Saini and Gulshan Bansal. Thermal characterization and compatibility studies of itraconazole and excipients for development of solid lipid nanoparticles. *Journal of Thermal analysis and Calorimetry*, 2014, 115, 2375–2383; DOI 10.1007/s10973-013-3237-6 [\*\(IF: 1.982\)\*](#)
30. Dheeraj Kaushik and Gulshan Bansal. Characterization of degradation products of idarubicin through LC-UV, MS<sup>n</sup> and LC-MS-TOF studies. *Journal of Pharmaceutical and Biomedical Analysis*, 2013, 85, 123-131. [\*\(IF: 2.979\)\*](#)
31. Balraj Saini and Gulshan Bansal. Characterization of four new photodegradation products of hydroxychloroquine through LC-PDA, ESI-MS<sup>n</sup> and LC-MS-TOF studies. *Journal of Pharmaceutical and Biomedical Analysis*, 2013, 84, 224-231. [\*\(IF: 2.979\)\*](#)
32. Rohit Bansal, Balraj Saini, Yogita Bansal and Gulshan Bansal. MS<sup>n</sup>, LC-MS-TOF and LC-PDA studies for identification of new degradation impurities of bupropion. *Biomedical Chromatography*, 2013, 27, 1387-1397. DOI 10.1002/bmc.2933. [\*\(IF: 1.945\)\*](#)
33. Yogita Bansal, Purva Sethi and Gulshan Bansal. Coumarin: A potential nucleus for anti-inflammatory molecules. *Medicinal Chemistry Research*, 2013, 22, 3049-3060, DOI 10.1007/s00044-012-0321-6. [\*\(IF: 1.271\)\*](#)
34. Gulshan Bansal, Ranjit Singh, Balraj Saini and Yogita Bansal. ESI-MS<sup>n</sup> and LC-ESI-MS studies to characterize forced degradation products of bosentan and a validated stability-indicating LC-UV method. *Journal of Pharmaceutical and Biomedical Analysis*, 2013, 72, 186-197. DOI: 10.1016/j.jpba.2012.08.014. [\*\(IF: 2.979\)\*](#)
35. Neeraj Kumar, Shishu, Gulshan Bansal, Sandeep Kumar and Asim Kumar Jana. Preparation and cyclodextrin assisted dissolution rate enhancement of itraconazolium dinitrate salt. *Drug Development and Industrial Pharmacy*, 2013 Feb, 39(2), 342-351; DOI: 10.3109/03639045.2012.681382 [\*\(IF: 1.509\)\*](#)
36. Neeraj Kumar, Shishu, Gulshan Bansal, Sandeep Kumar and Asim Kumar Jana. Ditosylate Salt of Itraconazole and Dissolution Enhancement Using Cyclodextrins. *AAPS PharmSci Tech*, 2012, 13(3), 863-874. DOI: 10.1208/s12249-012-9804-5 [\*\(IF: 1.211\)\*](#)
37. Gulshan Bansal, Pawan K. Maddhesia and Yogita Bansal. MS<sup>2</sup>/TOF and LC-MS/TOF studies on toremifene to characterize its forced degradation products. *Analyst*, 2011, 136, 5218-5228. [\*\(IF: 4.23\)\*](#)
38. Yogita Bansal, Gulshan Bansal. Analytical methods for standardization of *Aegle marmelos*: A review. *Journal of Pharmaceutical Education and Research*, 2011, 2(2), 37-44.
39. Manav Sharma, Parikshit R. Jawa, Ravinder S. Gill, Gulshan Bansal. Citalopram hydrobromide: Characterization of its degradation products and a validated stability-indicating LC-UV method for it. *Journal of Brazilian Chemical Society*, 2011, 22(5), 836-848. [\*\(IF: 1.458\)\*](#)
40. Sakshi Gupta and Gulshan Bansal. Validated stability-indicating HPLC-UV method for simultaneous determination of glipizide and its four degradation products. *Journal of AOAC International*, 2011, 94(2), 523-530. [\*\(IF: 1.196\)\*](#)
41. Aman Anand, Gulshan Bansal. LC-UV and LC-MS studies on Mirtazapine to characterize its degradation products. *Journal of Pharmaceutical Education and Research*, 2011, 2(1), 66-72.
42. Balraj Saini, Manjula Kaushal, Gulshan Bansal. A validated direct spectrofluorimetric method for quantification of mirtazapine in human whole blood. *Spectroscopy: Biomedical Applications*, 2010, 24(6), 641-649. DOI: 10.3233/SPE-2010-0488 [\*\(IF: 0.986\)\*](#)
43. Manjula Kaushal, Balraj Saini, Gulshan Bansal. Validated spectrofluorimetric method for quantification of pentazocine in human serum. *Journal of Pharmaceutical Education and Research*, 2010, 1(2), 68-72.
44. Indresh Jain and Gulshan Bansal. Spectrophotometric study of  $\beta$ -cyclodextrin-rosiglitazone maleate inclusion complex and its analytical application. *Journal of Pharmaceutical Education and Research*, 2010, 1, 37-43.
45. Gaganjot Parmar, Sanjiv Sharma, Karan Singh, Gulshan Bansal. Forced Degradation Study to Develop and Validate Stability-Indicating RP-HPLC Method for Quantification of Ropinirole Hydrochloride in its Modified Release Tablets. *Chromatographia*, 2009, 69, 199-206. [\*\(IF: 1.438\)\*](#)

46. Yogita Bansal, Shammi Ratra, Gulshan Bansal, Inderbir Singh and H.Y. Aboul-Enein. Design and Synthesis of Coumarin Substituted Oxathiadiazolone Derivatives having Anti-inflammatory Activity Possibly Through p38 MAP Kinase Inhibition. *Journal of the Iranian Chemical Society*, 2009, 6(3), 504-509. [\*\(IF: 0.64\)\*](#)
47. Navneet Kaur, Amardeep Kaur, Yogita Bansal, Dhvanit I. Shah, Gulshan Bansal, Manjeet Singh. Design, synthesis, and evaluation of 5-sulfamoyl benzimidazole derivatives as novel angiotensin II receptor antagonists. *Bioorganic and Medicinal Chemistry*, 2008, 16, 10210–10215. [\*\(IF: 3.157\)\*](#)
48. Gulshan Bansal, Manjeet Singh, K.C. Jindal and Saranjit Singh. LC-UV-PDA and LC-MS Studies to Characterize Degradation Products of Glimepiride. *Journal of Pharmaceutical and Biomedical Analysis*, 2008, 48, 788-795. [\*\(IF: 2.979\)\*](#)
49. Gulshan Bansal, Manjeet Singh, K.C. Jindal and Saranjit Singh. LC-UV-PDA and LC-MS studies on forced degradation behaviour of glibenclamide and development of a validated stability-indicating method. *Journal of AOAC International*, 2008, 91(4), 709-719. [\*\(IF: 1.196\)\*](#)
50. Gulshan Bansal, Manjeet Singh, K.C. Jindal and Saranjit Singh. Characterisation of mass ionisable degradation products of gliclazide by LC/ESI-MS. *Journal of Liquid Chromatography & Related Technologies* 2008, 31, 2174–2193. [\*\(IF: 1.272\)\*](#)
51. Gulshan Bansal, Manjeet Singh, K.C. Jindal and Saranjit Singh. LC and LC-MS study on establishment of degradation pathway of glipizide under forced decomposition conditions. *Journal of Chromatographic Science*, 2008, 46(6), 510-517. [\*\(IF: 1.327\)\*](#)
52. Dhvanit I. Shah, Manu Sharma, Yogita Bansal, Gulshan Bansal and Manjeet Singh. Angiotensin II – AT<sub>1</sub> receptor antagonists: Design, synthesis and evaluation of substituted carboxamido benzimidazole derivatives. *European Journal of Medicinal Chemistry*, 2008, 43, 1808-1812. [\*\(IF: 3.114\)\*](#)
53. Arun Prashar, Yogita Bansal, Gulshan Bansal. Synthesis of isoindolinones as prospective HNE inhibitors. *Indian Journal of Heterocyclic Chemistry*, 2008, 17(3), 267-268. [\*\(IF: 0.295\)\*](#)
54. Gulshan Bansal, Manjeet Singh and K.C. Jindal. Forced degradation study on gliclazide and application of validated stability-indicating HPLC-UV method in stability testing of gliclazide tablets. *Chromatographia* 2007, 66, 751–755. [\*\(IF: 1.438\)\*](#)
55. Alka Bali, Yogita Bansal, M. Sugumaran, Jatinder Singh Saggi, P. Balakumar, Gurpreet Kaur, Gulshan Bansal, Ajay Sharma and Manjeet Singh. Design, synthesis and evaluation of novel substituted benzimidazole compounds as angiotensin II receptor antagonists. *Bioorganic and Medicinal Chemistry Letters*, 2005, 15, 3962-3965. [\*\(IF: 2.531\)\*](#)
56. Dhandeep Singh and Gulshan Bansal. Synthesis of morpholine containing sulfonamides: Introduction of morpholine moiety on amine functional group. *E-Journal of Chemistry*, 2004, 01(03), 164-169.

### Medals and Awards

1. Gold Medallist in M. Pharm
2. University III<sup>rd</sup> rank in B. Pharm
3. Best paper award in National Seminar on Emerging Trends in Pharmaceutical Education and Research on April 28, 2007 at Lord Shiva College of Pharmacy, Sirsa, India.
4. Best Paper Award (Oral Presentation) to research work titled “Characterization of degradation products of citalopram hydrobromide through LC-MS/MS studies.” presented at National Conference on Innovations in Drug Discovery and Research (March 2009) at Punjabi University, Patiala, India.
5. Best Paper Award (Poster Presentation) to research work titled “Forced degradation study to develop and validate a HPLC-UV method for determination of Pioglitazone in the presence of its degradation products.” presented at National Conference on Innovations in Drug Discovery and Research (March 2009) at Punjabi University, Patiala, India.
6. Best Paper Award to research paper entitled "Characterization of forced degradation product of citalopram hydrobromide and a validated stability-indicating HPLC method" in 16th Annual National Convention of APTI (Oct 2011) at ISF College of Pharmacy, Moga, India.
7. Best Paper Awards (Oral and Poster) to research works presented at 7th Conference of Biotechnology Society of India on "Biotechnology in Medicine and Herbal Drug Development (Jan 2014) at Baba Farid University of Health Sciences, Faridkot, India.

### Other Activities

1. Regular reviewer for reputed international journals like Journal of Pharmaceutical and Biomedical Analysis, *Journal of AOAC International*, *Journal of Chromatography B*, *Journal of Chromatographic Science*.
2. PhD supervision: Awarded 04, Thesis submitted 03, Under supervision 02.
3. M. Pharm. Theses: More than 30.
4. Created the Alumni Association of the department and organised alumni meets.
5. Serving as Treasurer in Executive Committee of APTI (Punjab State Branch)
6. Convenor of Scientific Committee in 2<sup>nd</sup> Annual National Convention of APTI (Punjab State Branch) during March 18-19, 2016.

#### **Memberships of Professional Associations**

1. Life member of Indian Pharmacy Graduates Association (IPGA).
2. Life member of Association of Pharmaceutical Teachers of India (APTI).
3. Life member of Punjab Academy of Science (PAS).

#### **Contact**

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