Arvind K Bansal

Arvind K Bansal, Ph.D. is currently Professor and Head, department of Pharmaceutics at the National Institute of Pharmaceutical Education and Research (NIPER), SAS Nagar, Punjab, India. Dr. Bansal is leading a group of about 14 post-graduate and doctorate students, in various areas of Pharmaceutics like pre-formulation profiling, solid state characterization, improvement of aqueous solubility, enhancement of oral bioavailability and compaction physics. Dr. Bansal holds a masters (1988) and doctorate degree (1993) in Pharmacy from the University of Delhi. Dr. Bansal served in the pharmaceutical industry as a research scientist in major Indian pharmaceutical companies – JK Pharmaceuticals (now called Regent Drugs after being acquired by Teva Pharmaceuticals, Israel) and Ranbaxy Laboratories Limited.

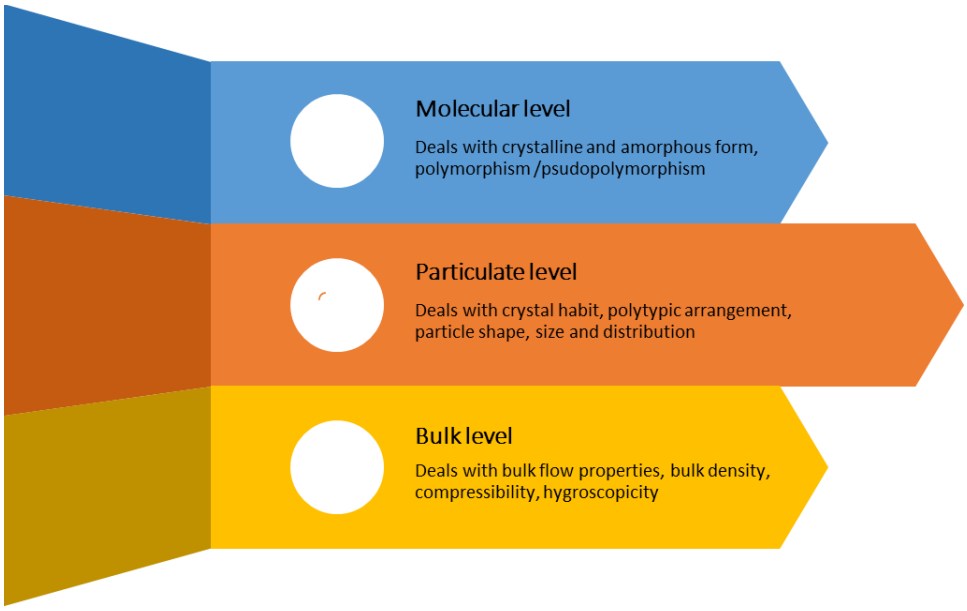
At JK Pharmaceuticals Dr. Bansal conceptualized, evolved formulation strategies, developed and transferred the technology to production shop floor of products belonging to dry powder injection, suspension for reconstitution, immediate release and delayed release tablets, oral liquid suspension and capsules.

At Ranbaxy Labs Limited, in addition to these activities Dr. Bansal was actively engaged in business, regulatory and legislative decision making process for timely launch of generics products in the domestic and international market. He also conceptualized and established a pharmaceutical research group focusing on pre-formulation and formulation development of New Chemical Entities (NCEs) leading to filing of two INDs. The activities of his group included characterization of physico-chemical (solid state pharmaceutics, aqueous solubility, pH solubility profiling, pH stability profiling, solid state stability, compatibility studies) and physico-technical (flow properties, hygroscopicity, and compaction studies) properties of the NCE, early formulation development, process development, fabrication of clinical trials batches and support to chemical and biology groups.

At NIPER (2000-till date) Dr. Bansal has developed expertise in characterization and stabilization of the amorphous form, polymorphism, pseudo-polymorphism, particle engineering, molecular understanding of compaction physics, solute behavior during lyophilization, formulation development of cocrystal based drug product, screening of salt forms, nanocrystalline solid dispersion and improvement of oral bioavailability. His group works with the mission statement - 'developing science based industrially viable pharmaceutical technologies' and works closely with pharmaceutical industry to create opportunities for commercial exploitation of the products. His group has successfully executed more than 550 sponsored projects from Indian and overseas pharmaceutical companies, in the area of pre-formulation and formulation development. Dr. Bansal's lab has developed platform technologies to improve delivery of 'difficult-to-deliver' drug molecules in the areas of amorphous solid dispersions, barrier coated amorphous particles, nano crystalline solid dispersions and SNEDDS. His group has recently patented novel bottom-up spray drying based technology for generation of nanocrystalline solid dispersions under the name of NanoCrySP^{TM}.

ACADEMIC ACTIVITIES

- ✓ **Teaching activities**
  - Developed and successfully implemented industry relevant academic courses.
  - Developed a vibrant research group focusing on research in the area of Solid State Pharmaceutics, pre-formulation and Drug Delivery.
  - Created strategic ties with numerous pharmaceutical companies, for carrying out collaborative projects.
  - Engaged in teaching of post-graduate classes of Solid State Pharmaceutics, Pharmaceutical Product Development, Pharmaceutical Production Technology, Formulation Industry and Scale up Techniques, and a Ph.D. level course on Role of Solid State Properties in Drug Delivery.
- ✓ **Research Activities**
  - Emphasis of research activity is on solid state properties. Solid state properties can be subdivided at three levels that is molecular properties, particulate properties and bulk properties



Amorphous systems

Research has been conducted to develop a fundamental understanding of amorphous phases of pharmaceuticals. Thus, he has evaluated the molecular relaxation behavior and isothermal crystallization in the supercooled state. He has investigated the effect of different states of sorbed water on the behavior of amorphous celecoxib. In addition, the effect of humidity on the alpha-relaxations of low-density polyethylene was evaluated using dielectric spectroscopy. His studies also proposed the use

of enthalpy relaxation studies to screen stabilizers for amorphous solid dispersions. Dr. Bansal has developed a novel ex-situ super-saturation technique to determine the glass transition temperature in freeze-concentrates temperature. He also investigated the effect of counter-ions on the glass transition temperature (Tg) during lyophilization of ganciclovir salt forms. Drug-polymer miscibility is vital to physical stability of amorphous solid dispersions. It governs the molecular mobility of amorphous drug dispersed in a polymeric carrier. In one of studies, we have demonstrated the impact of D-P miscibility on molecular mobility and phase behavior of dipyridamole amorphous solid dispersions with different polymers. Impact of the aforementioned parameters on the physical stability of amorphous solid dispersion was also established.

Phase behavior of drugs during freeze concentration in the lyophilization process Lyophilization is an important tool for formulation development and the processing of heat-labile pharmaceuticals. Dr. Bansal's group has carried out research to understand the behavior of solid forms during freeze concentration. Phase behavior of gemcitabin hydrochloride (GHCl) during freezing in presence of different buffering agents has been evaluated. The differential effect of buffering agents were explained by crystallization tendency of GHCl and unfrozen water content (UWC). He has also highlighted importance of the impact of unfrozen water in governing the crystallization behavior of solutes in multi-component frozen systems. Lyophilization was also used to generate the nanocrystalline solid dispersion of active pharmaceutical ingredients.

Molecular understanding of compaction behavior of pharmaceutical solids

Dr. Bansal's group has worked extensively in the area of the compaction behavior of pharmaceuticals. They investigated the effect of the molecular and particle level material properties, and process parameters on the compaction properties of pharmaceutical powders. His group has explored effect of various properties (i.e. crystal packing density, bonding strength, slip planes) on compaction behavior using polymorphs of different APIs, including clopidogrel bisulfate, indomethacin and ranitidine hydrochloride. The role of size enlargement and hardening of granules during dry compaction was investigated. Additional studies on the compaction behavior of a eutectic mixture and drug particles coated with ultrafine particles have provided practical information on compaction behavior.

Crystal habit and biopharmaceutical performance of BCS class II drugs

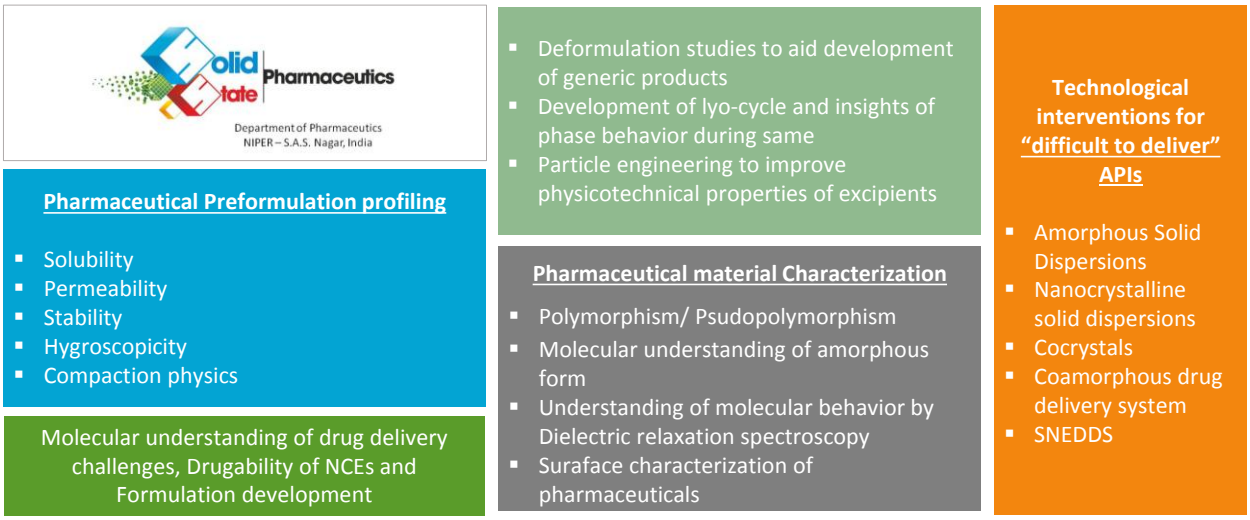
Dr. Bansal's research has provided novel and interesting insights into the effect of crystal habit on intrinsic dissolution, solubility and bioavailability of BCS class II drugs. The effect of crystal habit on compaction behavior was also demonstrated. They established a molecule-centered approach towards crystal habit modification of a BCS class II drug, celecoxib (CEL), and its effect on solubility, dissolution

behavior, oral bioavailability, and overall pharmaceutical product performance. This study has also provided a mechanistic understanding of a differential-surface molecular environment, contributed by the differential exposure of crystalline facets and its impact on pharmaceutical product performance. This work mandates considering crystal habit as a 'critical material attribute' in the QbD of oral solid dosage forms of BCS class II drugs.

Excipient variability and its impact on the performance of amorphous solid dispersions

Excipients are integral part of pharmaceutical dosage form. In the case of amorphous solid dispersions, nature and composition of polymeric excipients govern overall physical stability of the system. On the other hand, variability in physical characteristics of these polymers can have significant impact on the physical stability and resultant biopharmaceutical performance of drug. The variability has been identified as 'lot-to-lot' and 'batch-to-batch' for functional excipients like polymer for amorphous solid dispersions. We have demonstrated in our study the impact of variability in critical material attributes like true density and porosity on drug-polymer miscibility and crystallization in amorphous solid dispersions prepared using celecoxib and PVP K30.

The following figure captures the research areas functional in lab



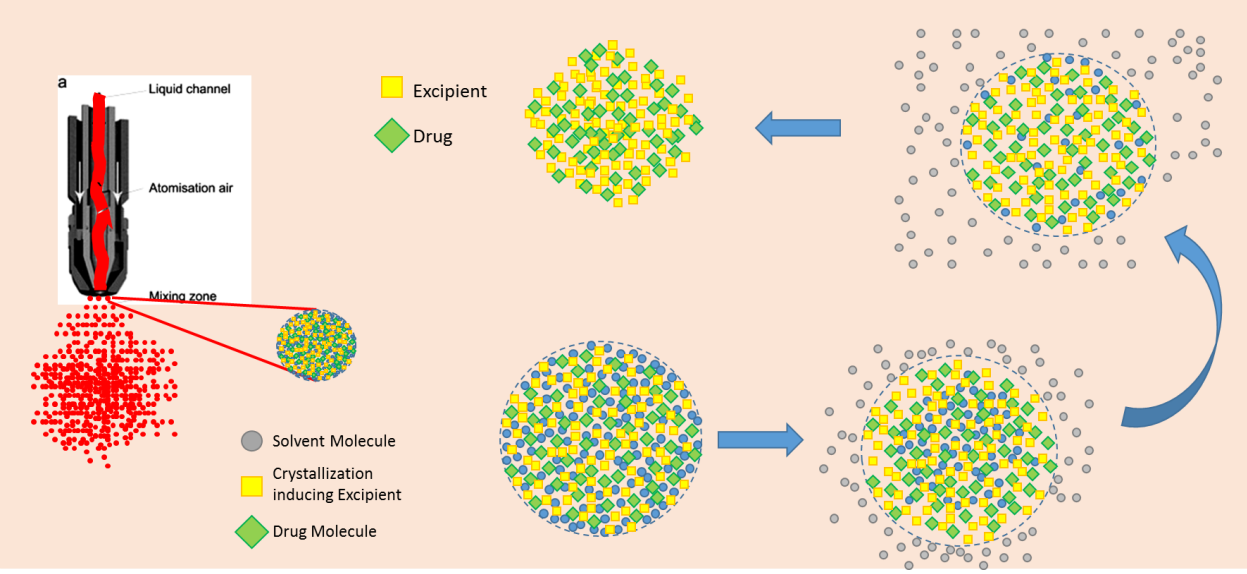
TECHNOLOGIES TRANSFERRED

Zinc Dispersible tablets

WHO & UNICEF have recommended use of zinc supplements in addition of ORS based dehydration therapy for management diarrhoea in children. Zinc supplements were added in the list of essential medicines provided by WHO in 2005. Estimate children mortality due to diarrhoea in India in the year 2004 was about 5,35,000. WHO recommends administration of zinc in the form of taste masked dispersible tablet of 20 mg strength. The technology for the same is challenging because of the bitter metallic after taste of zinc and intellectual property protection already taken by international companies. Dr. bansal's group at NIPER took up this challenge & developed patented technology for manufacturing of zinc sulphate taste masked dispersible tablets. This technology was transferred to Indian Drugs and Pharmaceuticals Limited.

NanoCrySP™

Dr. Bansal's group has developed a novel 'bottoms-up' platform technology for the generation of nanocrystalline solid dispersions. They have demonstrated the biopharmaceutical benefits of this



technology. Their group has also established the contribution of molecular mobility, heterogeneous nucleation, and the effect of excipients on nucleation and crystal growth, in the formation of nanocrystalline solid dispersions.

Development of herbal formulation for cough relief (KAFGON^{TM})

A blend of traditional wisdom and modern science led to the herbal formulation KAFGONTM. The product consisted of five indigenous herbs Vach, Kulanjan, Bavchi, Kaali Mirch and Pippli. The product

has proven activity against respiratory tract infective microbes and has been used for chronic to acute cough, bronchitis, whooping cough and smoker's cough. This invention was awarded support under TePP program, Department of Scientific and Industrial Research, Ministry of Science and Technology, Government of India.

Florfenicol solution

Florfenicol is a broad spectrum antibacterial active against wide variety of gram-positive and gram-negative bacteria isolated from domestic animals. It is indicated in the pneumonia and other respiratory infections in cattle (often referred as Bovine Respiratory Disease, BRD). Then marketed products of the florfenicol were included in the fish feed or swine feed and dispensed as a concentrated solution ranging from 2-2.5% w/v. We formulated co-solvent based solution of florfenicol with drug loading as high as 30% w/v. Physical stability was proven by freeze thaw cycling and dilution tests were performed to ensure 1 litre of final solution with only 1 mL of the generated formulation. The formulation was launched by the industry partner in veterinary segment.

A combination product of florfenicol and tilmicosin phosphate

Tilmicosin phosphate is an antibacterial agent which could potentially be used along with florfenicol (application is as discussed in section 11.4) to take care of wide variety of gram-positive and gram-negative infections in animal. We developed a combination product of timlocosin phosphate and florfenicol which could effectively control bacterial infections in animals. A single co-solvent system was screened, wherein 10% and 8.3% of florfenicol and tilmicosin phosphate, respectively, were incorporated to get the final formulation stable at accelerated temperatures when packed in HDPE containers. The formulation was found to have the potential to be diluted up to 1000 times in water without precipitation. The formulation was also launched by the industry partner in veterinary segment.

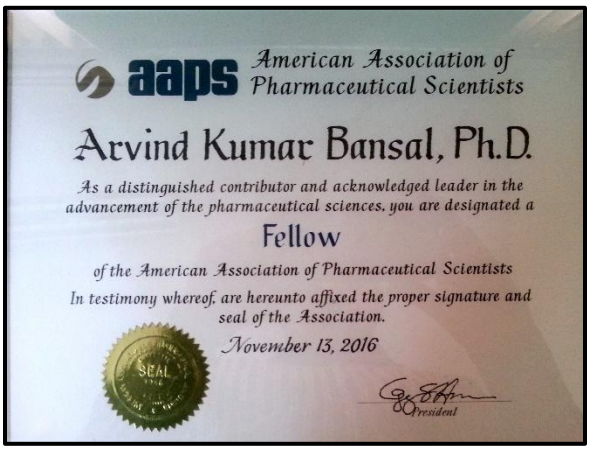
Gamma oryzanol capsules

Gamma oryzanol has clinically useful applications in hypercholesterolemia and exhibits action similar to synthetic lipid lowering agents. We developed formulation of Gamma Oryzanol for "direct filling" into capsules. The detailed preformulation studies revealed that the material was highly hydrophobic and demonstrated batch-to-batch variability in density and flow. The extreme fluffiness, low tapped density and poor flow properties led to softening and sticking of material during compaction. Hence, high-density and flow enhancing excipients were used to improve density and flow of material for direct

filling into capsules. Later, extensive efforts were dedicated towards development of dissolution media as an in-vitro tool for ensuring final product quality.

AWARDS AND HONORS

1. Appointed as a member of Technical Committee to assist the Department of Pharmaceuticals in the **Production Linked Incentive (PLI) Scheme for Pharmaceuticals**, Ministry of Chemicals and Fertilizers, Government of India, December 2020.
2. Appointed as a member of **Screening Committee for according recognition of In-house R&D units of Industries and Scientific and Industrial Research Organizations (SIROs) under Industrial Research and Development Promotion Programme (IRDPP) of Department of Science and Industrial Research (DSIR)**, as representative on behalf of the Department of Pharmaceuticals, August 2020.



3. Awarded for the Best Innovative Development of Solid Dosage Form at the **6th Indian Pharmaceutical Association (IPA) -ACG Scitech Innovation Award- 2018.**
4. Paper entitled "**Challenges in Translational Development of Pharmaceutical Cocrystals**", in the February 2017 Issue of the Journal of Pharmaceutical Sciences (JPharmSci), was selected by the journal's Editorial Team to be displayed under Features on the journal's new website http://www.jpharmsci.org.
5. Appointed as a member of '**Editorial Advisory Board**' of Journal of Pharmaceutical Sciences (JPharmSci) on January 1, 2017 for a period of three years.
6. Appointed member of the **Molecular Pharmaceutics - Editorial Advisory Board** in January 2017.
7. November 2016, awarded the prestigious **Fellow of American Association of Pharmaceutical Scientists (AAPS)**.
8. **Guest Editor,** Special issue on Nanocrystals of 'Pharmaceutics', a journal published by MDPI (Multidisciplinary Digital Publishing Institute), Basel, Switzerland [March 2015]
9. **Guest Editor,** Special issue on nanotechnology of Journal of Excipients and Food Chemicals [December 2014]
10. **Editorial Board Member of "Pharmaceutics"**, a journal published by MDPI (Multidisciplinary Digital Publishing Institute), Basel, Switzerland.

11. **Appointed as Editorial Board Member of "Journal of Excipients and Food Chemicals", an open access journal published from USA**, with affiliation to International Pharmaceutical Excipients Council (IPEC).
12. **Appointed as Editorial Board Member of "Recent Patents on Drug Delivery & Formulation"**, a Journal published by Bentham Science Publishers Ltd.
13. **AAiPS Distinguished Educator and Researcher Award for the Year 2008**

    This award is given to a faculty member from a recognized Indian Pharmacy education and research center. The mission of American Association of Indian Pharmaceutical Scientists (AAiPS) is to provide a forum for discussion, continuing education, and exchange of ideas on advances in pharmaceutical sciences and technology.

14. **Appointed as Editorial Board Member of International Journal of Biosciences and Technology**
15. **Innocentive Award**, in the area of formulation development for 3 times (April 2005, May 2006, May 2007)

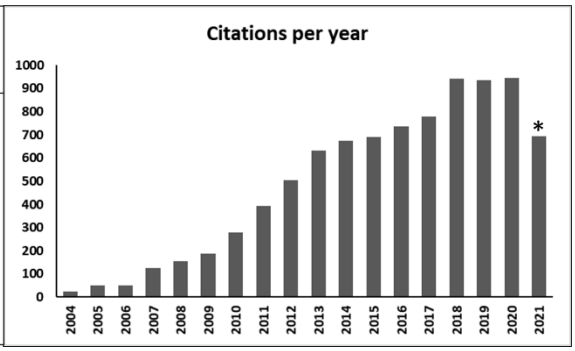
    Innocentive (www.innocentive.com) is a web-based community, managed by a sister concern of Eli Lilly,USA and facilitates pharmaceutical scientists to address challenges faced by chemical and pharmaceutical companies, from around the globe.

16. **OPPI (Organisation of Pharmaceutical Producers of India (OPPI) Scientist Award 2006**

    This award was conferred in September 2006, for outstanding contribution in the area of Pharmaceutics. The OPPI, established in 1965, is a premier organization of research based pharmaceutical manufacturers in India.

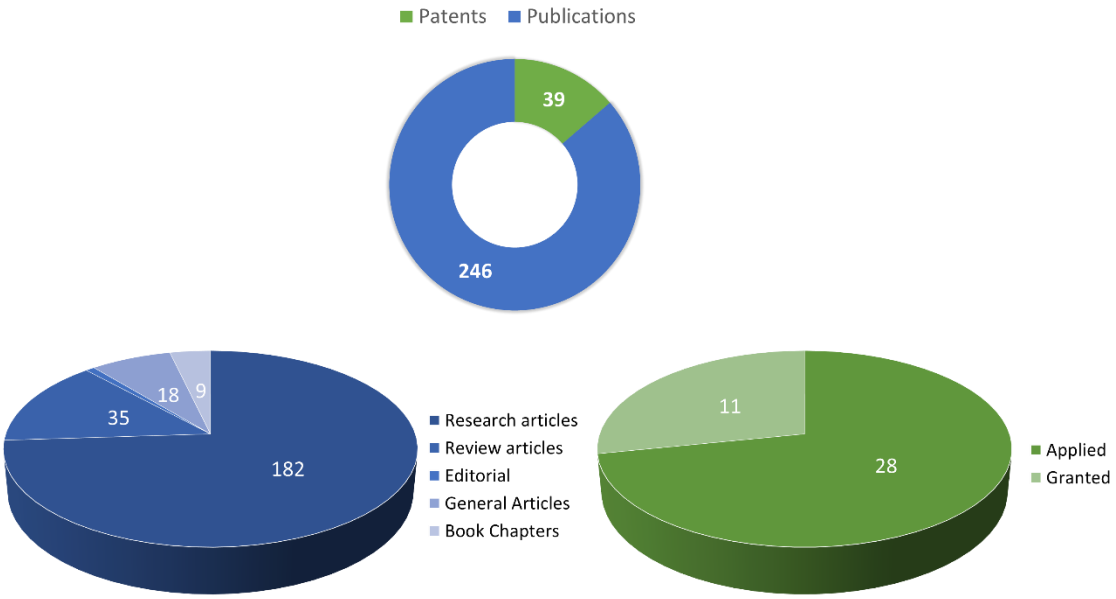
OVERVIEW OF PUBLICATIONS AND INDUSTRIAL INTERACTIONS

	All	Since 2016
Citations	9612	5199
h-index	51	36
i10-index	163	116



Source: Google Scholar (https://scholar.google.co.in/citations?user=8lVBYU0AAAAJ&hl=en)

An Overview of publications and patents



SCIENTIFIC PUBLICATIONS AND PRESENTATIONS

- ❖ PATENTS

- **Granted Patents**

1. Bansal A K, Shete G, Pawar Y B, Dantuluri A K. **Nanocrystalline solid dispersion compositions and process of preparation thereof.** European patent No. EP2822539B1, granted on 21.11.2018.
2. Bansal A K, Puri V, Kohli G, Rao P R. **Quick disintegrating taste masked composition**. Indian Patent No. 297184, granted on 29.05.2018
3. Bansal A K, Shete G, Pawar Y B, Dantuluri A K. **Nanocrystalline solid dispersion compositions and process of preparation thereof**. US patent US9801855B2, granted on 31.10.2017

4. Bansal A K and Puri V**. Fast dispersing multi layered stabilized amorphous particle and process thereof.** Patent No. 287971, granted on 29.09.2017
5. Bansal A K, Arora S, Kaushal AM. **A sustained release monolithic formulation of ropinirole.** Granted on November 7, 2012. Patent No. 253536
6. Bansal A K, Banga S, Chawla G. **A process of producing improved celecoxib crystals.** Granted on July 30, 2012. Patent No. 253536
7. Bansal A K, Gupta P, Kakumanu V. **A synergistic pharmaceutical composition of celecoxib with improved aqueous solubility.** Granted on August 2, 2011. Patent No. 248660
8. Bansal A K, Verma S. **A process for coating highly water-soluble drugs**, Patent filing on December 3, 2002. Patent granted on October 11, 2010. Indian Patent No. 243918
9. Bansal A K, Gupta P, Kakumanu V. **A process for the preparation of celecoxib composition with improved aqueous solubility.** Patent filing on November 18, 2002. Patent granted on October 4, 2010. Indian Patent No. 243294
10. Bansal A K, Puri V, Chawla H P S, Kaul C L. **Prolonged release injectable preparation of ketorolac.** Indian Patent Application granted on June 4, 2009. No. **234519**.
11. Madan S, Bansal A K, Arora V K. **Process for the preparation of acyclovir infusion formulation**. Indian Patent Application filed on November 3, 2000. Granted on August 3, 2003. No. 982/DEL/2000.

- **Applied Patents**

1. Bansal A K and Zode S S. **An intravenous nanosuspension formulations**. Indian Provisional Patent Application No. 201911002734, filed on January 23, 2019
2. Bansal A K, Parmar P K. **Nanocrystals based formulations for improved topical delivery of Apremilast.** Provisional Indian Patent 201911003539 filed on January 2019
3. Bansal A K, Shete G, Pawar Y B, Dantuluri A K. **Nanocrystalline solid dispersion compositions and process of preparation thereof**. European patent Application No. EP 13724871.2 filed on 30 September 2014.
4. Bansal A K, Shete G, Pawar Y B, Dantuluri A K. **Novel one step process for preparation of compositions comprising nanocrystalline solid dispersions.** Patent filed on March 7, 2013. No. PCT/IB2013/051807
5. Chauhan S, Dare M, Bahri D, Bansal A K, Amin A. **Method and composition to retard sorption of preservatives to plastics.** PCT application WO 2012/110971 with international publication on August 23, 2012.
6. Bansal A K, Dantuluri A K. **Novel one step process for preparation of compositions comprising nanocrystalline solid dispersions.** Provisional Indian Patent 674/DEL/2012 filed on March 2012.
7. Bansal A K, Amin A. **Method and Composition to retard sorption of preservatives to Plastics**. Indian patent Application No. 406/DEL/2011
8. Bansal A K, Puri V and Kohli G. **Quick disintegrating taste masked composition.** International PCT Application No. PCT/IB2009/007032
9. Bansal A K, Munjal B, Patel S. **Novel self nano emulsifying curcumin (curcuminoids) composition with enhanced bioavailability**. Indian Patent Application filed on July 24, 2008, No. 1776/DEL/2008
10. Bansal A K, Goyal M, Roy I, Banerjee U C. **A stabilized protein composition.** Indian Patent Application filed on May 23, 2008, No. 1268/DEL/2008
11. Bansal A K, Puri V, Kohli G, Rao P R. **Quick disintegrating taste masked composition**. Indian Patent Application filed on July 16, 2007. No. 1488/DEL/2007
12. Bansal A K, Puri V. **Novel formulation of celecoxib.** Indian Patent Application filed on June 18, 2007. No. 1300/DEL/2007
13. Bansal A K, Mohammad G A, Puri V. **An improved process for producing stavudine polymorph III**. Indian Patent Application filed on June 12, 2007. No. 1256/DEL/2007
14. Bansal A K, Mohammad G A, Puri V. **A pharmaceutical composition**. Indian Patent Application filed on May 24, 2007. No. 1118/DEL/2007
15. Bansal A K, Kumar L, Amin A, Jain R. **Novel acid addition salts of enalapril**. Indian Patent Application filed on May 16, 2007. No. 1064/DEL/2007

16. Bansal A K, Kumar S, Chawla G. **A process for producing spherical crystals of mebendazole**. Indian Patent Application filed on May 3, 2007, No. 951/DEL/2007
17. Bansal, A K, Bansal P, Patel S, Munjal B, Jachak S, Kohli G. **Novel curcumin formulation.** Provisional Indian Patent filed on February 22, 2007. Application No. 367/DEL/2007
18. Bansal A K, Kakumanu V. **Method of improvement of bioavailability of prodrug, using self emulsifying drug delivery system.** Indian Patent Application filed on November 23, 2005. No. 3136/DEL/2005
19. Bansal A K, Kakumanu V, Arora V K. **Gastro-retentive dosage form of cephalosporin, and process of preparation thereof.** Indian Patent Application filed on November 23, 2005. No. 3137/DEL/2005
20. Bansal A K, Kakumanu V. ***Method of improvement of bioavailability of prodrug using solid lipid nanoparticles.*** Indian Patent Application filed on November 23, 2005. No. 3139/DEL/2005
21. Bansal A K, Kakumanu V, Arora V K. **Pharmaceutical composition of cefpodoxime proxetil and cyclodextrin; and process of preparation thereof.** Indian Patent Application filed on November 23, 2005. No. 3140DEL/2005
22. Bansal A K, Trasi N, Kaushal A M, Banerjee U C, Roy N. **A stable phytase preparation.** Indian Patent Application filed on December 24, 2004. No. 2557/DEL/2004
23. Bansal A K, Verma S. **A process for coating highly water-soluble drug.** Indian Patent Application filed on December 3, 2002. No. 1210/DEL/2002
24. Bansal A K, Gupta P, Kakumanu V. **A process for the preparation of celecoxib composition with improved aqueous solubility.** Indian Patent Application filed on November 18, 2002, No. 1165/DEL/2002
25. Bansal A K, Verma S. **A taste-masking pharmaceutical composition.** Indian Patent Application filed on November 3, 2002. No. 1164/DEL/2002
26. Bansal A K, Nachaegari S K. **A pharmaceutical excipient having improved compressibility for application in direct compression tableting.** Indian Patent Application filed on June 16, 2003. No. 807/DEL/2003
27. Bansal A K, Gupta P, Kakumanu V. **Ternary amorphous systems for improving aqueous solubility for poorly water soluble drugs.** Indian Patent Application filed on June 26, 2002. No. 682/DEL/2002
28. Gogia A, Bansal A K, Arora V K. **Process for the preparation of aqueous pharmaceutical compositions of fluoroquinolones.** Indian Patent Application filed on March 7, 2000. No. 197/DEL/2000

❖ *PUBLICATIONS*

- **Research articles**

1. Wadhawan J, Parmar PK, Bansal AK. Nanocrystals for improved topical delivery of medium soluble drug: A case study of acyclovir. **Journal of Drug Delivery Science and Technology** 2021, 65, 102662
2. Rao SG, Parmar PK, Reddy KV, Bansal AK. Preparation and Characterization of Co-Processed Mannitol and Sorbitol Using NanoCrySP Technology. **AAPS PharmSciTech** 2021, 22 (5), 1-12
3. Bagwan NUS, Sheokand S, Kaur A, Dubey G, Puri V, Bharatam PV, Bansal AK. Role of surface molecular environment and amorphous content in moisture sorption behavior of milled Terbutaline Sulphate. **European Journal of Pharmaceutical Sciences** 2021, 161, 105782
4. Parmar PK, Bansal AK. Novel nanocrystal-based formulations of apremilast for improved topical delivery. **Drug Delivery and Translational Research** 2021, 11 (3), 966-983
5. Mukesh S, Joshi P, Bansal AK, Kashyap MC, Mandal SK, Sathe V, Sangamwat AT. Amorphous Salts Solid Dispersions of Celecoxib: Enhanced Biopharmaceutical Performance and Physical Stability, **Molecular Pharmaceutics** (Just accepted)
6. Nandwani Y, Kaur A, Bansal AK. Generation of Ophthalmic Nanosuspension of Prednisolone Acetate Using a Novel Technology. **Pharmaceutical Research**, 2021, 38 (2), 319-333

7. Datir SR, Kumar D, Kumar P, Jain S, Bansal AK, Nallamothu B, Thakore SD, Bele MH. Study of Different Crystal Habits of Aprepitant: Dissolution and Material Attributes. **Applied Sciences** 2021, 11(12):5604.
8. Sharma J, Singh B, Agrawal AK, Bansal AK. Correlationship of drug-polymer miscibility, molecular relaxation and phase behavior of dipyridamole amorphous solid dispersions. Accepted for publication in **Journal of Pharmaceutical Sciences**, 2021, 110 (4), 1470-1479.
9. Jain D, Thakur PS, Thakore SD, Samal SK, Bansal AK. Impact of differential particle size of fenofibrate nanosuspensions on biopharmaceutical performance using physiologically based absorption modeling in rats. **Journal of Drug Delivery Science and Technology** 2020, 60:102040.
10. Jadhav S, Kaur A, Bansal AK. Comparison of Downstream Processing of Nanocrystalline Solid Dispersion and Nanosuspension of Diclofenac Acid to Develop Solid Oral Dosage Form. **Pharmaceutics** 2020, 12(11):1015.
11. Zode SS, Thakore SD, Bansal AK. Effect of process parameters on phase behavior and particle size of aspirin during freeze concentration. **Drying Technology** 2020, 38(14):1891-1903.
12. Thakore SD, Prasad R, Dalvi SV, Bansal AK. Role of Solvent in Differential Phase Behavior of Celecoxib during Spray Drying. **International Journal of Pharmaceutics**. 2020:119489.
13. Parmar PK, Bansal AK. Novel nanocrystal-based formulations of apremilast for improved topical delivery. **Drug Delivery and Translational Research** 2020, 1-18.
14. Kale DP, Puri V, Kumar A, Kumar N, Bansal AK. The Role of Cocrystallization-Mediated Altered Crystallographic Properties on the Tabletability of Rivaroxaban and Malonic Acid. **Pharmaceutics** 2020, 12(6):546.
15. Kaur N, Thakur PS, Shete G, Gangwal R, Sangamwar AT, Bansal AK. Understanding the Oral Absorption of Irbesartan Using Biorelevant Dissolution Testing and PBPK Modeling. **AAPS PharmSciTech** 2020, 21(3):1-13.
16. Thakur PS, Thakore SD, Bansal AK. Role of Surface Characteristics of Mannitol in Crystallization of Fenofibrate during Spray Drying. **Journal of Pharmaceutical Sciences** 2020, 109(2):1105-1114.
17. Nandi S, Kaur A, Bansal AK. Dual drug nanocrystals loaded microparticles for fixed dose combination of simvastatin and ezetimibe. **Pharmaceutical development and technology** 2020, 25 (1):40-53.
18. Yadav JP, Yadav RN, Uniyal P, Chen H, Wang C, Sun CC, Kumar N, Bnasal AK, Jain S. Molecular Interpretation of Mechanical Behavior in Four Basic Crystal Packing of Isoniazid with Homologous Cocrystal Formers. **Crystal Growth & Design** 2019, 20(2):832-844.
19. Vohra ZA, Zode SS, Bansal AK. Effect of primary drying temperature on process efficiency and product performance of lyophilized Ertapenam sodium. **Drug Development and Industrial Pharmacy** 2019, 45(12):1940-1948.
20. Kaur A, Parmar PK, Bansal AK. Evaluation of different techniques for size determination of drug nanocrystals: A case study of celecoxib nanocrystalline solid dispersion. **Pharmaceutics** 2019, 11(10):516.
21. Jagia M, Daptardar R, Patel K, Bansal AK, Patel S. Role of structure, microenvironmental pH and speciation to understand the formation and properties of Febuxostat Eutectics. **Molecular Pharmaceutics** 2019, 16(11):4610-4620.
22. Phadke C, Sharma J, Sharma K, Bansal AK. Effect of Variability of Physical Properties of Povidone K30 on Crystallization and Drug–Polymer Miscibility of Celecoxib–Povidone K30 Amorphous Solid Dispersions. **Molecular pharmaceutics 2019,** 16(10):4139-4148.
23. Thakur PS, Sheokand S, Bansal AK. Factors affecting crystallization kinetics of fenofibrate and its implications for the generation of nanocrystalline solid dispersions via spray drying. **Crystal Growth & Design** 2019, 19(8):4417-4428.

24. Thakore SD, Thakur PS, Shete G, Gangwal R, Narang A. S., Sangamwar, A. T., & Bansal, A. K. Assessment of Biopharmaceutical Performance of Supersaturating Formulations of Carbamazepine in Rats Using Physiologically Based Pharmacokinetic Modeling. **AAPS PharmSciTech 2019**, 20(5):179.
25. Yadav JPA, Yadav RN, Sihota P, Chen H, Wang C, Sun CC, Kumar N, Jain S. Single-Crystal Plasticity Defies Bulk-Phase Mechanics in Isoniazid Cocrystals with Analogous Coformers. **Crystal Growth & Design** 2019, 19(8):4465-4475.
26. Kale DP, Ugale B, Nagaraja CM, Dubey G, Bharatam PV, Bansal AK. Molecular Basis of Water Sorption Behavior of Rivaroxaban-Malonic Acid Cocrystal. **Molecular pharmaceutics** 2019, 16(7):2980-2991.
27. Kurmi M, Sahu A, Ladumor MK, Bansal AK, Singh S. Stability behaviour of antiretroviral drugs and their combinations. 9: Identification of incompatible excipients. **Journal of Pharmaceutical and Biomedical Analysis** 2019, 166:174-182.
28. Munjal B, Zode SS, Bansal AK. Crystallization of Cyclophosphamide Monohydrate During Lyophilization. J**ournal of pharmaceutical sciences** 2019, 108(3):1195-1202.
29. Sheokand S, Navik U, Bansal AK. Nanocrystalline solid dispersions (NSD) of hesperetin (HRN) for prevention of 7, 12-dimethylbenz [a] anthracene (DMBA)-induced breast cancer in Sprague-Dawley (SD) rats. **European Journal of Pharmaceutical Sciences** 2019, 128:240-249.
30. Sahra M, Thayyil MS, Bansal AK, Ngai KL, Sulaiman MK, Shete G, Safna Hussan KP. Dielectric spectroscopic studies of three important active pharmaceutical ingredients-clofoctol, droperidol and probucol. **Journal of Non-Crystalline Solids** 2019, 505:28-36.
31. Sheokand S, Sharma J, Bansal AK. Effect of surfactants on the molecular mobility and crystallization kinetics of hesperetin. **Crystal engineering communications** 2019, 21(25):3788-3797.
32. Srivastava A, Zode SS, Pandey J, Srivastava K, Tandon P, Ayala AP, Bansal AK. A novel approach to design febuxostat-salicylic acid eutectic system: evaluation and characterization. **Crystal engineering communications** 2019, 21(2):310-320.
33. Jasani MS, Kale DP, Singh IP, Bansal AK. Influence of Drug-Polymer Interactions on Dissolution of Thermodynamically Highly Unstable Cocrystal. **Molecular Pharmaceutics** 2018**,** 16(1):151-164.
34. Pandey J, Prajapati P, Srivastava A, Tandon P, Sinha K, Ayala AP, Bansal AK. Spectroscopic and molecular structure (monomeric and dimeric model) investigation of Febuxostat: A combined experimental and theoretical study. **Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy** 2018, 203:1-12.
35. Yadav JPA, Yadav B, Kumar N, Bansal AK, Jain S. Revealing the role of structural features in bulk mechanical performance of ternary molecular solids of Isoniazid. **Molecular Pharmaceutics** 2018, 15(11):5252-5262.
36. Girdhar A, Thakur PS, Sheokand S, Bansal AK. Permeability behavior of nanocrystalline solid dispersion of dipyridamole generated using NanoCrySP technology. **Pharmaceutics** 2018, 10(3):160.
37. Yadav JP, Bansal AK, Jain S. Molecular Understanding and Implication of Structural Integrity in Deformation Behavior of Binary Drug-drug Eutectic Systems. **Molecular pharmaceutics** 2018, 15(5):1917-1927.
38. Dalsania S, Sharma J, Munjal B, Bansal AK. Impact of Drug-Polymer Miscibility on Enthalpy Relaxation of Irbesartan Amorphous Solid Dispersions. **Pharm Res** 2018, 35:29.
39. Apeji YE, Oyi AR, Isah AB, Allagh T, Modi SR, Bansal AK. Development and Optimization of a Starch-Based Co-processed Excipient for Direct Compression Using Mixture Design. **AAPS PharmSciTech** 2018, 19(2):866-880.
40. Ayorinde, J and Bansal AK. Evaluation of Two Novel Plant Gums for Bioadhesive Microsphere and Sustained Release Formulations of Metformin Hydrochloride, **Polymers in Medicine** 2017, 47(1):13–23.
41. Patel K, Munjal B and Bansal AK. Effect of cyclophosphamide on the solid form of mannitol during lyophilisation, **European Journal of Pharmaceutical Sciences** 2017, 101:251-257.
42. Yadav JP, Khomane K, Modi S, Ugale B, Yadav RN, Nagaraja CM, Kumar N, Bansal, AK. Correlating Single Crystal Structure, and Nanomechanical and Bulk Compaction Behavior of Febuxostat Polymorphs, **Molecular Pharmaceutics** 2017, 14(3):866-874.
43. Thakur PS, Singh N, Sangamwar A, Bansal AK. Investigation of need of natural bioenhancer for a metabolism susceptible drug - Raloxifene, in a designed self-emulsifying drug delivery system. **AAPS PharmSciTech** 2017, 18(7):2529-2540.

44. Tripathi SM, Sharma RJ, Bansal AK, Bhutani KK Singh IP. Development of chewable tablet of *Trikatu churna* and standardization by densitometry. **Indian Journal of Traditional Knowledge** 2017, 16(2):256-262.
45. Jain T, Sheokand S, Bansal AK. Effect of differential surface anisotropy on performance of two plate shaped crystals of aspirin form I. **European Journal of Pharmaceutical Sciences** 2017, 99:318-327, 2017.
46. Khurana RK, Bansal AK, Beg S, Burrow AJ, Katare OP, Singh KK and Bhoop BS. Enhancing biopharmaceutical attributes of phospholipid complex-loaded nanostructured lipidic carriers of mangiferin: Systematic development, characterization and evaluation. **International Journal of Pharmaceutics** 2016, 518(1-2):289-306.
47. Nandekar PP, Khomane K, Chaudhary V, Rathod VP, Borkar RM, Bhandi MM, Srinivas R, Sangamwar AT, Guchhait SK and Bansal AK. Identification of Leads for Antiproliferative Activity on MDA-MB-435 Human Breast Cancer Cells through Pharmacophore and CYP1A1-mediated Metabolism. **European Journal of Medicinal Chemistry** 2016, 115:82-93.
48. Sheokand S, Modi SR, Bansal AK. Quantification of low levels of amorphous content in crystalline celecoxib using dynamic vapor sorption (DVS). **European Journal of Pharmaceutics and Biopharmaceutics** 2016, 102:77-86.
49. Shete GB, Bansal AK. "NanoCrySP Technology for Generation of Drug Nanocrystals: Translational Aspects and Business Potential." **Drug Delivery and Translational Research** 2016, 6(4):392-8.
50. Sharma RJ, Gupta RC, Singh S, Bansal AK, Singh IP. Stability of anthocyanins- and anthocyanidins-enriched extracts, and formulations of fruit pulp of Eugenia jambolana ('Jamun'). **Food Chemistry** 2016, 190:808-817.
51. Bhatt V, Shete GB, Bansal AK. Mechanism of Generation of Drug Nanocrystals in Celecoxib : Mannitol Nanocrystalline Solid Dispersion. **International Journal of Pharmaceutics** 2015, 495(1):132-139.
52. Chavan RB, Modi SR, Bansal AK. Role of solid carriers in pharmaceutical performance of solid supersaturable SEDDS of celecoxib. **International Journal of Pharmaceutics** 2015, 495(1):374-384.
53. Shete GB, Modi SR and Bansal AK. Effect of Mannitol on Nucleation and Crystal Growth of Amorphous Flavonoids: Implications on the Formation of Nanocrystalline Solid Dispersion. **Journal of Pharmaceutical Sciences** 2015, 104(11):3789-3797.
54. Patel J, Jagia M, Bansal AK, Patel S. Characterization and Thermodynamic Relationship of Three Polymorphs of a Xanthine Oxidase Inhibitor, Febuxostat. **Journal of Pharmaceutical Sciences** 2015, 104(11):3722-3730.
55. Kumar D, Thipparaboina R, Modi SR, Bansal AK, Shastri NR. Effect of HPMC concentration on crystal habit of nifedipine. **Crystal engineering communications** 2015, 17(7):1615-1624.
56. Sharma RJ, Gupta RC, Bansal AK, Singh IP. Metabolite Fingerprinting of *Eugenia jambolana* Fruit Pulp Extracts using NMR, HPLC-PDA-MS, GC-MS, MALDI-TOF-MS and ESI-MS/MS Spectrometry. **Natural Products Communications** 2015, 10(6):969-976.
57. Kumar D, Thipparaboina R, Modi SR, Bansal AK and Shastri NR. Effect of surfactant concentration on nifedipine crystal habit and its related pharmaceutical properties. **Journal of Crystal Growth** 2015, 422:44-5.
58. Sharma P, Modi SR, Bansal AK. Co-processing of hydroxypropyl methylcellulose (HPMC) for improved aqueous dispersibility. **International Journal of Pharmaceutics** 2015, 485:348-356.
59. Shete G, Pawar Y, Thanki K, Jain S, Bansal AK. Oral bioavailability and pharmacodynamic activity of hesperetin nanocrystals generated using a novel bottom-up technology. **Molecular Pharmaceutics** 2015, 12(4):1158-70.
60. Sharma M, Akhtar N, Sambhav K, Shete G, Bansal AK, Sharma SS. Emerging potential of citrus flavanones as an antioxidant in diabetes and its complications. **Current topics in medicinal chemistry** 2015, 15(2):187-195.
61. Munjal B, Bansal AK. Counter-intuitive effect of non-crystallizing sugars on the crystallization of gemcitabine HCl in frozen solutions. **International Journal of Pharmaceutics** 2015, 478 (1):46-52.
62. Munjal B, Bansal AK. Impact of Tert-Butyl Alcohol on Crystallization Kinetics of Gemcitabine Hydrochloride in Frozen Aqueous Solutions. **Journal of pharmaceutical sciences** 2015, 104(1):87-97.

63. Tarate B, Bansal AK. Characterization of CoQ 10-Lauric Acid Eutectic System. **Thermochimica Acta** 2015, 605:100-106.
64. Modi, SR, Dantuluri AK, Perumalla SR, Sun CC, Bansal AK. Effect of crystal habit on intrinsic dissolution behavior of celecoxib due to differential wettability. **Crystal Growth Design** 2014, 14:5283-5292.
65. Khomane K, Bansal AK. Differential compaction behaviour of roller compacted granules of clopidogrel bisulphate polymorphs. **International Journal of Pharmaceutics** 2014, 472(1-2):288-295.
66. Jain HK, Kailas K, Bansal AK. Implication of microstructure on the mechanical behaviour of an aspirin–paracetamol eutectic mixture. **Crystal Engineering Communication** 2014, 16:8471-8478.
67. Patil SP, Modi SR Bansal AK. Generation of 1:1 Carbamazepine: Nicotinamide cocrystals by spray drying. **European Journal of Pharmaceutical Sciences** 2014,62:251-257.
68. Kumar, Mehul, Munjal B, Bansal AK. Differential effect of buffering agents on the crystallization of gemcitabine hydrochloride in frozen solutions. **International Journal of Pharmaceutics** 2014, 471(1-2):56-64.
69. Khomane K, Jain R, Bansal A K, Sangamwar AT. Intestinal Transport of TRH analogues through PepT1: The role of *in silico* and *in vitro* modelling. **Journal of Molecular Recognition** 2013, 27(10): 609-617.
70. Shete G, Kuncham S, Puri V, Gangwal R, Sangamwar AT, Bansal AK. Effect of different 'states' of sorbed water on amorphous celecoxib. **Journal of Pharmaceutical Sciences** 2014, 103(7) :2033–2041.
71. Kuncham, S, Shete G, Bansal AK. Quantification of clarithromycin polymorphs in presence of tablet excipients. **Journal of Excipients and Food Chemicals** 2014, 5(1):65-78.
72. Bagul P, Khomane K, Bansal AK. Investigating permeability related hurdles in oral delivery of 11-keto-β-boswellic acid. **International Journal of Pharmaceutics** 2014, 464(1-2):104-110.
73. Nanakwani K, Modi SR, Bansal AK. Role of thermodynamic, kinetic and structural factors in the recrystallization behavior of amorphous erythromycin salts. **Thermochimica Acta** 2014, 582:77-85.
74. Shete G, Bansal AK. Molecular relaxation behavior and isothermal crystallization above glass-transition temperature of amorphous hesperetin. **Journal of Pharmaceutical Sciences** 2014, 103(1):167–178.
75. Modi S, Khomane KS, Bansal AK. Impact of differential surface molecular environment on the interparticulate bonding strength of celecoxib crystal habits. **International Journal of Pharmaceutics** 2014, 460(1-2):189-195.
76. Dani P, Puri V, Bansal AK. Solubility advantage from amorphous etoricoxib solid dispersions. Accepted for publication in **Drug Development and Industrial Pharmacy** 2014, 40(1):92-101.
77. Khomane KS, Bansal AK. Weak hydrogen bonding interactions influence slip system activity and compaction behavior of pharmaceutical powders. **Journal of Pharmaceutical Sciences** 2013, 102(12):4242-4245.
78. Khomane KS, Bansal AK. Yield strength of microcrystalline cellulose: Experimental evidence by dielectric spectroscopy. **International Journal of Pharmaceutics** 2013, 455:1-4.
79. Khomane KS, Bansal AK. Effect of particle size on in-die and out-of-die compaction behaviour of ranitidine hydrochloride polymorphs. **AAPS Pharmaceutical Science and Technology** 2013, 14:1169-1177.
80. Modi SR, Dantuluri AK, Puri V, Pawar YB, Nandekar P, Sangamwar AT, Perumalla SR, Sun CC, Bansal, AK. Impact of crystal habit on biopharmaceutical performance of celecoxib. **Crystal Growth Design** 2013, 13:2824–2832.
81. Prajapati R, Singh U, Patil A, Khomane KS, Bagul P, Bansal AK, Sangamwar AT. *In-silico* model for p–glycoprotein substrate prediction: insights from molecular dynamics and *in-vitro* studies. **Journal of Computational Aided Molecular Design** 2013, 27:347-363.
82. Upadhyay P, Khomane KS, Kumar L, Bansal AK. Relationship between crystal structure and mechanical properties of ranitidine hydrochloride polymorphs. **Crystal Engineering Communication** 2013, 15:3959–3964.
83. Kumar L and Bansal AK. Determination of glass-transition of the freeze concentrate for lyophilization using novel *ex-situ* super-saturation technique. **Thermochimica Acta** 2013, 559:82–85.
84. Kumar L, Jog R, Singh and Bansal AK. Effect of counter-ion on the solid-state photo-degradation behaviour of prazosin salts. **AAPS Pharmaceutical Science and Technology** 2013, 14:757-763.
85. Laad P, Shete G, Modi S and Bansal AK. Differential surface properties of commercial crystalline telmisartan samples. **European Journal of Pharmaceutical Science,** 2013:49, 109–116

86. Khomane KS, More PK, Raghavendra G and Bansal AK. Molecular understanding of the compaction behaviour of indomethacin polymorphs. **Molecular Pharmaceutics,** 2013:10, 631–639
87. Joshi R P, Negi G, Kumar A, Pawar Y B, Munjal B, Bansal A K and Sharma S S. SNEDDS curcumin formulation leads to enhanced protection from pain and functional deficits associated with diabetic neuropathy: An insight into its mechanism for neuro-protection. **Nanomedicine**, 2013:9, 776–785
88. Srivastava A, Joshi BD, Tandon P, Ayala AP, Bansal AK and Grillo D. Study of polymorphism in imatinib mesylate: A quantum chemical approach using electronic and vibrational spectra. **Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy** 2013, 103L:325–332.
89. More P, Khomane KS and Bansal AK. Flow and compaction behaviour of ultrafine coated ibuprofen. Accepted for publication in **International Journal of Pharmaceutics** 2013, 441:527–534.
90. Kumar L, Meena CL, Pawar YB, Wahlang B, Tikoo KB, Jain R and Bansal AK. Effect of counterions on physicochemical properties of prazosin salts. **AAPS Pharmaceutical Science and Technology** 2013, 14: 141-150.
91. Pawar YB, Munjal B, Arora S, Karwa M, Kohli G, Paliwal J, Bansal AK. Bioavailability of lipidic formulation of curcumin in healthy human volunteers. **Pharmaceutics**, 2012, 4(4):517-530.
92. Pawar YB, Bansal AK. Novel lipid based oral formulation of curcumin: Development and optimization by Design of Experiments approach. **International Journal of Pharmaceutics** 2012, 436:617–623.
93. Khomane KS, Nandekar PP, Wahlang B, Bagul P, Shaikh N, Pawar YB, Meena CL, Sangamwar AT, Jain R, Tikoo KB, Bansal AK. Mechanistic Insights into PEPT1-Mediated Transport of a Novel Antiepileptic, NP-647. **Molecular Pharmaceutics** 2012, 9:2458-2468.
94. Pawar Y B, Shete G, Popat D, Bansal A K. Phase behavior and oral bioavailability of amorphous curcumin. **European Journal of Pharmaceutical Sciences** 2012, 47:56-64.
95. Khomane K, More P, Bansal AK. Counterintuitive compaction behavior of clopidogrel bisulfate polymorphs. **Journal of Pharmaceutical Sciences** 2012, 101:2408-2416.
96. Upadhyay P, Dantuluri AK, Kumar L, Bansal AK. Estimating relative stability of polymorphs by generation of configurational free energy phase diagram. **Journal of Pharmaceutical Sciences** 2012, 101: 1843-1852.
97. Lale SB, Goyal M, Bansal AK. Development of lyophilization cycle and effect of excipients on the stability of catalase during lyophilisation. **International Journal of Pharmaceutical Investigation** 2011, 1(4):214-221.
98. Wahlang B, Pawar YB, Kabra D, Tikoo KB, Bansal AK. Contribution of formulation and excipients towards enhanced permeation of curcumin**. Arznemittelforschung Drug Research** 2012, 62:88-93.
99. Amin A, Dantuluri AK, Bansal AK. Investigating the effect of humidity on the alpha-relaxations of low-density polyethylene using dielectric spectroscopy. **International Journal of Pharmaceutics** 2012, 422: 302-309.
100. Patil S R, Kumar L, Kohli G, Bansal AK. Validated HPLC method for concurrent determination of antipyrine, carbamazepine, furosemide and phenytoin and its application in assessment of drug permeability through Caco-2 cell monolayer. **Scientia Pharmaceutica** 2012, 82:89-100.
101. Sonje V, Kumar L, Bansal AK. Effect of counterions on the properties of amorphous atorvastatin salts. **European Journal of Pharmaceutical Sciences** 2011, 44:462-470.
102. Kumar L, Popat D, Bansal AK. Investigation of the atypical glass transition and recrystallization behavior of amorphous prazosin salts. **Pharmaceutics** 2011, 3:525-537.
103. Puri V, Dantuluri AK, Bansal AK. Barrier coated drug layered particles for enhanced performance of amorphous solid dispersion dosage form. **Journal of Pharmaceutical Sciences** 2011, 101(1):342-353.
104. Kumar L, Bansal AK. Effect of humidity on the hydration behaviour of prazosin hydrochloride polyhydrate: thermal, sorption and crystallographic study. **Thermochimica Acta** 2011, 525:206-210
105. Patel S, Kaushal AM, Bansal AK. The effect of starch paste and sodium starch glycolate on the compaction behavior of wet granulated acetaminophen formulations. **Journal of Excipients and Food Chemicals** 2011, 2(3):64-72.
106. Kumar L, Bansal AK. Effect of counterion on the phase behaviour during lyophilization of indomethacin salt forms. **European Journal of Pharmaceutical Sciences** 2011, 44:136-141.
107. Dantuluri AK, Amin A, Puri V, Bansal AK. Role of α-relaxation on crystallization of amorphous celecoxib above T_g probed by dielectric spectroscopy. **Molecular Pharmaceutics** 2011, 8:814-822.

108. Munjal B, Pawar Y and Bansal AK. Comparative oral bioavailability advantage from curcumin formulations. **Drug Delivery and Translational Research,** 2011, 1(4):322-331.
109. Amin A and Bansal AK. Interaction of antimicrobial preservatives with blow-fill-seal packs: Correlating sorption with solubility parameters. **Pharmaceutical Development and Technology** 2012, 17(5):614-624.
110. Khomane K, Meena CL, Jain R and Bansal AK. NP-647, a novel TRH analogue: Investigating physicochemical parameters critical for its oral and parenteral delivery. **International Journal of Pharmaceutics** 2011, 406:21–30.
111. Wahlang B, Pawar YB and Bansal AK. Identification of permeability-related hurdles in oral delivery of curcumin using Caco-2 cell model. **European Journal of Pharmaceutics and Biopharmaceutics** 2011, 77:275–282.
112. Kumar L, Baheti A and Bansal AK. Effect of counterion on the glass transition temperature (T_g) during lyophilization of ganciclovir salt forms. **Molecular Pharmaceutics** 2011, 8(1):309–314.
113. Puri V, Dantuluri AK and Bansal AK. Investigation of atypical dissolution behaviour of an encapsulated amorphous solid dispersion. **Journal of Pharmaceutical Sciences** 2011, 100(6):2460–2468.
114. Patel S and Bansal AK. Prediction of mechanical properties of compacted binary mixtures containing high-dose poorly compressible drug. **International Journal of Pharmaceutics** 2011, 403:109–114.
115. Amin A, Chauhan S, Dare M and Bansal AK. Sorption of antimicrobial agents in blow-fill-seal packs. **Pharmaceutical Development and Technology** 2012, 17(1):84-93.
116. Patel S, Dahiya SK, Sun C and Bansal AK. Understanding size enlargement and hardening of granules on tabletability of unlubricated granules prepared by dry granulation. **Journal of Pharmaceutical Sciences** 2011, 100(1):758–766.
117. Joshi, A, Patel S and Bansal AK. Compaction studies of alternate solid forms of celecoxib. **Advanced Powder Technology** 2010, 21(4):452–460.
118. Shete, G, Puri V and Bansal AK. Solid-state characterization of commercial crystalline and amorphous atorvastatin calcium samples. **AAPS Pharmaceutical Science and Technology** 2010, 11(2):598-609.
119. Puri V, Karar N, Bansal AK. Wettability and surface chemistry of crystalline and amorphous forms of a poorly water soluble drug. **European Journal of Pharmaceutical Sciences** 2010, 40(2):84-93.
120. Bansal SS, Kaushal AM and Bansal AK. Enthalpy relaxation studies of two structurally related amorphous drugs and their binary dispersions. **Drug Development and Industrial Pharmacy**, 2010:36(11), 1271-80
121. Amin A, Chauhan S, Dare M and Bansal AK. Paraben degradation by *Pseudomonas beteli* and *Bulkholderia lateens*. **European Journal of Pharmaceutics and Biopharmaceutics** 2010, 75(2):206-212.
122. Goyal MK, Roy I, Amin A, Banerjee UC and Bansal AK. Stabilization of lysozyme by benzyl alcohol: surface tension and thermodynamic parameters. **Journal of Pharmaceutical Sciences** 2010, 99(10):4149–4161.
123. Patel, S. Kaushal AM and Bansal AK. Mechanistic investigation on pressure dependency of Heckel parameter. **International Journal of Pharmaceutics** 2010, 389:66–73.
124. Raijada D, Bansal AK and Singh S. Influence of microenvironment pH, humidity and temperature on the stability of polymorphic and amorphous forms of clopidogrel bisulphate. **AAPS Pharmaceutical Science and Technology** 2010, 11(1):197-203.
125. Srivastava A, Mishra S, Tandon P, Patel S, Ayala AP, Bansal AK and Siesler HW. Molecular structure and vibrational spectroscopic analysis of an anti-platelet drug; clopidogrel hydrogen sulphate (form 2) – A combined experimental and quantum chemical approach. **Journal of Molecular Structure** 2010, 964:88-96.
126. Alam S, Patel S and Bansal AK. Effect of sample preparation method on quantification of polymorphs using PXRD. **Pharmaceutical Development and Technology** 2010, 15(5):452-459.
127. Bora P, Puri V and Bansal AK. Physicochemical properties and excipient compatibility studies of probiotic *Bacillus coagulans* spores. **Scientia Pharmaceutica** 2009, 77(3):625–637.
128. Chawla G and Bansal AK. Molecular mobility and physical stability of amorphous irbesartan. **Scientia Pharmaceutica** 2009, 77(3):695–709.
129. Sharma SS, Srinivasan SK, Krishnamoorthy S, Kaushal AM and Bansal AK. Preclinical safety Pharmacology studies on the amorphous formulation of celecoxib. **Arznemittelforschung Drug Research** 2009, 59(5):254-262.

130. Goyal MK, Roy I, Banerjee UC, Sharma V and Bansal AK. Role of benzyl alcohol in prevention of heat induced aggregation and inactivation of hen egg white lysozyme. **European Journal of Pharmaceutics and Biopharmaceutics** 2009, 71(2):367-376.
131. Hiwale PB, Amin A, Patel S, and Bansal AK. Variables affecting reconstitution behaviour of cefuroxime sodium for injection. **Asian Journal of Pharmaceutical Sciences** 2009, 4(1):23-31.
132. Kaushal A, Chakraborti AK and Bansal AK. FTIR Studies on differential intermolecular association in crystalline and amorphous states of structurally related non-steroidal anti-inflammatory drugs. **Molecular Pharmaceutics** 2008, 5(6):937–945.
133. Hiwale PB, Amin A, Patel S and Bansal AK. Reconstitution behaviour of cefuroxime sodium powder for injection. **Indian Journal of Hospital Pharmacy** 2008, 45:121-125.
134. Kumar L and Bansal AK. Preparation and characterization of salt forms of enalapril. **Pharmaceutical Development and Technology** 2008, 13(5):345-357.
135. Bansal SS, Kaushal A, Bansal AK. Co-relationship of physical stability of amorphous dispersions with enthalpy relaxation. **Die Pharmazie-An International Journal of Pharmaceutical Sciences** 2008, 63(11):812-814.
136. Chawla G and Bansal AK. Improved dissolution of a poorly water soluble drug in solid dispersions with polymeric and non-polymeric hydrophilic additives. **Acta Pharmaceutica** 2008, 58(3):257-274.
137. Kumar S, Chawla G and Bansal AK. Spherical crystallization of mebendazole for improvement of processability. **Pharmaceutical Development and Technology** 2008, 13(6):559-568.
138. Mohammaed GA, Puri V and Bansal AK. Co-processing of nevirapine and stavudine by spray drying. **Pharmaceutical Development and Technology** 2008, 13(4):299-310.
139. Kaushal A and Bansal AK. Thermodynamic behavior of glassy state of structurally related compounds. **European Journal of Pharmaceutics and Biopharmaceutics** 2008, 69(3):1067-1076.
140. Kakumanu VK, Arora VK, Bansal AK. Gastro-retentive dosage form for improving bioavailability of cefpodoxime proxetil in rats**. Yakugaku Zasshi** 2008, 128 (3):439-445.
141. Kumar S, Chawla G and Bansal AK. Characterization of solid-state forms of mebendazole. **Die Pharmazie-An International Journal of Pharmaceutical Sciences** 2008, 63(2):136-43.
142. Kumar S, Chawla G and Bansal AK. Role of additives like polymers and surfactants in the crystallization of mebendazole. **Yakugaku Zasshi,** 2008:128 (2), 281-289.
143. Patel S, Kaushal AM and Bansal AK. Compaction behavior of roller compacted ibuprofen. **European Journal of Pharmaceutics and Biopharmaceutics**, 2008, 69:743-749.
144. Patel S, Kaushal AM and Bansal AK. Lubrication potential of magnesium stearate studied on instrumented rotary tablet press. **AAPS Pharmaceutical Science and Technology** 2007, 8(4):57-64.
145. Bansal SS, Kaushal AM and Bansal AK. Molecular and thermodynamic aspects of solubility advantage from solid dispersions. **Molecular Pharmaceutics** 2007, 4(5):794-802.
146. Chawla G and Bansal AK. A comparative assessment of solubility advantage from glassy and crystalline forms of a water-insoluble drug. **European Journal of Pharmaceutical Science** 2007, 32:45-57.
147. Tiwari M, Chawla G and Bansal AK. Quantification of olanzapine polymorphs using powder X-ray diffraction technique. **Journal of Pharmaceutical and Biomedical Analysis** 2007, 43(3):865-872.
148. Patel S, Kaushal AM and Bansal AK. Effect of particle size and compression force on compaction behavior and derived mathematical parameters of compressibility. **Pharmaceutical Research** 2007, 24(1), 111-124
149. Banga S, Chawla G, Varandani D, Mehta BR and Bansal AK. Modification of the crystal habit of celecoxib for improved processability. **Journal Pharm Pharmacology** 2007, 59(1):29-39.
150. Gupta P and Bansal AK. Oral bioavailability advantage from stabilized amorphous systems of celecoxib. **Journal of Pharmaceutical Research** 2006, 5(1):15-24.
151. Kakumanu VK, Arora VK and Bansal AK. Investigation of physicochemical and biological differences of cefpodoxime proxetil enantiomers. **European Journal of Pharmaceutics and Biopharmaceutics** 2006, 64: 255-259.
152. Bansal AK, Mulla M and Kakumanu VK. Criticality of functional excipients and decoding methods during generic product development. **Pharmaceutical Technology Europe** 2006, 18(6):34-38.
153. Kakumanu VK, Arora VK and Bansal AK. Investigation of factors responsible for low oral bioavailability of cefpodoxime proxetil. **International Journal of Pharmaceutics** 2006, 317:155-60.

154. Kakumanu VK, Arora VK and Bansal AK. Development and validation of isomer specific RP-HPLC method for quantification of cefpodoxime proxetil. **Journal of Chromatography *B*** 2006, 835:16-20.
155. Gupta P and Bansal AK. Modeling of drug release from celecoxib-PVP-meglumine amorphous systems. **PDA Journal of Pharmaceutical Science and Technology** 2005, 59(6):346-354.
156. Gupta P, Issa C and Bansal AK. Simultaneous determination of atenolol and furosemide in intestinal perfusion samples by validated reversed-phase high-performance liquid chromatography. **Indian Journal of Pharmaceutical Sciences** 2005, 67(6):672-676.
157. Gupta P and Bansal AK. Ternary amorphous composites of celecoxib, poly(vinyl pyrrolidone) and meglumine with enhanced solubility. **Die Pharmazie-An International Journal of Pharmaceutical Sciences** 2005, 60(11):830-836.
158. Madan J, Chawla G, Arora V, Malik R and Bansal AK. Unbiased membrane permeability parameters for gabapentin using boundary layer approach. **AAPS Pharmaceutical Science and Technology** 2005, 7(1):E224-E230.
159. Koradia VS, Chawla G and Bansal AK. Comprehensive characterization of the innovator product: Targeting bioequivalent generics. **Journal of Generic Medicine** 2005, 2(4):335-346.
160. Rao KP, Chawla G, Kaushal AM and Bansal AK. Impact of solid-state properties on lubrication efficacy of magnesium stearate. **Pharmaceutical Development and Technology** 2005, 10(3):423-437.
161. Gupta P and Bansal AK. Spray drying for generation of a ternary amorphous system of celecoxib, PVP, and meglumine. **Pharmaceutical Development and Technology** 2005, 10(2):273-281.
162. Gupta P and Bansal AK. Molecular interactions in celecoxib–PVP–meglumine amorphous system. **Journal of Pharmaceutics and Pharmacology** 2005, 57(3):303-310.
163. Gupta P, Thilagavathi R, Chakraborti AK and Bansal AK. Role of molecular interaction in stability of Celecoxib-PVP amorphous systems. **Molecular Pharmaceutics** 2005, 2(5):384-391.
164. Gupta P and Bansal A K. Devitrification of amorphous celecoxib. **AAPS Pharmaceutical Science and Technology,** 2005:6(2), E223-E230
165. Gupta P, Thilagavathi R, Chakraborti AK and Bansal AK. Differential molecular interactions between the crystalline and the amorphous phases of celecoxib. **Journal of Pharmacy and Pharmacology,** 2005:57(10), 1271-1278
166. Gupta P, Kakumanu VK and Bansal AK. Stability and solubility of celecoxib–PVP amorphous dispersions: a molecular perspective. **Pharmaceutical Research** 2004, 21(10):1762-1769.
167. Gupta P, Chawla G and Bansal AK. Physical stability and solubility advantage from amorphous celecoxib: The role of thermodynamic quantities and molecular mobility. **Molecular Pharmaceutics** 2004, 1(6):406-413.
168. Koradia V, Chawla G and Bansal AK. Qualitative and quantitative analysis of clopidogrel bisulfate polymorphs. **Acta Pharmaceutica** 2004, 54(3):193-204.
169. Chawla G and Bansal AK. Effect of processing on celecoxib and its solvates. **Pharmaceutical Development and Technology** 2004, 9(4):419-433.
170. Puri V and Bansal AK. *In vitro-in vivo* characterization of release modifying agents for parenteral sustained-release ketorolac formulation. **Drug Development and Industrial Pharmacy** 2004, 30(6):619–626.
171. Issa C, Gupta P and Bansal AK. Intestinal permeation mediated absorption interactions between atenolol and furosemide. **Indian Journal of Pharmaceutical Sciences** 2003, 65(6):631-633.
172. Chawla G, Gupta P, Thilagavathi R, Chakraborti AK and Bansal AK. Characterization of solid–state forms of celecoxib. **European Journal of Pharmaceutical Sciences** 2003, 20(3):305–317.
173. Issa C, Gupta P and Bansal AK. Implications of density correction in gravimetric method for water flux determination using rat single-pass intestinal perfusion technique: A technical note. **AAPS Pharmaceutical Science and Technology** 2003, 4(2):133-138.
174. Vasukumar, K and Bansal AK. Enthalpy relaxation studies on celecoxib amorphous mixtures. **Pharmaceutical Research** 2002, 19(12):1873-1878.
175. Bansal AK, Khar RK, Dubey R and Sharma AK. Benzyl ester prodrug of ibuprofen: pharmacological and toxicological profile. **Bolletino Chimico Farmaceutico** 2001, 140(2):79-82.
176. Bansal AK, Khar RK, Dubey R and Sharma AK. Alkyl ester prodrugs for improved topical delivery of ibuprofen. **Indian Journal of Experimental Biology** 2001, 39(3):280-283

177. Bansal AK, Khar RK, Dubey R and Sharma AK. Activity profile of glycolamide ester prodrugs of ibuprofen. **Drug Development and Industrial Pharmacy** 2001, 27(1):63-70.
178. Bansal AK, Dubey R and Khar RK. Quantitation of activity of alkyl ester prodrugs of ibuprofen. **Drug Development Industrial Pharmacy** 1994, 20(12):2025-2034.
179. Bansal AK, Khar RK, Dubey R and Sharma AK. Effect of group substitution on the physicochemical properties of ibuprofen prodrugs. **Die Pharmazie**-An International Journal of Pharmaceutical Sciences 1994, 49(6):422-424.
180. Kakkar AP, Gulati RK and Bansal AK. Solvent deposition of chlordiazepoxide on starch lactose granules. **Indian Journal of Pharmaceutical Sciences** 1993, 55(6):212-217
181. Bansal AK and Kakkar AP. Solvent deposition system of salbutamol and sucrose pellets. **Indian Drugs**, 1991, 28(10):481-482.
182. Bansal AK and Kakkar AP. Solvent deposition of diazepam over sucrose pellets. **Indian Journal of Pharmaceutical Sciences** 1990, 52:186-187.

- **Review articles**

1. Thakore SD, Sirvi A, Joshi VC, Panigrahi SS, Manna A, Singh R, Sangamwar AT, Bansal AK. Biorelevant dissolution testing and physiologically based absorption modeling to predict in vivo performance of supersaturating drug delivery systems. **International Journal of Pharmaceutics**, 2021, 120958
2. Parmar PK, Wadhawan J, Bansal AK. Pharmaceutical nanocrystals: a promising approach for improved topical drug delivery. **Drug Discovery Today** (Just accepted)
3. Thakore SD, Akhtar J, Jain R, Paudel A, Bansal AK. Analytical and Computational Methods for the Determination of Drug-Polymer Solubility and Miscibility. **Molecular Pharmaceutics** (Just accepted)
4. Kaur A, Kale DP, Bansal AK. Surface characterization of pharmaceutical solids. **TrAC Trends in Analytical Chemistry**, 2021, 116228
5. Parmar PK, Rao SG, Bansal AK. Co-processing of small molecule excipients with polymers to improve functionality. **Expert Opinion on Drug Delivery**, 2021, 1-22
6. Patel D, Zode SS, Bansal AK, Formulation Aspects of Intravenous nanosuspensions. **International Journal of pharmaceutics** 2020**,** 119555.
7. Thakore SD, Sood A, Bansal AK. Emerging role of primary heterogeneous nucleation in pharmaceutical crystallization. **Drug Development Research** 2020, 81(1):3-22.
8. Singh IP, Ahmad F, Gore DD, Tikoo K, Bansal AK, Jachak S M, Jena G. Therapeutic potential of seabuckthorn: a patent review (2000-2018). **Expert Opinion on Therapeutic Patents** 2019, 29(9):733-744.
9. Kaur N, Narang A, Bansal AK. Use of biorelevant dissolution and PBPK modeling to predict oral drug absorption. **European Journal of Pharmaceutics and Biopharmaceutics** 2018, 129:222-246.
10. Kale DP, Zode SS and Bansal AK. Challenges in Translational Development of Pharmaceutical Cocrystals. **Journal of pharmaceutical sciences** 2017, 106(2):457-470.
11. Sharma P, Modi SR, Bansal AK. Co-processing as a tool to improve aqueous dispersibility of cellulose ethers. **Drug development and industrial pharmacy** 2015, 41(11):1745-1758.
12. Shete GB, Jain H, Punj D, Prajapat H, Akotiya P and Bansal AK. Stabilizers used in nanocrysatal based Drug Delivery Systems. **Journal of Excipients and Food Chemicals** 2014, 5(4):184-209.
13. Sharma M, Akhtan N, Sambhav K, Shete G, Bansal AK and Sharma SS. Emerging Potential Of Citrus Flavanones As An Antioxidant In Diabetes And Its Complications. **Current Topics in Medicinal Chemistry** 2015, 15(2):187-195.
14. Sheokand S, Modi SR, Bansal AK. Dynamic vapor sorption as a tool for characterization and quantification of amorphous content in predominantly crystalline materials. **Journal of Pharmaceutical Sciences** 2014, 103(11):3364-3376.
15. Tarate B, Chavan R and Bansal AK. Oral Solid Self-emulsifying Formulations: A Patent Review**. Recent patents on drug delivery & formulation** 2014, 8(2):126-143.

16. Surikutchi BT, Patil SP Shete G, Patel S and Bansal AK. Drug-excipient behavior in polymeric amorphous solid dispersions. **Journal of Excipients and Food Chemicals** 2013, 4(3).
17. Aitipamula S, Banerjee R, Bansal AK, Biradha K, Cheney ML, Choudhury AR, Desiraju GR, Dikundwar AG, Dubey R, Duggirala N, Ghogale PP, Ghosh S, Goswami PK, Goud N R, Jetti Ram RKR, Karpinski P, Kaushik P, Kumar D, Kumar V, Moulton B, Mukherjee A, Mukherjee G, Myerson AS, Puri V, Ramanan A, Malla Reddy TRC, Rodriguez-Hornedo N, Rogers RD, Guru Row TN, Sanphui P, Shane N, Shete G, Singh A, Sun CC, Swift JA, Thaimattam R, Thakur TS, Thaper R, Thomas SP, Tothadi S, Vangala VR, Variankaval N, Vishweshwar P, Weynae DR, Zaworotko MJ. Polymorphs, Salts and Cocrystals: What's in a Name? **Crystal Growth and Design** 2012, 12(5):2147-2152.
18. Khomane K, Meena CL, Jain R and Bansal AK. Novel thyrotropin-releasing hormone analogs: a patent review **Expert Opinion in Therapeutic Patents** 2011, 121(11):1673-1691.
19. Baheti A, Kumar L and Bansal AK. Excipients used in lyophilization of small molecules. **Journal of Excipients and Food Chemicals** 2010, 1(1):41-54.
20. Hiwale P, Amin A, Kumar L and Bansal AK. Variables affecting reconstitution time of dry powder for injection. **Pharmaceutical Technology,** 2008, 32(7):62-68.
21. Kumar L, Amin A and Bansal AK. Salt selection in drug development. **Pharmaceutical Technology** 2008, 32(3):128-146.
22. Kumar L, Amin A and Bansal AK, An overview of automated approaches relevant in pharmaceutical salt screening. **Drug Discovery Today** 2007, 12(23-24):1046-1053.
23. Bansal SS, Joshi A and Bansal AK. New dosage formulations for targeted delivery of cyclo-oxygenase-2 inhibitors: Focus on use in the elderly. **Drugs and Aging** 2007, 24(6), 441-451
24. Amin A and Bansal AK. Formulation development for sterile liquid products in blow-fill-seal packs. **Pharmaceutical Technology** 2006, 30(10):142-154.
25. Patel S, Kaushal AM and Bansal AK. Compression physics in the formulation development of tablets. Critical Review **The Drug Carrier System** 2006, 23(1):1-65.
26. Shah B, Kakumanu V and Bansal AK. Analytical techniques for quantification of amorphous/crystalline phases in pharmaceutical solids. **Journal of Pharmaceutical Sciences** 2006, 95(8):1641-1665.
27. Bansal AK and Koradia V. The role of reverse engineering in the development of generic formulations. **Pharmaceutical Technology** 2005, 29(8):50-55.
28. Kaushal AM, Gupta P and Bansal AK. Amorphous drug delivery systems: Molecular aspects, design, and performance. **Critical Review in Therapeutic Drug Carrier System** 2004, 21(3):133–193.
29. Nachaegari SK and Bansal AK. Co-processed excipients for solid dosage forms. **Pharmaceutical Technology** 2004, 28(1):52-64.
30. Bansal AK. Improved excipients by solid-state manipulation. **The Industrial Pharmacist** 2003, (31):9-12.
31. Chawla G, Gupta P, Koradia V and Bansal AK. Gastroretention–A means to address regional variability in intestinal drug absorption. **Pharmaceutical Technology** 2003, 27(7):50-68.
32. Gupta P and Bansal AK. Patent opportunities in matrix based oral controlled release drug delivery systems, Part II. **Pharmaceutical Technology** 2002, 14(10):47-54.
33. Gupta P and Bansal AK. Patent opportunities in matrix based oral controlled release drug delivery systems, Part I. **Pharmaceutical Technology** 2002, 14(9):49-59.
34. Gupta P and Bansal AK. Patent opportunities in matrix based oral controlled release drug delivery systems, Part I. **Pharmaceutical Technology** 2002, 13-20.
35. Bansal AK. Product development issues of powders for injection. **Pharmaceutical Technology** 2002, 26(3):122–132.

- **Editorial**

1. Suryanarayanan R, Bansal AK. Pharmaceutical Materials Science–Advances in Analyses. **TrAC Trends in Analytical Chemistry**, 2021, 116323
2. Bansal AK, Excipients used in nano-technology assisted drug delivery systems. **Journal of Excipients and Food Chemicals** 2014, 5(4):173-176.

- **General articles**

1. Kumar S, Kaushal AM and Bansal AK. Regulating follow-on bio-products. **Chronicle Pharmabiz** 2006, 43-46
2. Chawla G and Bansal A K. Making improved generic products. **Pharmabiz** 2006
3. Arora S, Kaushal AM and Bansal AK. Role of powder characteristics in the design of dry powder inhalers. **CRIPS Current Research & Information on Pharmaceutical Sciences** 2005, 6(1):7-11
4. Bansal AK. Developing industry responsive courses in academic institutions. **Express Pharma Pulse,** Special Feature: 56th Indian Pharmaceutical Congress. 2004, 24-25
5. Banga S, Chawla G and Bansal AK. New trends in crystallization of active pharmaceutical ingredients. **Business Briefing: Pharmagenerics** 2004, 70-74.
6. Kakumanu V and Bansal AK. Supercritical fluid technology in pharmaceutical research. **Business briefing: Labtech** 2004, 70-72.
7. Chawla G, Banga S and Bansal AK. High throughput polymorph screening of pharmaceuticals– 'Farming for crystal mutants'. **Business Briefing: Future Drug Discovery** 2004, 66-72.
8. Chawla G and Bansal AK. Challenges in polymorphism of pharmaceuticals. **CRIPS Current Research & Information on Pharmaceutical Sciences** 2004, 5(1):12-15.
9. Chawla G and Bansal AK. Regulatory issues related to polymorphism. **Express Pharma Pulse** 2003, 9(49):8.
10. Chawla G and Bansal AK. Polymorphism: Challenges and opportunities. **Express Pharma Pulse** 2003, 9(48):10.
11. Bansal AK and Gupta P. Peroral controlled DDS: Future trends. **Express Pharma Pulse**, **Special feature: Pharmaceutical Technology** 2003, 39-42.
12. Kakumanu V and Bansal AK. Supercritical fluid technology in pharmaceutical research. **CRIPS Current Research & Information on Pharmaceutical Sciences** 2003, 4(2):8-12.
13. Bansal AK and Nachaegari SK. High functionality excipients in solid dosage forms. **Business Briefings: PharmaGenerics** 2002, 38-44.
14. Puri V and Bansal AK. Pharmaceutical technology: Challenges and opportunities. **CRIPS Current Research & Information on Pharmaceutical Sciences** 2001, 2(4):2-11.
15. Verma S and Bansal AK. SUPAC: A scientific approach for scale-up. **Express Pharma Pulse** 2001, 11.
16. Verma S and Bansal AK. SUPAC: Reduce testing and reporting needs. **Express Pharma Pulse** 2001, 11.
17. Verma S and Bansal AK. Genesis of SUPAC-IR guidance. **Express Pharma Pulse** 2001, 20.
18. Singh S, Garg S and Bansal AK. The quality of pharmaceutical products exported from India and the soundness of dossiers submitted by Indian exporters. **Pharma Times** 2001, 33:12-16.

- **Book chapters**

1. Rumondor A, Puri V, Patel D, Thakore SD, Bansal AK. **Role of Solid-State Properties in Drug Dissolution**. Deskbook of Pharmaceutical Dissolution Science and Applications, 2nd Ed, SPDS, 2021.
2. Bansal AK, Balwani G, Sheokand S. **Critical Material Attributes in Wet Granulation**. Handbook of Pharmaceutical Wet Granulation 2019, 421-453.
3. Thakkar S, Sharma K, Khurana S, Bansal AK **Excipients and their Functionality for Enabling Technologies in Oral Dosage Forms**. Pharmaceutical Excipients, ed.: John Wiley & Sons, Inc. 2016, 97-143.
4. Munjal B, Koradia V, Boddu SHS, Bansal AK. **Role of Innovator Product Characterization in Generic Product Development.** In Narang AS and Boddu SHS, editors. Excipient applications in formulation design and drug delivery, Springer 2015, 521-538.
5. Sonje VM, Kumar L, Meena CL, Kohli G, Puri V, Jain R, Bansal AK and Brittain HG. **Atorvastatin calcium.** In: Brittain HG, editor. Profiles of drug substances, excipients, and related methodology. San Diego, CA, USA: Academic Press 2010, 1-70.
6. Kumar L, Alam MS, Meena CL, Jain R and Bansal AK. **Fexofenadine hydrochloride**. In: Brittain HG, editor. Profiles of drug substances, excipients, and related methodology. San Diego, CA, USA: Academic Press 2009, 153-192.

7. Gupta P, Nachaegari SK and Bansal AK. **Improved excipient functionality by co-processing**, In: Katdare A, Chaubal MV, editors. Excipient development for Pharmaceutical, Biotechnology, and Drug delivery Systems. New York: Informa Healthcare 2006, 109-26.
8. Chawla G, Gupta P and Bansal AK. **Gastroretentive drug delivery systems**. In: Jain N K, editor. Progress in controlled and novel drug delivery systems. New Delhi: CBS Publishers and Distributors 2004, 76–97.
9. Bansal AK. **Overview of modern parenteral products and processes**. In: Williams K, editor. Microbial contamination control in parenteral manufacturing. New York: Marcel Dekker 2004, 59–90.

EXTRAMURAL FUNDING

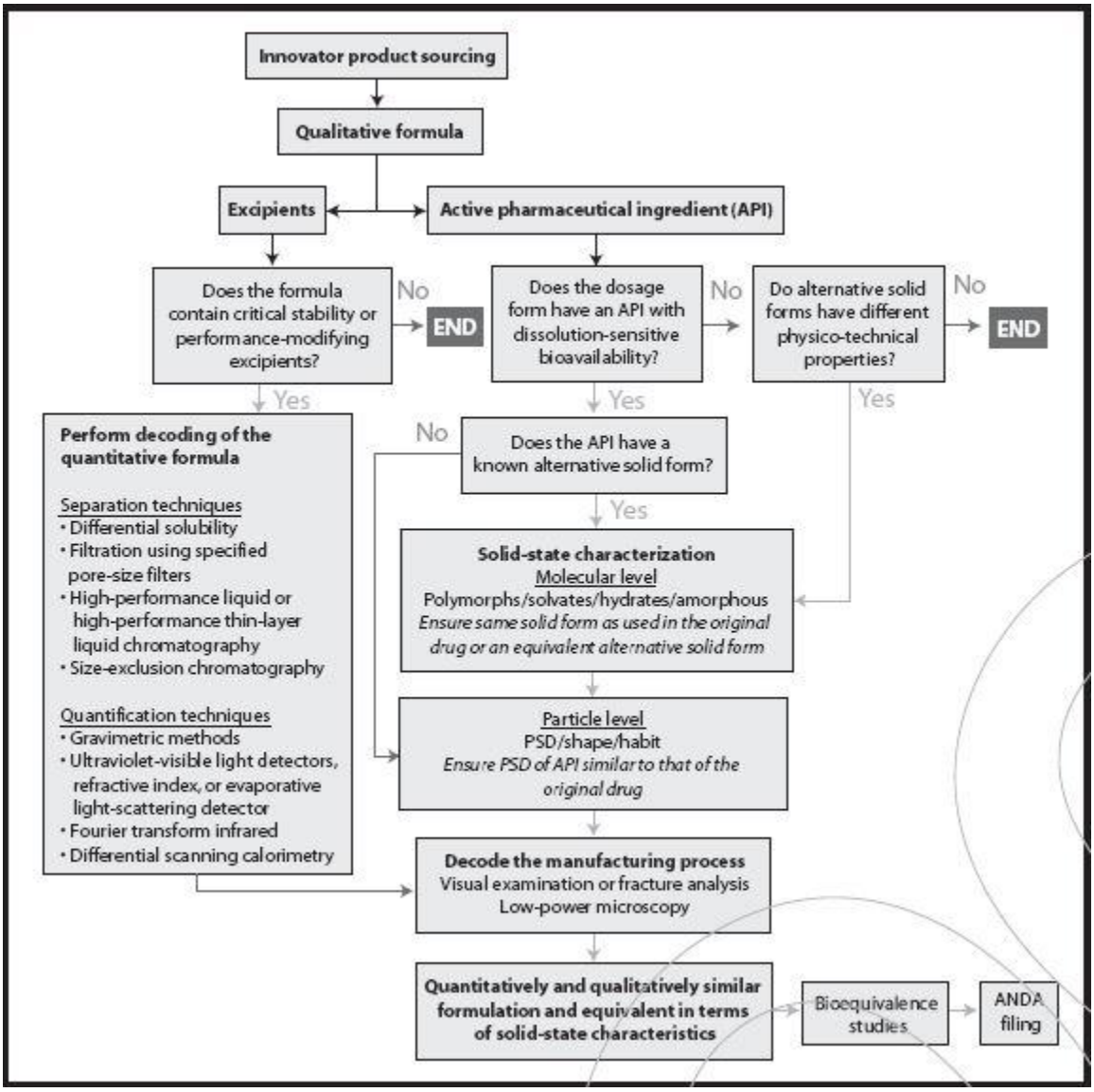
- Principal Investigator (PI) for project entitled **"Preclinical development of penicillin drug delivery system for prophylaxis of rheumatic heart disease"**, sponsored by Indian Council of Medical Research, India. To be commenced in 2017.
- Principal Investigator (PI) for project entitled **"Development of herbal formulations from seabuckthorn"**, sponsored by Department of Biotechnology, India. To be commenced in 2017.
- Co- Principal Investigator (PI) for project entitled "**Enhancement of oral bioavailability of poorly water soluble drugs using NanoCrySP, a patented nanocrystalline solid dispersion technology developed at NIPER-SAS Nagar"**, sponsored by Biotechnology Industry Research Assistance Council (BIRAC), India. Initiated in 2016.
- Principal Investigator (PI) for project entitled "**Development and evaluation of Nanocrystalline Solid Dispersions of a poorly water soluble drug**" sponsored by Department of Science and Technology, India. Initiated in 2015.
- PI for project entitled "**Nanocrystalline Solid Dispersion of hesperetin with enhanced oral bioavailability for cancer treatment**" sponsored by Department of Biotechnology, India. Initiated in 2015.
- PI for Project entitled "**Enhancement of oral bioavailability of melatonin and evaluation of radio-protective efficacy in mice"** sponsored by Institute of Nuclear Medicine and Allied Sciences, DRDO. Completed in December 2014.
- Co-PI for Project entitled "**Centre for pharmaceutical nano-technology**" sponsored by Department of Science and Technology. Completed in June 2012.
- PI for Project entitled "**Design and characterization of nano-crystalline solid dispersions**" sponsored by Department of Biotechnology, India, completed in 2010.
- PI for Project entitled "**Salt forms for optimization of biopharmaceutical properties of drug substances**" sponsored by Department of Science and Technology, India. Completed in 2009.
- PI for Project entitled "**Development of optimized formulations of curcumin**" sponsored by Department of Biotechnology, India. Completed in 2008.

INTERACTION WITH THE PHARMACEUTICAL INDUSTRY

Globalization of Indian pharmaceutical industry has introduced new scientific, regulatory and intellectual property challenges in the area of drug discovery and development. The industry expects academic institution to respond to their emerging needs in research and development. Realizing this, our laboratory has established strong ties with the Indian pharmaceutical industry. Our research activities are broadly divided into pre-formulation profiling and development of Drug Delivery Systems. Pre-formulation activities include solubility, permeability, stability, compaction physics and compatibility studies. Our laboratory has developed expertise in material characterization including salt form selection, polymorph studies, surface characterization and crystal engineering. Based on the pre-

formulation profile suitable interventions for improvement of aqueous solubility and permeability are applied.

Indian pharmaceutical companies have made their strong presence globally in the generic market. We have significantly contributed to the development of generic formulations by proposing a decision tree for reverse engineering of the innovator products. We have expanded the concept of "sameness" of the generic formulations to the concept of "sameness of formulation". This leads to accelerated development of generic formulations and also improves probability of development of a generic formulation (Bansal A K, Koradia V. **The role of reverse engineering in the development of generic formulations.** Pharmaceutical Technology 2005:29(8), 50-55). To this effect we have performed characterization of over innovator formulations, for numerous leading generic companies of India.



(Ref: http://www.pharmtech.com/role-reverse-engineering-development-generic-formulations)

Our laboratory has collaborated with numerous Indian and overseas pharmaceutical companies in the area of Solid state material characterization, Quantification of polymorphic forms, Formulation

development of conventional / modified release formulations, Process optimization, Development of value added generics, Development of lyophilization cycle, Technical support for patent litigation.

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- Solid state material characterization
- Quantification of polymorphic forms
- Formulation development of conventional / modified release formulations
- Process optimization
- Development of value added generics
- Development of lyophilization cycle
- Technical support for patent litigation

We have collaborated with numerous overseas and Indian pharmaceutical companies (a selected list is given below) on sponsored projects.

Medochemie Limited, Cyprus; Reckitt Benckiser, USA; JM Pharma, LLC, USA; DSM Anti-Infectives, Netherlands; United Laboratories, Philippines; Montajat Veterinary Pharmaceutical, Saudi Arabia; Sandoz Private Limited; Ranbaxy Research Labs; Dr. Reddy's Laboratories; Nicholas Piramal; Zydus Cadila Limited; Dabur India Limited; Panacea Biotech; Strides Arcolab; Jubilant Organosys; Natco Pharma; Alpha Drugs, Famy Care Limited; Alkem Labs; Promed Exports Private Limited; UCB Limited; Lupin Labs; Aurobindo Pharma; Macleods; Orchid Pharma; Ind-Swift Labs; Torrent Pharmaceuticals; Lupin Limited; Getz Pharma Research

RESEARCH SCHOLARS

Graduated Ph.D. Students

Dr. Piyush Gupta (2004) Development of amorphous system of celecoxib for enhanced solubility : a molecular perspective	Dr. Vasu Kumar Kakumanu (2006) Oral bioavailability improvement of cefpodoxime proxetil	Dr. Garima Chawla (2007) Molecular insight into amorphous system of three Angiotensin II receptor antagonists	Dr. Aditya M. Kaushal (2007) Molecular and thermodynamic properties of pharmaceutical amorphous forms
Dr. Sarasvat Patel (2010) Compaction behavior of pharmaceutical solids in mono and multi component systems	Dr. Monu Kumari* (2010) Effect of preservatives on the stability of lysozyme	Dr. Aeshna Amin (2010) Interactions of antimicrobial preservatives with Form-Fill-Seal packs and ophthalmic excipients	Dr. Vibha Puri (2011) Pharmaceutical product development of amorphous celecoxib solid dispersions

Dr. Lokesh Kumar (2012) Impact of salt formation on the biopharmaceutical properties of prazosin and solid form behavior during lyophilization of indomethacin and ganciclovir	Dr. Pawar Yogesh B. (2012) Nanocrystalline solid dispersions of curcumin	Dr. Kailas Khomane (2014) Structure, property and process relationship of compaction behavior of pharmaceutical powders	Dr. Ram Jee Sharma* (2015) Studies on Eugenia Jambolana derived anthocyanins-and anthocyanidins-enriched extracts : standardization, biological evaluation and formulation development
Dr. Bhushan Munjal (2015) Effect of processing and formulation variables on the solid form behavior of API(s) during lyophilization	Dr. Shete Ganesh Bhaskarrao (2016) Development and evaluation of nanocrystalline solid dispersions of antioxidants	Dr. Sameer R Modi (2016) Impact of differential surface anisotropy of crystal habits on pharmaceutical performance of celecoxib: a bcs class ii drug	Dr. Bapurao Tarate (2016) Enhancement of oral bioavailability of coenzyme Q10 using eutectic based self emulsifying drug delivery system
Dr. Poonam Singh Thakur (2019) Development and Evaluation of nanocrystalline solid dispersion for Fenofibrate using NanoCrySP™ Technology based on spray drying	Dr. Sneha Sheokand (2019) Development of Nanocrystalline Solid Dispersion of hesperetin and its oral formulation, with enhanced oral bioavilability for prevention of breast cancer	Dr. Sandeep Zode (2019) Lyophilized Nanocrystalline Solid Dispersion of aspirin for parenteral administration	Dr. Jagadish Sharma (2019) Influence of Drug-Polymer Miscibility on Designing of Amorphous Solid Disperson of Dipydamole
Dr. Dnyaneshwar Kale (2020) Development of Cocrystal based Drug Product for Improving biopharmaceutical Performance of Rivaroxaban			

*Co-supervision

Masters students

143 masters' students have graduated till 2020

ACHIEVEMENTS OF THE LAB

1. Ms. Ankita Ramnani won (International block) at IV International Interuniversity GxP summit 2020, held online) for presenting a Case study

2. Ms. Sanika Jadav was awarded with Best Presentation award for second Russian Interuniversity GxP Summit. (2008)
3. Mr. Bhushan Munjal was awarded with Ranbaxy Science Scholar Award 2014 in field of Pharmaceutical Sciences. (2014)
4. Mr. Kailash Khomane was awarded with Lee foundation award for best poster and best abstract in 6th Asian Association of Schools of Pharmacy (AASP) conference at Natiinal University of Singapore, Singapore. (2013)
5. Mr. Sameer R Modi was awarded with Lee foundation award for best abstract in 6th Asian Association of Schools of Pharmacy (AASP) conference at Natiinal University of Singapore, Singapore. (2013)
6. Mr. Yogesh Pawar was awarded with Ranbaxy Science Scholar Award 2012 in field of Pharmaceutical Sciences. (2012)
7. Mr. Lokesh Kumar was awarded with Ranbaxy Science Scholar Award 2012 in field of Pharmaceutical Sciences. (2012)
8. Mr. Sarasvat Patel was awarded with DST young Scientist fellowship for tenure of 2007 to 2010