

Bengal College of Pharmaceutical Sciences & Research

Durgapur- 713212, West Bengal

PUBLICATIONS AND PRESENTATIONS (JAN – MAY 2015)

A. RESEARCH ARTICLE

1. Patel H, Ghosh A and **Chakraverty R**. Current Trends in Therapeutic Strategies for the Management Of Achondroplasia: Revelations for Clinical Trials. *J. Fundam. Pharm. Res.* 2014; 2(2),46-50
2. Naskar S, **Chakraverty R** and Ghosh A. Mycotoxin : An alternate source of anticancer drug. *International Research Journal of Pharmaceutical and Biosciences.*2015; 2(1):31-41.
3. Chakraborty Prithviraj, ParchaVersha, **Chakraborty D. Debarupa**, Ghosh Amitava. Application of artificial neural network model in predicting physicochemical characteristics of pharmaceutically developed wafers of Loratadine. *Asian Journal of Pharmaceutics*, Jan-Mar 2015; 9(1): 44-48. **(IF: 0.46)**.
4. [Rahul Hegde](#), [Prashant Sharma](#), [Pushp Raj](#), [R. V. Keny](#), [Prashant. J. Bhide](#), [Sunil Kumar](#), [Shiv Sankar Bhattacharya](#), [AlkaLohani](#), [Arvind Kumar](#), [AnuragVerma](#), [Prithviraj Chakraborty](#), [Amitava Ghosh](#), [Vaibhav Trivedi](#). Factors affecting emissions from diesel fuel and water-in diesel emulsion. *Energy Sources: Part A Recovery Utilization and Environmental Effects (In Press)*. **(IF: 0.36)**
5. **Manna SS**, Umathe SN. Paracetamol potentiates the antidepressant-like and anticomulsive-like effects of fluoxetine. **Behav Pharmacol.** 2015 Apr; 26(3):268-81. **(Impact factor 2.194)**
6. Mycotoxin- a target for anticancer drug development; **Annals of Medicinal Chemistry and Research;** 2015; **Sagar Naskar***, Amitava Ghosh and Partha Pratim Mahata.

B. SCIENTIFIC POSTER PRESENTATIONS

1. **Raja Chakraverty**, Tatini Debnath, Amitava Ghosh and Anuradha De “Assessment of the impact of a polyherbal antidiabetic formulation on kidney function in diabetic rats” presented at the National Seminar held at Bengal College of Pharmaceutical Sciences and Research in association with SPER during April,2015.
2. Narayan Nath, **Raja Chakraverty**, Supriya Datta, Amitava Ghosh “Preliminary findings from the hydro-alcoholic extract of the leaves of *Eryngium foetidum Linn.*” presented at the National Seminar held at Bengal College of Pharmaceutical Sciences and Research in association with SPER during April, 2015.
3. Ratnamala Datta, **Raja Chakraverty**, Amitava Ghosh, Anuradha De “Evaluation of the impact of a polyherbal antidiabetic formulation on liver parameters in diabetic rats” presented at the National Seminar held at Bengal College of Pharmaceutical Sciences and Research in association with SPER during April, 2015.
4. Susen Adak, **Raja Chakraverty**, Amites Gangopadhyay, Amitav Ghosh “Nanoparticles: a novel source of potential thrombolytics” presented at the National Seminar held at Bengal College of Pharmaceutical Sciences and Research in association with SPER during April, 2015.
5. Silajit Dutta, **Raja Chakraverty**, Amitava Ghosh “Current Prospects of Antiretroviral therapy in the prevention of Mother to Child transmission of HIV” presented at the National Seminar held at Bengal College of Pharmaceutical Sciences and Research in association with SPER during April, 2015.
6. Poster presentation on “Microwave Assisted Organic synthesis-Current Perspectives and Future Prospects” Moumita Banerjee, **Debarupa D. Chakraborty**, Amitava Ghosh, Prithviraj Chakraborty at UGC sponsored National Seminar on “Recent developments in Green Chemistry (RDGC-2015)”, 22nd March 2015 organized by Gushkara Mahavidyalaya, Gushkara, Burdwan, West Bengal In Collaboration with Vivekananda Mahavidyalaya, Burdwan, West Bengal. (PP-15)
7. Poster presentation on “ Herbal Lipstick: A Developmental Approach ” PratyushaSen, KamalenduNath, **Debarupa D. Chakraborty**, Prithviraj Chakraborty at National Seminar on “ Emerging Trends & Innovation in Pharmaceutical Education & Research in India” , April 11, 2015 organized by Society of Pharmaceutical Education & Research (SPER) & Bengal College of Pharmaceutical Sciences & Research (BCPSR), Durgapur. (SPER-BCPSR/15/01)

8. Poster presentation on “ Dynamic chromatin modification by Benzophenanthridine alkaloid- Chelerythrine ” PrajnaParamita Das, Chandrima Das, **Debarupa D. Chakraborty**, Amitava Ghosh at National Seminar on “ Emerging Trends & Innovation in Pharmaceutical Education & Research in India” , April 11, 2015 organized by Society of Pharmaceutical Education & Research (SPER) & Bengal College of Pharmaceutical Sciences & Research (BCPSR), Durgapur. (SPER-BCPSR/15/14)

9. Poster presentation on “Role of Pharmacists in Nations Health Care” Sushruta Chakraborty, Sajal Kumar Jha, Amitava Ghosh at National Seminar on “ Emerging Trends & Innovation in Pharmaceutical Education & Research in India” , April 11, 2015 organized by Society of Pharmaceutical Education & Research (SPER) & Bengal College of Pharmaceutical Sciences & Research (BCPSR), Durgapur. (SPER-BCPSR/15/07).

10. **“Caffeine-capsaicin combinational therapy to treat diabetes”** National Seminar on “Emerging Trends and Innovation in Pharmaceutical Education & research in India-2015” on **11th April, 2015** at Bengal College of Pharmaceutical Sciences and Research, Durgapur (2nd runners up awarded).

11. **“In vitro models to study the effect of drug-drug interactions”** National Seminar on “Emerging Trends and Innovation in Pharmaceutical Education & research in India-2015” on **11th April, 2015** at Bengal College of Pharmaceutical Sciences and Research, Durgapur.

12. **Application of Green Chemistry to carcinogenic chemicals and strategy to minimize the risk of cancer;** on **22nd March, 2015**; Organized by GUSHKARA Mahavidyalaya, Gushkara, Burdwan, W.B., India.

C. BOOKS / CHAPTERS

1. **Prithviraj Chakraborty**, Amitava Ghosh, Debarupa D. Chakraborty, 2015. **Polymeric systems in Quick dissolving Novel Films**, In: Thakur, V.K., Thakur M.K., (Eds.), Handbook of Polymers for Pharmaceutical Technologies, Volume 1, Structure and Chemistry. 2015. **John Wiley & Sons, Inc, U.S.A.**, ISBN: 978-1-119-04134-4
2. **Title of book: “MCQs IN PHARMACY FOR GPAT”**, Author: **Sagar Naskar**; **Publication date:** January, 2015; Publisher: **Nirali Prakashan**, India.
3. Chapter entitled “**Monoclonal antibodies in targeted anticancer therapy**” contributed by **Sonia Auddy, Amitava Ghosh, Sagar Naskar** for the eBook entitled “**Recent Trends in Targeted Drug delivery**” proposed by **SM Group, USA** (accepted).
4. Editor of the invited eBook chapters entitled “**Recent Trends in Targeted Drug delivery**” proposed by **SM Group, USA** (for the year of 2015).

PUBLICATIONS AND PRESENTATIONS

2014

RESEARCH/REVIEW ARTICLES

1. **Sarkar S, Chakraverty R, Ghosh A.** *Calotropis Gigantea* Linn. - A Complete Basket Of Indian Traditional Medicine. International Journal of Pharmaceutical Sciences Research, 2014; 2(1):7-17.
2. **Sarkar S, Das S, Ghosh A.** Qualitative phytochemical screening & acute toxicity study, LD50 determination of Datura metel. Indo American Journal of Pharmaceutical Research, 2014; 4(2), 1114-1119.
3. Deb P, Ghosh R, **Chakraverty R**, Debnath R, Das L, Bhakta T. Phytochemical and Pharmacological evaluation of fruits of *Solanum indicum* Linn. Int. J. Pharm.Sci.Rev.Res., 2014; 25(2):28-32.
4. Chinmoy Paul, **Debarupa D.Chakraborty**, Amitava Ghosh, **Prithviraj Chakraborty**. Natural Indicator as a substitute to Synthetic indicator-A Developmental Approach. *Journal of Applied Pharmaceutical Science (JAPS)* 2014;4(9):001-005.
5. **Sajal Kumar Jha**, Roopa Karki, Venkatesh D.P, Geethalakshami A. Development and Evaluation of Ground Nut Oil Based Microemulsion System Containing Ranitidine Hydrochloride. Indo American Journal of Pharmaceutical Research.2014; 4(2):1029-1039. (**Impact factor: 1.25**)
6. **Sajal Kumar Jha**, Roopa Karki, B Sajeev, Venkatesh D P, Geethalakshmi A. Characterization of Olive Oil based Microemulsion Drug Delivery System for Oral delivery of Antiulcer agent. American Journal of Pharm Tech Research. 2014;4(2):190-201. (**Impact factor: 0.98**)
7. **Sanjay Dey**, Sankha Chattopadhyay, and Bhaskar Mazumder Formulation and Evaluation of Fixed-Dose Combination of Bilayer Gastroretentive Matrix Tablet Containing Atorvastatin as Fast-Release and Atenolol as Sustained-Release. Biomed Research International. Volume 2014, Article ID 396106, 12 pages <http://dx.doi.org/10.1155/2014/396106>. (**Impact factor: 2.88**)
8. **Sajal Kumar Jha**, Roopa Karki Evaluation of Antiulcer Activity of Famotidine-loaded Microemulsion on Experimental Animals. Journal of Chronotherapy and Drug Delivery.2014;5(1):19-25. (**I C Value: 5.09**)

9. **Chakraverty Raja, Naskar Sagar,** Chakraborty Bhaswat Recent insights into the association of chronic inflammatory and neurodegenerative processes in clinical depression; *Journal of Fundamental Pharmaceutical Research*; 2(1), 2014 (**SJIF- 1.608**).
10. **Prithviraj Chakraborty,** Versha Parcha, **Debarupa D. Chakraborty,** and **Amitava Ghosh.** Comparative study on the predictability of statistical models (RSM and ANN) on the behavior of optimized buccoadhesive wafers containing Loratadine and their in vivo assessment. *Drug Delivery*, Early Online: 1–12 (**Impact Factor 2.202**)
11. **Chakraborty Prithviraj,** Parcha Versha, **Chakraborty D. Debarupa, Ghosh Amitava** Application of artificial neural network model in predicting physicochemical characteristics of pharmaceutically developed wafers of loratadine. *Accepted .Asian Journal of Pharmaceutics.*(**Impact Factor 0.46**)
12. Babita Gupta, Urmi Chaurasia, **Prithviraj Chakraborty.** Design and Development of Oral Transmucosal Film for Delivery of Salbutamol Sulphate. *Journal of Pharmaceutical, Chemical and Biological Sciences. Jun-August 2014; 2(2): 118-129.*
13. Rahul Rama Hegde, Prashant Sharma , Pushp Raj, R. V. Keny, Prashant. J. Bhide, Sunil Kumar, Shiv Sankar Bhattacharya, Alka Lohani, Arvind Kumar, Anurag Verma, **Prithviraj Chakraborty , Amitava Ghosh,** Vaibhav Trivedi. Factors affecting emissions from diesel fuel and water-in-diesel emulsion authors ; energy sources part A (accepted manuscript) (**Impact Factor: 0.5**).
14. B. Sajeev Kumar, R. Saraswathi, K. Venkates Kumar, **S. K. Jha,** D. P. Venkates, and S. A. Dhanaraj. Development and characterization of lecithin stabilized Glibenclamide nanocrystals for enhanced solubility and drug delivery. *Drug Delivery Informa.* 2014; 21(3): 173-184. (**Impact Factor 2.202**).
15. **Sajal Kumar Jha,** Roopa Karki, Venkatesh Dinnekere Puttegowda, and **Amitava Ghosh.** Pharmacodynamics and Pharmacokinetics Evaluation of Ranitidine Microemulsion on Experimental Animals. *Advances in Pharmaceutics.* 2014(2014); 1-6.
16. Malakar J, Datta PK, Das Purakayastha S, **Dey S,** Nayak AK. Floating capsules containing alginate-beads of salbutamol sulfate: *In Vitro-in vivo* evaluations. **Int. J Biol. Macro.** 2014; 64: 181-189. (**IF-2.596**).

17. **Chakraverty R**, Samanta A, **Ghosh A**, Sarkar N. Evaluation of the Synergistic Potential of the Combination of an Opioid and Non-Opioid Analgesic in Experimental Models of Pain. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*. 2014; 5(3): 2079-2084.

PAPER & POSTER PRESENTATIONS

1. **S Sarkar** Poster presentation on Qualitative phytochemical screening & acute toxicity study and LD₅₀ determination of *Datura metel*. AICTE sponsored National Conference held on 23rd Jan 2014 on Complex Diseases, Novel therapeutics & Delivery challenges at Gupta College of Technological Sciences, Asansol, India.
2. **S Sarkar** Poster presentation on Mechanism of Snake venom & Antisnake venom. National seminar held on 7th March 2014, on Emerging Thrust Area of Pharmaceuticals in the Field of Nanotechnology By BCDA College of Pharmacy & Technology, Barasat, Kolkata.
3. **Raja Chakraverty**, Arunava Biswas, Ranjita Santra, Anuradha De (Pati), Santanu K. Tripathi. "Evaluation of the safety and efficacy of Diabind®- a polyherbal ayurvedic proprietary medicine in streptozotocin induced diabetes in wistar rats" at the AICTE-sponsored National Conference at Gupta College of Technological Sciences , Asansol-1 between January 23-24, 2014. (Received Best Poster Award).
4. **Raja Chakraverty** and Amitava Ghosh. Current opinion on the prospects of antiretroviral therapy in the prevention of mother-to-child transmission (MTCT) of HIV at AICTE- sponsored National Seminar at BCDA College Of Pharmacy and Technology, Kolkata in March, 2014. (Received Best Poster Award).
5. **Simli Sarkar** Formulation, Preparation, Evaluation and Comparison of Theophylline sustained release tablets using some natural & synthetic agents AICTE sponsored national conference on **complex diseases, novel therapeutics and delivery challenges** dated on 23rd and 24th January was held on Gupta College of Technological Sciences, Asansol, India.
6. **Prithviraj Chakraborty, Debarupa D. Chakraborty, Amitava Ghosh.** *Development of a quick dissolving pharmaceutical wafer of BCS CLASS II drug following FBD approach presented in AICTE sponsored National Seminar on "Recent Developments for Modernization of Indian Traditional Formulations"*, 24th – 25th January 2014, Organized by, Columbia Institute of Pharmacy, Raipur (C.G), India.

7. **Sajal Kumar Jha, Dipshikha Midya, Sagar Naskar, Amitava Ghosh.** Formulation & Evaluation of Orally Disintegrating Tablets containing Ofloxacin presented in AICTE-sponsored National Seminar at BCDA College Of Pharmacy and Technology, Kolkata on 7th March, 2014.
8. **Sudipta Biswas, Amitava Ghosh, Sagar Naskar.** Antioxidant and Prooxidant properties as well as as health benefits of Flavonoids presented in AICTE- sponsored National Seminar at BCDA College Of Pharmacy and Technology, Kolkata on 7th March, 2014.
9. **Sonia Auddy, Sujit Karmakar, Amitava Ghosh, Sagar Naskar.** Evaluation of Anti-dysentery activity and preliminary phytochemical screening of alcoholic extract of *Hydrocotyle asiatica* L. presented in AICTE- sponsored National Seminar at BCDA College of Pharmacy and Technology, Kolkata on 7th March, 2014.
10. **Sagar Naskar, Sanjay Dey, Amitava Ghosh.** Interaction of Engineered Nanoparticles with various components of the environment and possible strategies for their risk assessment presented in AICTE- sponsored National Seminar at BCDA College of Pharmacy and Technology, Kolkata on 7th March, 2014.
11. **Satarupa Ghosh, Chandrima Chatterjee, Amitava Ghosh, Sagar Naskar.** Evaluation of CNS depressant activity and separation of protein from *Abroma augusta* L. by Gel electrophoresis presented in AICTE- sponsored National Seminar at BCDA College of Pharmacy and Technology, Kolkata on 7th March, 2014.
12. **Payel Naskar, Amitava Ghosh, Sagar Naskar.** The Possible interaction of vitamin D and obesity with regard to Type II diabetes and insulin resistance presented in AICTE-sponsored National Seminar at BCDA College of Pharmacy and Technology, Kolkata on 7th March, 2014.
13. **Ratnamala Dutta, Jadupati Malakar, Amitava Ghosh, Sagar Naskar.** Development and Evaluation of glipizide floating beads for oral drug delivery system presented in AICTE- sponsored National Seminar at BCDA College of Pharmacy and Technology, Kolkata on 7th March, 2014.
14. **Shreya Das, Sagar Naskar.** Antibiotic resistance: some strategies to overcome presented in National Seminar on New insights into diseases and therapeutic approaches at Jadavpur University, Kolkata on 17-19th Jan 2014.
15. **Udipta Sarkar, Sagar Naskar.** Biosensor: the new wave in diagnosis and therapy presented in National Seminar on New insights into diseases and therapeutic approaches at Jadavpur University, Kolkata on 17-19th Jan 2014.
16. **Jayeeta Pal, Sagar Naskar.** Herbosomes: an innovative approach to novel drug delivery system for herbs presented in National Seminar on New insights into diseases and therapeutic approaches at Jadavpur University, Kolkata on 17-19th Jan 2014.
17. **SankhaSubhra Ta, AbdhiniBiswas, Prithviraj Chakraborty.** *Evolving Soft Computation in Pharmaceutical Research and Data Management.* National Seminar on "Pharmaceutical Profession and Research in India-Current Scenario and Future

Perspectives, pp 96, organized at Bengal College of Pharmaceutical Sciences and Research, Durgapur in association with APTI, Bengal Branch on 30th August 2014.(Poster Presentation).

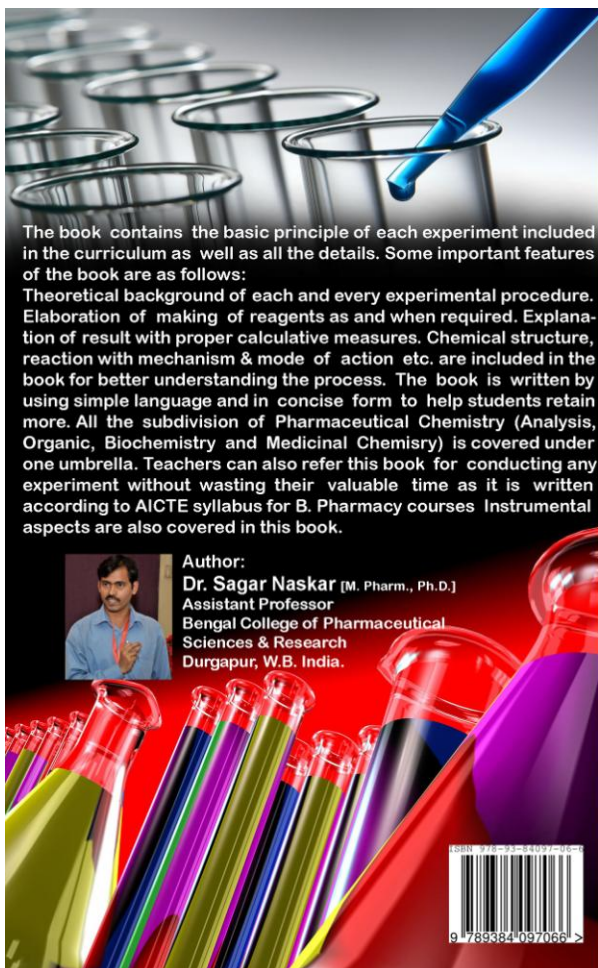
18. Manisha Khandelwal, AlimpanSarkar, **Prithviraj Chakraborty**. *An Insight of Oral Thin Films*.National Seminar on“Pharmaceutical Profession and Research in India-Current Scenario and Future Perspectives, pp 96, organized at Bengal College of Pharmaceutical Sciences and Research, Durgapur in association with APTI, Bengal Branch on 30th August 2014.(Poster Presentation).
19. **Prithviraj Chakraborty**, Debarupa D. Chakraborty, Amitava Ghosh “Artificial Neural Network: A data mining tool in Pharmacovigilance” at 3rd International Conference and Exhibition on “ Pharmacovigilance & Clinical Trials”, 27-29th October, 2014 organized by OMICS Publishing Group, Phamacovigilance-2014 in Hyderabad International Convention Centre, India.(Oral presentation)
20. **Poster presentation** on “*MORE Chemistry: Synthesizing Chemicals in Eco Friendly Environment*” Moumita Banerjee, **Debarupa D. Chakraborty** at National Seminar on Pharmaceutical Profession and Research in India-Current Scenario and Future Perspectives, organized at Bengal College of Pharmaceutical Sciences and Research , Durgapur in association with APTI, Bengal Branch, 30th August, 2014 (BCPSR/NS/14/81)
21. **Poster presentation** on “*Phytochemical Investigation of the flowers of Delonix regia*” **Debarupa D. Chakraborty**, Moumita Banerjee, Kamalendu Nath at International Conference: Frontiers in Pharmaceutical Science & Research on the theme “ Cutting edge technology in New Drug Discovery & Drug Delivery Systems”, 11-12th October 2014 organized by Columbia Institute of Pharmacy in association with Society For Ethnopharmacology, India (IC/PP/221).
22. “Exploitation of two statistical optimization technique to develop buccoadhesive wafers with desired properties” **Prithviraj Chakraborty**, Amitava Ghosh, Manisha Khandelwal at International Conference: Frontiers in Pharmaceutical Science & Research on the theme “ Cutting edge technology in New Drug Discovery & Drug Delivery Systems”, 11-12th October 2014 organized by Columbia Institute of Pharmacy in association with Society For Ethnopharmacology, India (IC/PP/255).(Poster presentation).
23. **Poster presentation** on “Fast Dissolving Tablets: Innovative Technology for suffering Mankind” Juhi Singh, **Sajal Kumar Jha** and **Amitava Ghosh** at National Seminar on Pharmaceutical Profession and Research in India-Current Scenario and Future

Perspectives, organized at Bengal College of Pharmaceutical Sciences and Research , Durgapur in association with APTI, Bengal Branch, 30th August, 2014.

24. Delivered an Oral Presentation on : “Current evidence on the effect of DPP-4 inhibitor drugs on mortality in type 2 diabetic (T2D) patients: A meta-analysis” at the Omics Group 3rd International Conference and Exhibition on Pharmacovigilance & Clinical Trials held between October 27-29, 2014 Hyderabad International Convention Centre, Hyderabad, India.
25. Paper presentation at the 4th Annual Conference & International Colloquium of the Toxicological Society of India (TSICon) on “Ethnomedicinal plants as a viable alternative to synthetic antsnake venom serum (ASVS) in snakebite therapy: an appraisal” held between November 20-22, 2014 held at Calcutta school of Tropical Medicine, Kolkata.
26. Presented paper which received the Second Prize at the Poster session on “Evaluation of Hepatoprotective and Antiulcer effect of aqueous extracts of *Ocimum canum*” at the National Seminar held at Bengal College of Pharmaceutical Sciences & Research on 30th August, 2014.
27. Ethnomedicinal Plants As A Viable Alternative-Antisnakevenom (ASV) In Snake Bite Therapeutics; An Appraisal 4th International Conference And International Colloquium, School Of Tropical Medicine, Kolkata 22-24th November,2014.
28. “Evaluation of Hepatoprotective and Antiulcer effect of aqueous extracts of *Ocimum canum* National Seminar held at Bengal College of Pharmaceutical Sciences & Research. 30th August, 2014.

Books Published

1. "**A BASIC KNOWLEDGE OF PHARMACEUTICAL ANALYSIS**" by Prof. Sujit Karmakar and Prof. (Dr.) Amitava Ghosh on June month published by Pharmamedix India Pvt Ltd, Rajasthan, India
2. : “**A HANDBOOK OF PRACTICAL PHARMACEUTICAL CHEMISTRY**” for B.Pharm students; Author: Sagar Naskar; Publication date: **August, 2014**; Publisher: Pharmamedix, India.
3. “**CONCEPTUAL PHARMACY**” for Pharmacy students, Author: Sagar Naskar, Mrityunjoy Kundu; Publication status: **December, 2014**; Publisher: PharmamedixIndia.



The book contains the basic principle of each experiment included in the curriculum as well as all the details. Some important features of the book are as follows:

Theoretical background of each and every experimental procedure. Elaboration of making of reagents as and when required. Explanation of result with proper calculative measures. Chemical structure, reaction with mechanism & mode of action etc. are included in the book for better understanding the process. The book is written by using simple language and in concise form to help students retain more. All the subdivision of Pharmaceutical Chemistry (Analysis, Organic, Biochemistry and Medicinal Chemistry) is covered under one umbrella. Teachers can also refer this book for conducting any experiment without wasting their valuable time as it is written according to AICTE syllabus for B. Pharmacy courses. Instrumental aspects are also covered in this book.



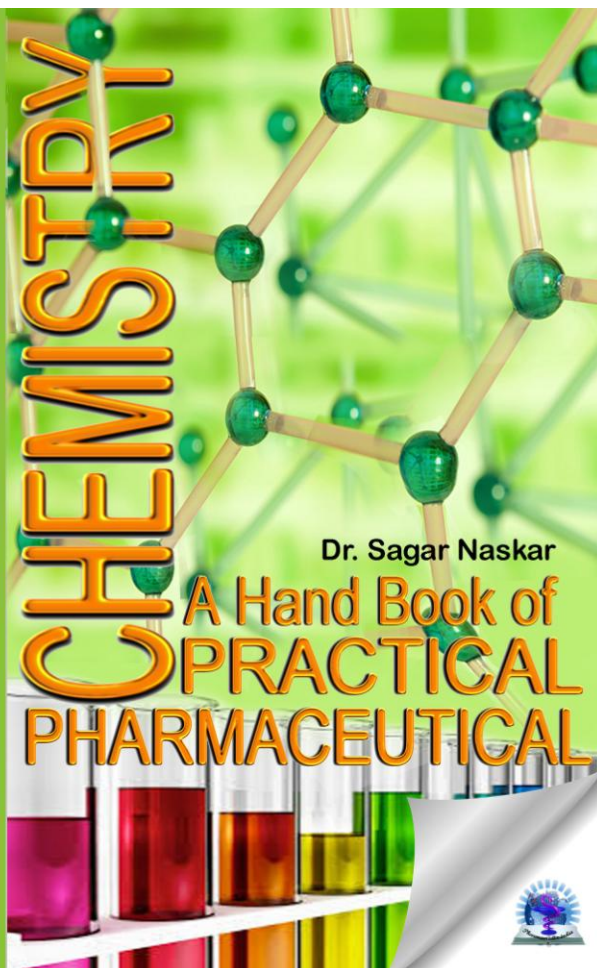
Author:
Dr. Sagar Naskar (M. Pharm., Ph.D.)
Assistant Professor
Bengal College of Pharmaceutical
Sciences & Research
Durgapur, W.B. India.



PMIP

PRACTICAL PHARMACEUTICAL CHEMISTRY

Dr. Sagar Naskar



Dr. Sagar Naskar

A Hand Book of
**PRACTICAL
PHARMACEUTICAL**




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First Hearty congratulations to you for having chosen this book on "A Basic Knowledge of Pharmaceutical Analysis". I remember Prof. (Dr.) G. Pramanik, once discussed with me a similar small idea about the writing a book on Pharmaceutical Analysis for the students of Pharmacy and the Industry Person. The hand notes, that I have prepared for teaching undergraduates & Post graduate of Pharmacy over last 07 years which helped me in preparing this text book.

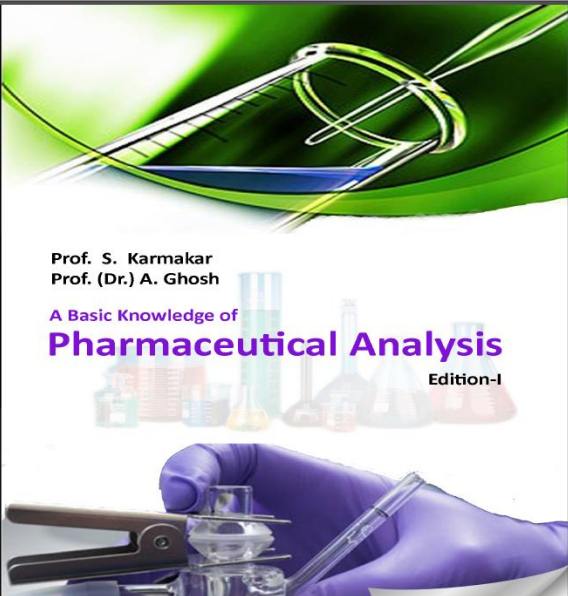
The idea of writing this book was conceived when our own students found great difficulty in getting a book suited to their academic needs, though there were several related books but they had very high technical standard, complex language as well as introductory part, with less relevance to Examination point of view. Vast majority of the students find this subject to be dull & boring to read & have great difficulty to answer in the examination due to proper understand the knowledge of the chapter.

FEATURES OF THIS BOOK:
Full coverage of the UG & PG syllabus for Pharmaceutical Analysis. Covers all the topics of "A Basic knowledge of Pharmaceutical Analysis" & suitable for the syllabus of all the Indian Universities offering Drug Analysis subject. A very simple language & lucid presentation. Too much solution for varies difficult & complex topics are examined in an easy to understand way & in the examination point of view.

Author's:

Prof. S. Karmakar
 Assistant Professor
 Bengal College of Pharmaceutical Sciences & Research
 Bidhannagar, Durgapur, W.B.


Prof. (Dr.) A. Ghosh
 Principal
 Bengal College of Pharmaceutical Sciences & Research
 Bidhannagar, Durgapur, W.B.

A Basic Knowledge of Pharmaceutical Analysis



Prof. S. Karmakar
Prof. (Dr.) A. Ghosh


A Basic Knowledge of Pharmaceutical Analysis
Edition-I


Karmakar

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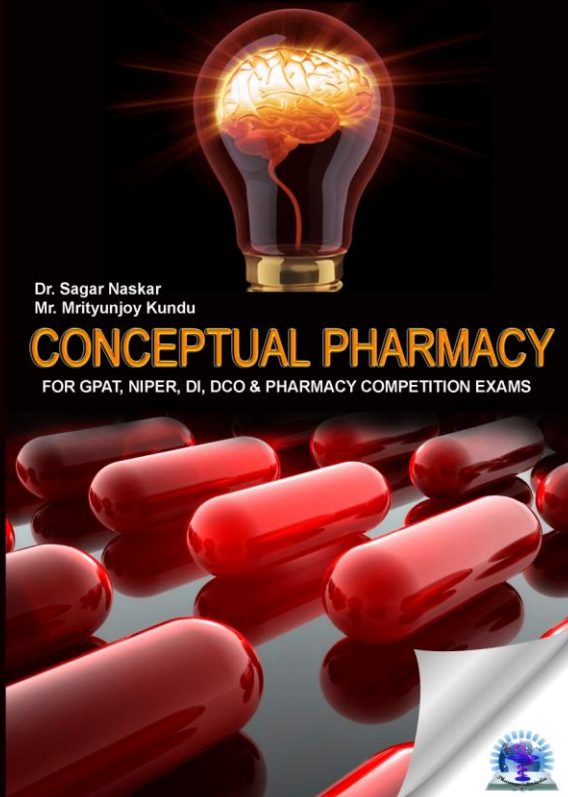
The present book entitled "Conceptual Pharmacy" is written in very concise form and designed for the candidates who are preparing for competitive examination. This book conglomerates the comprehensive information of diverse subject in this discipline. Here the reader will get a brief fundamental content having a degree or diploma or going to be a qualified personal in this field. Apart from getting basic subject knowledge of pharmacy this book will help immensely to inculcate the subject matter to prepare themselves for different competitive examination either to go for higher studies or in different level of written test for recruitment procedure. The book is written in a simple manner to understand the matter and can memorize in an easiest way. This book contains important portion covering almost all major areas of Pharmacy subject such as Pharmaceutical Chemistry, Pharmacognosy, Pharmacology, Pharmaceutics, Biochemistry, Analytical Chemistry, Forensic Pharmacy and Microbiology to some extent.

-Author's

Author:

Dr. Sagar Naskar (M.Pharm., Ph.D)
 Assistant Professor
 Bengal College of Pharmaceutical Sciences & Research,
 Durgapur, W.B, India

Co-Author:

Mr. Mrityunjoy Kundu (M.Pharm.)
 Technical Assistant
 Department of Chemistry
 Bose Institute, Kolkata, W.B
 India.


CONCEPTUAL PHARMACY



Dr. Sagar Naskar
Mr. Mrityunjoy Kundu

CONCEPTUAL PHARMACY
FOR GPAT, NIPER, DI, DCO & PHARMACY COMPETITION EXAMS

Naskar & Kundu



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PUBLICATIONS AND PRESENTATIONS

2013

RESEARCH/REVIEW ARTICLES

1. Chakraborty P, Dey S, Parcha V, Bhattacharya SS, Ghosh A. Design expert supported mathematical optimization and predictability study of bucoadhesive pharmaceutical wafers of loratadine. *BioMed Research International*. 2013. Article ID 197398, 12 pages. doi: 10.1155/2013/197398. (IF-2.88)
2. Ghosh A, Chakraborty P. Formulation and mathematical optimization of controlled release calcium alginate micro pellets of frusemide. *BioMed Research International*. 2013. Article ID 819674. (IF-2.88)
3. Chakraborty P, Parcha V, Chakraborty DD, Chanda I, Ghosh A. Mathematical optimization and characterization of pharmaceutically developed novel bucoadhesive wafers for rapid bioactive delivery of loratadine. *Journal of Pharmaceutical Investigation*. 2013; 43: 133-143.
4. Datta S, Chakraborty DD, Sarkar N, Chakraborty P, Deb J, Ghosh A. Pharmacognostic profiling and pharmacological screening of *Zanthoxylum acanthopodium* DC-a sub-Himalayan shrub of ethnomedicinal value. *American Journal of Pharm Tech Research*. 2013; 3(3): 712-720.
5. Bhattacharya SS, Shukla S, Banerjee S, Chowdhury P, Chakraborty P, Ghosh A. Tailored IPN hydrogel bead of sodium carboxymethyl cellulose and sodium carboxymethyl xanthan gum for controlled delivery of diclofenac sodium. *Polymer-Plastics Technology and Engineering*. 2013; 52: 795-805. (IF-1.279)

6. Hegde RR, Kumar S, Aswal VK, Verma A, Bhattacharya SS, Ghosh A. Small angle neutron scattering study of non ionic surfactant micelles and phase transitions in w/o microemulsion. *Journal of Dispersion Science and Technology*. 2013; DOI: 10.1080/01932691.2013.813393. (IF-0.667)
7. Saxena A, Mishra AK, Verma N, Bhattacharya SS, Ghosh A, Verma A, Pandit JK. Gelucire based in situ gelling emulsions: A potential carrier for sustained stomach specific delivery of gastric irritant drugs. *BioMed Research International*. 2013; Article ID 436932, 11 pages. (IF-2.88)
8. Hegde RR, Bhattacharya SS, Verma A, Ghosh A. Physicochemical and pharmacological investigation of topical ocular w/o microemulsion of timolol maleate for treatment of glaucoma. *Current Eye Research*. 2013; 1-9. (IF-1.70)
9. Kumar BS, Saraswathi R, Kumar KV, Sam TA, Jha SK, Dhanaraj SA. Solid state characterization and effect of PEG 20000 and lecithin on particle size reduction and stability of complexed glibenclamide nanocrystals. *British Journal of Pharmaceutical Research*. 2013; 3(4): 1031-1044.
10. Chatterjee C, Biswas S, Chakraborty DD. Comparative study on differential protein expression in different parts of chickpea plantlet, during its growth in tissue culture. *Asian Journal of Pharmacy and Life Science*. 2013; 3(1): 40-45.
11. Malakar J, Nayak AK, Das A. Modified starch (cationized)-alginate beads containing aceclofenac: Formulation optimization using central composite design. *Starch/Stärke*. 2013, 00, 1-11(Accepted). (IF-1.243)

12. Malakar J, Nayak AK, Pal D, Jana P. Potato starch-blended alginate beads for prolonged release of tolbutamide: Development by statistical optimization and *in vitro* characterization. *Asian Journal of Pharmaceutics*. 2013; 7(1): 43-51. **(IF-0.46)**
13. Nayak AK, Hasnain MS, Malakar J. Development and optimization of hydroxyapatite-ofloxacin implants for possible bone delivery in osteomyelitis treatment. *Current Drug Delivery*. 2013;10; 241-250.
14. Nayak AK, Pal D, Malakar J. Ionotropically emulsion-gelled tamarind seed polysaccharide-alginate floating beads for controlled gastroretentive drug delivery: Development, optimization *in vitro* and *in vivo* evaluation. *Journal of Polymer Engineering Sciences*. 2013; 53(2): 238-250. **(IF-1.302)**
15. Sarkar S, Sen M, Bhattacharjee P, Ghosh A. Qualitative phytochemical screening and antimicrobial studies of *Calotropin gigantia* Linn. latex. *Journal of Pharmacy Research Rx*. 2013 (**In Press**).
16. Geethalakshmi A, Karki R, Sagi P, Jha SK, Venkatesh DP. Temperature triggered *in situ* gelling system for betaxolol in glaucoma. *Journal of Applied Pharmaceutical Science*. 2013; 3(2): 153-159.
17. Bhattacharya SS, Banerjee S, Ghosh AK, Chattopadhyay, Verma A, Ghosh A. A RP-HPLC method for quantification of diclofenac sodium released from biological macromolecules. *International Journal of Biological Macromolecules*. 2013; 58: 354-359. **(IF-2.453)**

18. Bhattacharya SS, Mazahir F, Banerjee S, Verma A, Ghosh A. Preparation and *in vitro* evaluation of xanthan gum facilitated superabsorbent polymeric microspheres. *Carbohydrate Polymers*. 2013. (In Press) (IF-3.628)
19. Chakraverty R, Das A. Prospects of antiretroviral therapy in the prevention of mother-to-child transmission of HIV. *Indo American Journal of Pharmaceutical Research*. 2013; 3(6): 4666-4669.
20. Chakraverty R, Banerjee A. Emerging issues of Pharmacovigilance of herbal medicines in India. *Int. J. Pharm. Sci. Rev. Res*. 2013; 20(1): 40-42.
21. Venkatesh DP*, Roopa karki, Divakar Goli, Sajal Kumar Jha OVER VIEW- ION EXCHANGE RESINS IN CONTROLLED DRUG DELIVERY SYSTEM. *WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES*. 2013; 2(6): 4764-4777. (Global Impact factor 0.629)

BOOK PUBLISHED

1. Title of book: **“RECENT ADVANCES IN ASSISTED REPRODUCTIVE TECHNOLOGY”** Name of chapter: **“HERBAL DRUGS IN REPRODUCTIVE HEALTH: BOON OR BANE”**, authors: **Vikas Gupta, Parveen Bansal, Sanjiv Kumar, Savita Sharma and Prithviraj Chakraborty**; publisher: **Gulab Publishers, New Delhi, India.**
2. Title of book: **“ASSESSMENT OF CHOLESTEROL LOWERING ACTIVITY BY SAPONIN”**, authors: **Sujit Karmakar, Sritinath Chkraborty and Amitava Ghosh**; publication date: **24.01.2013**, publisher: **LAMBERT Academic Publishing.**

ORAL/POSTER PRESENTATION IN SEMINAR/CONFERENCE

1. Raja Chakraverty “Recent insights into the association of chronic inflammatory and neurodegenerative processes in clinical impression” National Seminar held on 5th September, 2013 at Gupta College of Technological Sciences, Asansol, India. (***Poster Presentation; Best Poster Award***)
2. Raja Chakraverty “Recent trends in the clinical trials of novel anxiolytics- an appraisal” National Seminar held on 18th November, 2013 at Calcutta Institute of Pharmaceutical Technology and AHS, Uluberia, India. (***Poster Presentation; Best Poster Award***)
3. Raja Chakraverty “Evaluation of the safety and efficacy of Diabind[®]- a polyherbal ayurvedic proprietary medicine in streptozotocin induced diabetes in Wister rats” Annual Conference of the Indian Pharmacological Society, Bengal Branch. (***Poster Presentation***)
4. Narayan Nath, Kironmoy Karmakar, Sipra Sarkar, Raja Chakraverty “Indigenous medicinal plant of Eastern India-a focus on antidiabetics” National Seminar held on 18th November, 2013 at Calcutta Institute of Pharmaceutical Technology and AHS, Uluberia, India. (***Poster Presentation; Second Prize Award***)
5. Sipra Sarkar, Shreya Das, Amitava Ghosh “Antisnake venom properties of herbal medicine” National Seminar held on 18th November, 2013 at Calcutta Institute of Pharmaceutical Technology and AHS, Uluberia, India. (***Poster Presentation***)
6. Sipra Sarkar, Shreya Das, Amitava Ghosh “Antisnake venom property of herbal medicine - a challenge to antisnake venom serum” in IPSCONWB, 2013 at NRSMC, Kolkata, India. (***Oral Presentation***)

7. Sajal Kumar Jha “Formulation and evaluation of microemulsion drug delivery system containing BCS-III model drug” APTI Annual Convention held at Rajahmundry on 25th to 27th October, 2013. (*Poster Presentation*)
8. Sipra Sarkar, Shreya Das, Amitava Ghosh “Herbal drugs as antsnake venom- a challenge to antsnake venom serum” National Seminar held on 18th November, 2013 at Calcutta Institute of Pharmaceutical Technology and AHS, Uluberia, India. (*Poster Presentation*)
9. Moumita Banerjee, Sipra Sarkar “Herbal drugs in place of conventional NSAIDS drugs” National Seminar held on 18th November, 2013 at Calcutta Institute of Pharmaceutical Technology and AHS, Uluberia, India. (*Poster Presentation*)
10. Revana Mridha, Kanchan Kr. Day, Raja Chakraborty “Recent insights into the molecular mechanisms of G-protein coupled receptors” ” in IPSCONWB, 2013 at NRSMC, Kolkata, India. (*Poster Presentation*)
11. Sagar Naskar, Upal Kanti Mazumder “Natural remedies and herb-drug interactions” in IPSCONWB, 2013 at NRSMC, Kolkata, India. (*Oral Presentation*)
12. Simli Sarkar, Lopamudra Chakraborty, Amitava Ghosh “Design, formulation and comparative evaluation of mouth dissolving tablet using some super-disintegrant for buccal cavity infections” National Seminar held on 5th September, 2013 at Gupta College of Technological Sciences, Asansol, India. (*Poster Presentation*)

2012

RESEARCH/REVIEW ARTICLES

1. Malakar J, Nayak AK, Pal D. Development of cloxacillin loaded multiple-unit alginate-based floating system by emulsion-gelation method. *International Journal of Biological Macromolecules*. 2012; 50: 138-147. (IF-2.453)
2. Jadupati M, Ghosh A, Basu A, Nayak AK. Nanotechnology: A promising carrier for intracellular drug delivery system. *International Research Journal of Pharmacy*. 2012; 3(2): 36-40.
3. Dey S, Sarkar S, Malakar J, Ghosh A, Gangopadhyay A, Mazumder B. Spectrophotometric method for simultaneous determination of atenolol and atorvastatin in tablet dosage forms. *Int J Pharm Biomed Res*. 2012; 3(1): 40-43.
4. Naskar S, Mazumder UK, Pramanik G, Saha P, Halder PK, Gupta M. Evaluation of antinociceptive and anti-inflammatory activity of hydromethanol extract of *Cocos nucifera* L. *Journal of Inflammopharmacology*. DOI. 10.1007/s10787-012-0135-7.
5. Naskar S, Mazumder UK, Biswas R. Laboratory assessment and phytochemical screening of *Mollugo spergula*. *Journal of Biomedical and Pharmaceutical Research*. 2012; 1(1): 1-3.
6. Bala A, Halder PK, Kar B, Naskar S, Mazumder UK. Carbon tetrachloride: A hepatotoxin causes oxidative stress in murine peritoneal macrophage and peripheral blood lymphocyte cells. *Immunopharmacology and Immunotoxicology*. 2012; 34(1): 157-162.
7. Gangopadhyay A, Malakar J, Ghosh A, Pramanik G, Karmakar S. Comparative antibacterial study of *Barlteria prionitis* Linn. leaf extracts. *International Journal of Pharmaceutical and Biological Archives*. 2012; 3(2): 391-393.

8. Karmakar S, Biswas T, Pramanik S, Malakar J, Gangopadhyay A, Ghosh A, Pramanik G. Pharmacognostical studies and chromatographic evaluation of the different extracts of *Abrus precatorious* Linn. *International Journal of Pharmaceutical Research and Development*. 2012; 4(3): 225-233.
9. Malakar J, Datta PK, Biswas R, Ghosh A. Development and *in vitro* evaluation of hydrodynamically balanced system for aceclofenac delivery. *Am. J. PharmTech Res.* 2012; 2(3): 863-872.
10. Malakar J, Basu A, Ghosh A. Nanosuspension: A nano-heterogeneous carrier for drug delivery system. *International Journal of Pharmaceutical & Biological Archives*. 2012; 3(1): 4-13.
11. Malakar J, Nayak A, Basu A. Ondansetron HCl microemulsions for transdermal delivery: Formulation and *in vitro* skin permeation. *ISRN Pharmaceutics*. 2012; doi: 5402/2012/428396.
12. Malakar J, Nayak AK. Theophylline release behavior from hard gelatin capsules containing hydrophilic polymeric matrices. *J. Pharm Educ. Res.* 2012; 3(1): 10-16.
13. Malakar J, Kumar AK. Transferosome: An opportunistic carrier for transdermal drug delivery system. *International Research Journal of Pharmacy*. 2012; 3(3): 35-38.
14. Dey S, Datta S, Mazumder B. Formulation and evaluation of floating matrix tablet of atenolol for gastro-retentive drug delivery. *International Journal of Pharmacy and Pharmaceutical Sciences*. 2012; 4(suppl 3): 432-437.
15. Malakar J, Das T, Ghatak S. Microencapsulation: An indispensable technology for drug delivery system. *International Research Journal of Pharmacy*. 2012; 3(4): 8-13.

16. Dey S, Jha SK, Malakar J, Gangopadhyay A. Improvement of bioavailability of poorly soluble drugs through self emulsifying drug delivery system. *Journal of PharmaSciTech*. 2012; 1(2): 6-11.
17. Jha SK, Karki R, Ghosh A. Potential role of antioxidants in cancer management. *International Journal of Therapeutic Applications*. 2012; 1: 32-37.

ORAL PRESENTATION

1. Sagar Naskar “Hepatoprotective activity of *Cocos nucifera* L. against carbon tetrachloride induced hepatotoxicity in rats” in 12th International Congress of Ethnopharmacology in Jadavpur University, Kolkata, India.
2. Prabir Kr. Datta, Amitava Ghosh, Goutam Mukhopadhyay. “Application of pharmaceutical engineering: A useful technology and guide in pollution control of toxic pollutant in pharmaceutical industry” in National seminar on ‘Recent Advancement in Environmental Management’ in DIMS, Durgapur.

POSTER PRESENTATION

1. Sagar Naskar, Upal K. Mazumder. “Instrumentation, standard operating procedure and calibration of the UV-Visible spectrophotometer for testing the quality of medicines” in national seminar of “21st Century Quality Challenges in Pharma Formulation Sector” in B.C. Roy College of Pharmacy and AHS.
2. Sagar Naskar. “Phytochemical screening for the evaluation of herbal drugs” in national seminar of “Recent Research Trends in Herbal Medicine” in B.C. Roy College of Pharmacy and AHS.
3. Sagar Naskar, Upal K. Mazumder. “Instrumentation, standard operating procedure and calibration of the UV-Visible spectrophotometer for testing the quality of medicines” in

national seminar of “21st Century Quality Challenges in Pharma Formulation Sector” in B.C. Roy College of Pharmacy and AHS.

4. Sagar Naskar and Upal K. Mazumder. “Instrumentation and application of HPTLC in the field of pharmaceutical technology” in national seminar of “Recent Research Trends in Herbal Medicine” in B.C. Roy College of Pharmacy and AHS.
5. Biswarup Sen, Sanjay Dey, Amitava Ghosh. “Formulation and *in vitro* evaluation of a bilayer matrix tablet containing glimperide as immediate release and metformin hydrochloride as sustained release’ in international seminar of “1st International Conference on Innovative Pharmacy and Pharmaceutical Sciences” in Bhopal.
6. Siddharth Kumar, Sanjay Dey, Amitava Ghosh. “Preparation and *in vitro* characterization of mucoadhesive buccal patches of ondansetron hydrochloride” in international seminar of “1st International Conference on Innovative Pharmacy and Pharmaceutical Sciences” in Bhopal.
7. Sarpita Das, Sanjay Dey, Amitava Ghosh. “Formulation development and *in vitro* evaluation of floating drug delivery systems of metoclopramide hydrochloride” in international seminar of “1st International Conference on Innovative Pharmacy and Pharmaceutical Sciences” in Bhopal.
8. Dishari Dutta, Sanjay Dey, Amitava Ghosh. “Formulation and *in vitro* evaluation of gastroretentive matrix tablets of levofloxacin” in international seminar of “1st International Conference on Innovative Pharmacy and Pharmaceutical Sciences” in Bhopal (**BEST POSTER, WIN 1st PRIZE, RECEIVED YOUNG INNOVATIVE AWARDS**).

9. Dharmaraj Tewari, Sanjay Dey, Amitava Ghosh. "Preparation and *in vitro* characterization of gastroretentive floating microspheres of ofloxacin hydrochloride" in international seminar of "1st International Conference on Innovative Pharmacy and Pharmaceutical Sciences" in Bhopal.
10. Rimi Ghosh, Sanjay Dey, Amitava Ghosh. "Formulation and characterization of sustained release matrix tablet for gastric retention of ofloxacin" in international seminar of "1st International Conference on Innovative Pharmacy and Pharmaceutical Sciences" in Bhopal.
11. Krishnendu Mukherjee, Sanjay Dey, Amitava Ghosh. "Formulation and evaluation of oro dispersible tablets of ondansetron hydrochloride by direct compression using superdisintegrants" in international seminar of "1st International Conference on Innovative Pharmacy and Pharmaceutical Sciences" in Bhopal.
12. Krishnendu Kumar Das, Sanjay Dey, Amitava Ghosh. "Formulation and *in vitro* characterization of pimozone buccal mucoadhesive patches" in international seminar of "1st International Conference on Innovative Pharmacy and Pharmaceutical Sciences" in Bhopal.
13. Shuvabrata Dolui, Sanjay Dey, Amitava Ghosh. "Preparation and *in vitro* evaluation of silymarin sustained release tablets prepared using hydrophilic natural gums" in international seminar of "1st International Conference on Innovative Pharmacy and Pharmaceutical Sciences" in Bhopal.
14. Swati Som, Sanjay Dey, Amitava Ghosh. "Formulation and *in vitro* characterization of ethylcellulose sustained release matrix tablets of theophylline" in international seminar of

“1st International Conference on Innovative Pharmacy and Pharmaceutical Sciences” in Bhopal.

15. Lopamudra Chakraborty, Sanjay Dey, Amitava Ghosh. “Formulation and *in vitro* evaluation of sustained release matrix tablets of theophylline using hydrophilic polymer as release retardant” in international seminar of “1st International Conference on Innovative Pharmacy and Pharmaceutical Sciences” in Bhopal.
16. Soumya Sinha, Sanjay Dey, Amitava Ghosh. “Development, characterization, *in vitro* and *ex vivo* evaluation of valsartan loaded solid lipid nanoparticles” in international seminar of “1st International Conference on Innovative Pharmacy and Pharmaceutical Sciences” in Bhopal.
17. Rabi Kant Sharma, Sanjay Dey, Amitava Ghosh. “Preparation and evaluation of gastroretentive microparticulate system of amoxicillin” in international seminar of “1st International Conference on Innovative Pharmacy and Pharmaceutical Sciences” in Bhopal.

BOOK PUBLISHED

Title of book: “**BASIC RESEARCH IN FREE RADICALS AND ITS SCAVENGERS**”,
authors: **Sagar Naskar and Upal K. Mazumder**; publication date: **10.05.2012**, publisher:
LAMBERT Academic Publishing.

2011

RESEARCH/REVIEW ARTICLES

1. Malakar J, Datta PK, Dey S, Gangopadhyay A, Nayak AK. Proniosomes: A preferable carrier for drug delivery system. *Elixir Pharmacy*. 2011; 40: 5120-5124.
2. Nayak AK, Malakar J. Formulation and in vitro evaluation of hydrodynamically balanced system for theophylline delivery. *Journal of Basic and Clinical Pharmacy*. 2011; 1: 133-137.
3. Malakar J, Sen SO, Nayak AK, Sen KK. Development and evaluation of microemulsion for transdermal delivery of insulin. *ISRN Pharmaceutics*. Article ID. 780150. doi: 5402/2011/780150.
4. Vajpayee A, Fartyal S, Singh AP, Jha SK. Formulation and evaluation of colon targeted curcumin microspheres using natural polymers. *Journal of Pharmaceutical Research and Opinion*. 2011; 1(4): 108-112.
5. Jha SK, Karki R, Venkatesh DP, Geethalakshami A. Formulation development and characterization of microemulsion drug delivery systems containing antiulcer drug. *Int J Drug Dev & Res*. 2011; 3(4): 336-343.
6. Jha SK, Dey S, Karki R. Microemulsion-potential carrier for improved drug delivery. *Internationale Pharmaceutica Scientia*. 2011; 1(2): 25-28.
7. Geethalakshami A, Karki R, Jha SK, Venkatesh DP, Nikunj B. Sustained ocular delivery of brimomidine tartarate using ion activated *in situ* gelling system. *Current Drug Delivery*. 2011; 9(2): 197-204.
8. Naskar S, Mazumder UK, Halder PK, Ghosh A. Evaluation and review of hepatoprotective drugs from natural resources. *Pharmacologyonline*. 2011; 3: 993-1006.

9. Naskar S, Mazumder UK, Pramanik G, Bala A, Halder PK, Islam A, Gupta M. Comparative *in vitro* antioxidant activity of different parts of *Cocos nucifera* (Linn.) on reactive oxygen and nitrogen species. *International Journal of Pharmacy and Pharmaceutical Sciences*. 2011; 3(3):
10. Dey S, Mahanti B, Mazumder B, Malgope A, Dasgupta S. Nasal drug delivery: an approach of drug delivery through nasal route. *Der Pharmacia Sinicia*. 2011; 2(3): 94-106.
11. Malakar J. Microemulsion: A micro-heterogeneous carrier for drug delivery system. *International Journal of Advances in Pharmaceutical Research*. 2011; 2(12): 650-657.

2010

1. Nayak AK, Malakar J. Formulation and *in vitro* evaluation of gastroretentive hydrodynamically balanced system for ciprofloaxacin HCl. *Journal of Pharmaceutical Education and Research*. 2010; 1(2): 65-68.
2. Nayak AK, Malakar J, Sen KK. Gastroretentive drug delivery technologies: Current approaches and future potential. *J Pharm Edu Res*. 2010; 1(2): 1-12.