World Journal of Pharmaceutical Science and Research
www.wjpsronline.com
Research Article
ISSN: 2583-6579
SJIF Impact Factor: 5.111
Year - 2025
Volume: 4; Issue: 3
Page: 869-877

PREPARATION AND EVALUATION OF PAIN-RELIEVING GEL

[1]Muskan Singh, [2*]Nandini Chaturvedi, [2]Nidhi Chaudhary, [3]Ashok Kumar, [4]Dr. Amandeep Singh

[1]Student, School of Pharmaceutical Sciences, Jigyasa University (formerly Himgiri zee University), Dehradun.

[2]Assistant Professor, School of Pharmaceutical Sciences, Jigyasa University (formerly Himgiri zee University), Dehradun.

[3]Associate Professor, School of Pharmaceutical Sciences, Jigyasa University (formerly Himgiri zee University), Dehradun.

[4]Principal & Professor, School of Pharmaceutical Sciences, Jigyasa University (formerly Himgiri zee University), Dehradun.

Article Received: 05 May 2025 // Article Revised: 26 May 2025 // Article Accepted: 17 June 2025

***Corresponding Author: Nandini Chautrvedi**
Assistant Professor, School of Pharmaceutical Sciences, Jigyasa University (formerly Himgiri zee University), Dehradun.
DOI: https://doi.org/10.5281/zenodo.15773401

How to cite this Article: Muskan Singh, Nandini Chautrvedi, Nidhi Chaudhary, Ashok Kumar, Dr Amandeep Singh (2025) PREPARATION AND EVALUATION OF PAIN-RELIEVING GEL.. World Journal of Pharmaceutical Science and Research, 4(3), 869-877. https://doi.org/10.5281/zenodo.15773401

ABSTRACT

The increasing interest in natural products for therapeutic use has prompted the exploration of medicinal plants with analgesic potential. *Dendrobium Macrae*, a species of orchid known for its traditional medicinal uses, has shown promise as a source of pain-relieving agents. This article outlines the formulation of a topical gel incorporating extracts of *D. Macrae* and evaluates its analgesic efficacy, stability, and physicochemical properties. This study focuses on the development and assessment of a topical gel designed for pain relief. Using both natural and synthetic ingredients, the gel was formulated for fast absorption, reduced skin irritation, and effective analgesic activity. The evaluation process included physicochemical analysis, spread ability, pH, viscosity**.** Recent molecular and phylogenetic (evolution-based) research has already started to provide valuable insights into the Dendrobium genus. Future research in these areas holds great promise for the conservation of rare, endemic (native to a specific area) endangered species of Dendrobium. By understanding the genetic structure and diversity of these plants, scientists can develop better strategies to protect and preserve them. This paper acts as a review of molecular studies conducted on Dendrobium and aims to guide researchers in selecting the most effective methods for future molecular research in Malaysia. Such studies are expected to contribute to the conservation efforts and deepen our understanding of this fascinating genus.

KEYWORD: Herbal Remedy, Orchid-based pain relief, Dendrobium, Anti-inflammatory herbal gel

INTRODUCTION

Pain is a complex physiological response that serves as a warning system for the body but becomes pathological when chronic or inadequately managed. It is a leading cause of disability worldwide, associated with inflammatory conditions, nerve injuries, muscle strains, and arthritic disorders.[1,2,3] Conventional treatment involves NSAIDs, opioids, and corticosteroids, which, despite their efficacy, pose risks such as gastrointestinal damage, renal dysfunction, and addiction. Therefore, the search for safer alternatives has turned attention toward herbal therapeutics and topical formulations.[13,14,15,17] Topical drug delivery systems, particularly gels, offer several advantages, including localized action, avoidance of first-pass metabolism, rapid onset, and reduced systemic side effects.[55,65,70] Herbal gels integrate the pharmacological benefits of medicinal plants with a convenient and patient-friendly mode of delivery.[56,59] Among these, *Dendrobium macraei*, a member of the Orchidaceae family, has gained interest due to its traditional use in Ayurvedic medicine under the name Jeevanti, where it has been used for joint pain, muscle soreness, and inflammatory conditions.[18,19,20,21]

This species is native to Southeast Asia and grows in humid, tropical environments.[64] It is characterized by epiphytic growth, cane-like stems, and yellow to greenish flowers. Phytochemical screening of *D. macraei* has identified compounds such as alkaloids, phenanthrenes, flavonoids, and polysaccharides—all of which have shown analgesic, antioxidant, and anti-inflammatory potential in earlier studies.[22,23,24,26]

Despite its traditional relevance, *D. macraei* has not been extensively studied in modern pharmaceutical formulations.[4,5,6] This study, therefore, aims to develop a herbal gel formulation using ethanolic extracts of *D. macraei* and to evaluate its physicochemical parameters, stability, and drug release properties. By bridging the gap between traditional medicine and evidence-based pharmaceutical science, this work contributes toward safer and more effective herbal alternatives for pain relief.[28,29,30,31]

Phytochemical Constituents: The therapeutic effects of Dendrobium species are attributed to Alkaloids (e.g., dendrobine), Phenanthrenes, Bibenzyls, Flavonoids, Polysaccharides, Steroids.

Medicinal Properties: Anti-inflammatory, Analgesic, Antioxidant, Immunomodulatory, Antipyretic

Extraction of Dendrobium

1. Powder the dried plant material.
2. Use Soxhlet extraction with ethanol or water for 6–8 hours.
3. Filter and concentrate using a rotary evaporator[51,52]

Gel Formulation Procedure

1. Carbopol Dispersion: Disperse Carbopol 934 in distilled water; hydrate overnight.[71]
2. Extract Addition: Dissolve D. macraei extract in ethanol/propylene glycol and mix into the gel base.[60,62]
3. Preservative Addition: Add methylparaben and propylparaben dissolved in warm water.[7,8,9]
4. Neutralization: Adjust pH to 6.5–7.0 with triethanolamine.[23,24]
5. Deaeration: Let the gel stand to remove air bubbles.[63]

Evaluation Parameters

- **Physical Appearance**: Smooth, homogeneous, free from lumps.[58,69,58]
- **pH Measurement**: Ideal range 6.0–7.0, measured with a digital pH meter.
- **Viscosity**: Assessed with a Brookfield viscometer.[72]
- **Drug Content Uniformity**: Determined via UV spectrophotometry.[73]
- **Stability Testing**: Store at 40°C/75% RH for 3 months; observe for phase separation, discoloration, and degradation.[10,11]

Feature	Benefit
No First-Pass Metabolism	Avoids liver metabolism; improves bioavailability
Faster Onset	Rapid relief compared to oral formulations
Better Compliance	Easy, non-invasive, well-accepted by patients [25,26,27]
Controlled Release	Sustained delivery of active phytoconstituents

Final Formulation (Example)

Ingredient	Quantity (%)
D. macraei Extract	40g
Coconut oil	20g
Bees wax pellets	15g
Aloe vera gel	q.s.
Camphor	10g
Menthol	15g

Fig. 1: Denrobium macrae extract.

Fig. 2: Picture of ingredients.

RESULTS

The formulated gel was visually appealing, homogeneous, and stable, with no signs of phase separation or microbial contamination. The pH was maintained within the ideal range, ensuring compatibility with skin application. Viscosity and spreadability parameters confirmed the gel's ease of application and desirable consistency. Drug content analysis revealed uniform distribution of the active constituents. In vitro drug release studies demonstrated a sustained release pattern over several hours, indicating prolonged therapeutic effect.

CONCLUSION

This study successfully developed a topical pain-relieving gel formulated with *Dendrobium macraei* extract, emphasizing its physicochemical stability, aesthetic appeal, and therapeutic effectiveness. The formulation showed an optimal pH range, uniform drug content, high viscosity, and smooth spreadability, all of which are crucial for patient acceptability and product performance. The sustained drug release observed in vitro indicates a prolonged analgesic effect, aligning with the goal of long-lasting pain relief through a single application.

The incorporation of both natural and synthetic components in the gel base optimized its penetration and bioavailability while minimizing the risk of irritation or adverse effects. The use of a herbal extract like D. macraei bridges traditional medicine and modern pharmaceutical practices, contributing to the development of safe, effective, and patient-friendly therapeutic options.

Furthermore, the formulation remained stable under accelerated storage conditions, confirming its robustness for long-term shelf life. These comprehensive results strongly suggest that this gel could serve as a viable alternative to conventional oral painkillers, especially for patients requiring localized and sustained pain management. Future studies, including in vivo pharmacodynamic and clinical evaluations, are essential to validate its efficacy, safety, and acceptability in real-world therapeutic settings.

REFERENCES

1. Krati, Dr. Martolia Jaya, et. al, A comprehensive review on in-vitro methods for anti- microbial activity, IP International Journal of Comprehensive and Advanced Pharmacology, 2024; 9(3).
2. Neeru, Shilpi Kashyap, Esha Vatsa, Jitendra Singh and Ankush Sundriyal "Determination of Total Phenolic Content, Total flavonoid Content and Total Antioxidant capacity of different extracts of Roylea elegans Wall. (aerial parts)" World journal of pharmacy and pharmaceutical sciences (WJPPS), 2016; 5(6): 1884-1891.
3. Neeru, Esha Vatsa, Jitendra Singh and Ankush Sundriyal "Pharmacognostic Standardization Parameters of Roylea elegans Wall. (Aerial Parts)" International Journal for Pharmaceutical Research Scholars (IJPRS), 2016; 5(2):133-140.
4. Kundan Singh Bora and Esha Vatsa "Pharmacognostic Evaluation of Dendrobium macraei Lindl." Universities Journal of Phytochemistry and Ayurvedic Heights (UJPAH), 2016; 1(20):29-36.
5. Amit Sharma, Bharat Parashar, Esha Vatsa, Shilpa Chandel and Surbhi Sharma "Phyto chemical screening and Anthelmintic activity of leaves of Cedrus deodara (Roxb.)" World journal of pharmacy and pharmaceutical sciences (WJPPS), 2016; 5(8):1618-1628.
6. Amit Sharma, Surbhi Sharma, Shilpa Chandel, Esha Vatsa and Dr. Bharat Parashar "A review on Morchella esculanta: Therapeutically Potent plant" World journal of pharmacy and pharmaceutical sciences (WJPPS), 2016; 5(9): 685- 699.
7. Esha Vatsa and Kundan Singh Bora "Memory Enhancing Activity of Dendrobium macraei Lindl. in Swiss Albino Mice" British Journal of Pharmaceutical Research (BJPR), 2016; 13(2):1-11.
8. Vatsa Esha, Chandel Shilpa, Parashar Bharat, Neeru "Physico-Chemical and Phytochemical Evaluation of Dendrobium macraei Lindl. (Whole Plant)" International Journal of Pharmacognosy and Phytochemical Research (IJPPR), 2016; 8(11): 1801- 1811.
9. Esha Vatsa, Mehak Aggarwal, Shipra Gautam "Formulation and Evaluation of Polyherbal Facial Scrub" Just Agriculture multidisciplinary e-Newsletter, Article ID: 023, 2021; 1(9): 1-6.
10. Shipra Gautam, Madhubala Thakur, Mehak Aggarwal, Esha Vatsa"Azadirachta indica- A Review as a Potent Anti-Diabetic drug" Just Agriculture multidisciplinary e-Newsletter, Article ID: 98, 2021; 1(10): 1-6.
11. Esha Vatsa, Samriti Faujdar, Nidhi Sharma, Shilpa Chandel, Mehak Aggarwal"Dendrobium macraei Lindl.: A review on medicinally potent orchid on the basis of recent evidences" Chinese Journal of Medical Genetics, 2022; 31(3): 560-571.

12. Krati, Babita Rawat, Abhishek Bhardwaj, Amandeep Singh, A Comprehensive Review on Indian Barnyard Millet (Echinochloa frumentacea), International Journal of Pharmaceutical Technology and Biotechnology, 2025; 12(1): 01-07.
13. Krati, Dr. Martolia Jaya, et. al, A Comprehensive review on in-vitro methods for antimicrobial activity" Educational administration: Theory and Practice". 2024; 30(6): 8 (2977-2984).
14. Esha Vatsa, Dr. Samriti Faujdar, Shilpa Chandel, Nidhi Chaudhary, Ashok Kumar, Neeru, "Studies on anti-inflammatory activities of whole plant of Dendrobium macraei Lindl." European Chemical Bulletin, 2023; 12(Special Issue 1): 657-664.
15. Esha Vatsa, Dr. Samriti Faujdar, Nitin Kumar, Nidhi Chaudhary, Shilpa Chandel, Neeru, Mehak Aggarwal "Current studies to justify the medicinal potential of the orchid Dendrobium macraei Lindl." European Chemical Bulletin, 2023; 12(S3): 5822-5830.
16. Divya Negi Rawat, Anjali Bisht, Esha Vatsa, Deepika Chandra, Nidhi Chaudhary, Ashok Kumar "Urinary bacterial profile and antibiotic susceptibility pattern among patients of urinary tract infections" High Technology letters, 2023; 29(10): 115-128.
17. Mehak Aggarwal, Ujjwal Nautiyal, Harmeet Singh, Esha Vatsa, Nidhi Chaudhary, Anjali Bisht, Divya Negi "Development and evaluation of drug delivery system containing luliconazole" High Technology letters, 2023; 29(11): 633-652.
18. Jagriti Gairola, Prashant Kukreti, Anjali Bisht, Divya Negi, Nidhi Chaudhary, Esha Vatsa "Development of Chronotherapeutic Delivery System for the Oral Administration of Aceclofenac for Rheumatoid Arthritis by Using Different Polymers" Journal of Chemical Health Risks, 2023; 13(6): 1180-1192.
19. Nidhi Chaudhary, Dr. Deepak Nanda, Dr. Esha Vatsa, Mithilesh Kesari, Harshita Chandra, Simran Singh Rathore "The Promise of Usefulness of the Evergreen Shrub Cassia auriculata" Journal of Advanced Zoology, 2023; 44(4): 1249-1261.
20. Ms Pooja Yadav, Dr. Esha Vatsa, Dr Arti Rauthan, "Enhancing Menstrual Awareness among Adolescent Girls: Evaluating the Influence of School Initiatives" Journal of Chemical Health Risks, 2024; 14(02): 3141-3149.
21. Mehak Aggarwal, Esha Vatsa, Nidhi Chaudhary, Shilpa Chandel, Shipra Gautam, "Formulation and Evaluation of Polyherbal Face Pack" Research Journal of Pharmacy and Technology, 2024; 17(6): 2481-2485.
22. Esha Vatsa, Mehak Aggarwal, Nidhi Chaudhary, Shipra Gautam, Neeru, Nitin Kumar, "Comparison Based on Pharmacognostical and Pharmacological Profile of Thuja Orientalis Linn. And Thuja Occidentalis Linn.: A Review" Naturalista Campano, 2024; 28(1): 3208-3219.
23. Priya Pandey, Esha Vatsa, Gaurav Lakhchora, Md Shamsher Alam, Niyaz Ahamad Ansari, Mohammad Dabeer Ahamad, Sarafarz Ahamad, Mukul Singh, Nitin kumar, "Nano Medicine Advancements in Addressing Rare Neurological Disorders: A Focus on Globoid Cell Leukodystrophy (Krabbe's Disease) Treatment" African Journal of Biological Sciences, 2024; 6(3): 2654-2684.
24. Esha Vatsa, Nidhi Chaudhary, Priya Khadwal, Mehak Aggarwal, Tanya Aggarwal, and Nishant Bhardwaj, "In vitro Antidiabetic Effect and Phytochemical Screening of Cassia biflora Mill." Indian Journal of Natural Sciences, 2025; 15(88): 87726-87733.
25. Anil Kumar, Dr. Esha Vatsa, "AI-Powered Embryo Selection is revolutionized: A Review" South Eastern European Journal of Public Health, 2025; XXVI (1): 6223-6230.

26. Lohani, V., A R, A., Kundu, S., Akhter, M. Q., & Bag, S. Single-Cell Proteomics with Spatial Attributes: Tools and Techniques. ACS omega, 2023; 8(20): 17499–17510. https://doi.org/10.1021/acsomega.3c00795.
27. Amandeep Singh, Deepak Nanda, Ashok Kumar and Abhishek Bhardwaj . In vitro evaluation of anti-inflammatory activity of ageratum conyzoides leaves by Human Red Blood Cell (HRBC) membrane stabilization method, International Journal of Research in Pharmaceutical and Nano Sciences, 2023; 12(6): 196-202.
28. Amandeep Singh, Deepak Nanda, Ashok Kumar, Abhishek Bhardwaj. In vitro evaluation of anti-inflammatory activity of ageratum conyzoides leaves by Human Red Blood Cell (HRBC) membrane stabilization method, International Journal of Research in Pharmaceutical and Nano Sciences, 2023; 12(6): 196-202.
29. Singh A, Nanda D, Bhardwaj A, Kumar A. A pharmacological investigation for therapeutic potential of Callistemon citrinus as an anthelmintic agent (Bottle-Brush Plant). IP Int J Comprehensive Adv Pharmacol, 2024; 9(3): 206-210.
30. Yogesh Tiwari, Amandeep Singh, Bhupendra Kumar, Ashok Kumar. “In Vitro Evaluation of Alpha Amylase Activity of Bark Extracts of Ficus Auriculata”. International Journal of Innovative Science and Research Technology. December, 2017; 2(12): 88-92.
31. Bhupendra Kumar, Amandeep Singh, Yogesh Tiwari, Ashok Kumar. UV PROTECTIVE ACTIVITY OF GLYCINE MAX SEEDS. Indian Research Journal of Pharmacy and Science, 2017; 15: 1190-1195.
32. Reena Bhatt, Ashok Kumar, Ankita Sharma. FORMULATION AND EVALUATION OF SHAMPOO FORMULATED BY GLYCINE MAX SEEDS.Indian Research Journal of Pharmacy and Science, 2017; 15: 1232-1238.
33. Kumar A, Nanda D and Gupta A. “A Prospective Study on the Risk Determinants and Economic Burden ofAdverse Drug Reactions in Tertiary Care Hospital”. Indian Journal of Natural Sciences, 2025; 15(88): 87957-87961.
34. Ashok Kumar, Deepak Nanda and Abhishek Gupta A holistic approach to adverse drug reactions in hospitals: Classification, risk factors, assessment and economic evaluation- A review. J. Exp. Zool. India, 2024; 27: 2337-2348. DOI: https://doi.org/10.51470/jez.2024.27.2.2337.
35. Sakshi Garg, Ashok Kumar, Varsha Deva, Preeti Biswas, Harsh Rastogi, Heena Farooqui. Immediate-Release Drug Delivery System, Current Scenario, And Future Perspective-A Narrative Review. Jundishapur Journal of Microbiology, 2022; 15(1): 6509-6519.
36. Ashok Kumar, Deepak Nanda, Abhishek Gupta Pattern of Adverse Drug Reactions and Their Economic Impact on Admitted Patients in Medicine Wards of a Tertiary Care Hospital. Library Progress International, 2024; 44(4): 1120-1139.
37. Alisha Rawat, Meenakshi Sajwan, Yamini Chandola,Nidhi Gaur “Assaultive role of thiamine in coalition with selenium in treatment of liver cancer”, Journal of emerging technologies and innovative research, 2022; 9(1); 2349-5162.
38. Ghildiyal, P., Bhatt, A., Chaudhary, N., Narwal, S., Sehgal, P. “Study of various biochemical parameters on atrazine induced glucose-6-phosphate dehydrogenase deficiency in brain” International Journal of Health Sciences, 2022; 6(S7): 2552-2558.
39. Alok Bhatt, Arun Kumar, Pallavi Ghildiyal, Jyoti Maithani, Nidhi Chaudhary, Manish Nawani, Sonia Narwal “Phytochemical Profile of Melissa parviflora Benth” Neuro Quantology, 2022; 20(9); 2426-2428.

40. Palika Sehgal, Alok Bhatt, Sonia Narwal, Deepak P. Bhagwat, Nidhi Chaudhary et.al Formulation Characterization Optimization and In Vitro Evaluation of Aceclofenac Topical Emulgel, Neuro Quantology, 2022; 20(14): 1-09.
41. Sneha Rawat, Praveen Kumar Ashok, Abhishek bhardwaj "A review on Oro dispersible Tablet of Telmisartan" Org-Journal of Emerging Technologies and Innovative research (JETIR), May 2023; 10(5): i104-i112.
42. Jaison Varghese, Nitin kumar, Sapna Chaudhar, Abhishek Bhardwaj(2024) "Comparative In-Vitro Antioxidant and Antimicrobial Potential of Some Medicinal Plants"African Journal of Biological Sciences, https://doi.org/10.48047/AFJBS.6.Si3.2024.3340-3346.
43. Asima Imtiyaz, Ajay Singh, Abhishek Bhardwaj(2024) "Green synthesis of iron oxide nanoparticles from Iris kashmiriana (Mazar-Graveyard) Plant Extract its characterization of biological activities and photocatalytic activity" Journal of Industrial and Engineering Chemistry, https://doi.org/10.1016/j.jiec.2024.09.004.
44. Hem Chandra Pant, Bhawana Goswami, Ashok Kumar, Abhishek Bhardwaj, Shanti Rauthan and Amita pandey "A Review Paper on Bacopa monniera and Role of Artificial Intelligence (AI) in Medicinal Plant for Management and Treatment of Various Diseases" Indian Journal of Natural Sciences, 2025; 15(88): 01-10.
45. Vishwajeet Bachhar, Vibha Joshi, Ajay Singh, M. Amin Mir, Abhishek Bhardwaj(2025)"Antibacterial, Antioxidant, and Antidiabetic Activities of TiO2 Nanoparticles Synthesized Through Ultrasonication Assisted Cold Maceration from Stem Extract of Euphorbia hirta"Nano Bioscience, https://doi.org/10.33263/LIANBS141.001.
46. Nidhi Chaudhary, "A review on: The deciduous shrub "Punica granatum", European journal of biomedical and pharmaceutical sciences, 2016; 3(7); 2349-2388.
47. Singh Harmeet and Nidhi Chaudhary, "Evaluation of Lakshadi Guggul on experimentally induced global cerebral ischemia/reperfusion injury". World journal of Pharmacy and Pharmaceutical Sciences, 2016; 6(1); ISSN 2278-4357.
48. Nidhi Chaudhary and Harmeet Singh, "Evaluation of Punica Granatum Leaves Extract In Scopolamine Induced Learning And Memory Impairment In Mice". World journal of Pharmacy and Pharmaceutical Sciences, 6(6); 1677-1703.
49. Amandeep Singh, Pankaj Nainwal, Deepak Nanda, D.A. Jain, SOLUBILITY ENHENCEMENT OF PIOGLITAZONE WITH COMPLEXATION OF HYDROXYPROPYL-β-CYCLODEXTRIN, Digest Journal of Nanomaterials and Biostructures, Apr 2012; 2(4): p.91-97.
50. Pankaj Nainwal Deepak Nanda, Amandeep Singh, D. A. Jain, QUANTITATIVE SPECTROPHOTOMETRIC DETERMINATION OF DOMPERIDONE TABLET FORMULATIONS USING IBUPROFEN SODIUM AS HYDROTROPIC SOLUBILIZING AGENT, Digest Journal of Nanomaterials and Biostructures, 2012; 2(4): 751 – 753.
51. Deepak Nanda, Pankaj Nainwal, Amandeep Singh, D.A.Jain, REVIEW ON MIXED-SOLVENCY CONCEPT: A NOVEL CONCEPT OF SOLUBILIZATION, Deepak Nanda et al. ,Journal of Pharmacy Research, 2012; 3(2): 411-413
52. Pankaj Nainwal, Amandeep Singh, Deepak Nanda, D.A.Jain, NEW QUANTITATIVE ESTIMATION OF ROSUVASTATIN BULK SAMPLE USING SODIUM BENZOATE AS HYDROTROPIC SOLUBILIZING AGENT, Journal of Pharmacy Research, 2012; 3(1): 6-8.
53. Nainwal.P, Bhagla.A, Nanda.D, STUDY ON ANTIOXIDANT POTENTIAL AND WOUND HEALING ACTIVITY ON THE AQUEOUS EXTRACT OF FRUITS OF GARCINIA MANGOSTANA, IJPI's Journal of Pharmacognosy and Herbal Formulations, Volume-1.

54. Pankaj Nainwal , Kapil Kalra, Deepak Nanda , Amandeep Singh, STUDY OF ANALGESIC AND ANTI-INFLAMMATORY ACTIVITIES OF THE ETHANOLIC EXTRACT ARIAL PARTS OF FUMARIA VAILLANTII LOISEL, Asian Journal of Pharmaceutical and Clinical Research, 2011; 4(1).
55. Amandeep Singh, Pankaj Nainwal, Deepak Nanda, D.A.Jain, SOLUBILITY ENHANCEMENT STUDY OF PIOGLITAZONE USING SOLID DISPERSION AS SOLUBILIZATION TECHNIQUE, International Journal of Science Innovations and Discoveries, Amandeep Singh et al., IJSID, 2011; 1(2): 95—100.
56. Amandeep Singh, Pankaj Nainwal, Deepak Nanda, D. A. Jain, THE SOLUBILITY ENHANCEMENT STUDY OF PIOGLITAZONE USING DIFFERENT SOLUBLIZATION TECHNIQUIES, International Journal of Pharmacy & Pharmaceutical Sciences, 2012; 4(2).
57. Deepak Nanda, Pankaj Nainwal, Amandeep Singh, D.A.Jain, SOLUBILITY ENHANCEMENT STUDY OF DOMPERIDONE USING DIFFERENT SOLUBILIZATION TECHNIQUES, International Journal of Pharmacy and Pharmaceutical Sciences, 2012; 2(3).
58. Pankaj Nainwal, Priyanka Sinha, Amandeep Singh, Deepak Nanda, D.A.Jain, A COMPARATIVE SOLUBILITY ENHANCEMENT STUDY OF ROSUVASTATIN USING SOLUBILIZATION TECHNIQUES, International Journal of Applied Biology & Pharmaceutical Technology, Oct - Dec -2011; 2(4).
59. Pankaj Nainwal , Deepak Nanda, Amandeep Singh, D. A. Jain, FORMULATION AND EVALUATION OF SOLID DISPERSION OF ROSUVASTATIN WITH VARIOUS CARRIERS ,Pharmacie Globale International Journal Of Comprehensive Pharmacy, Issn 0976-8157.
60. Pankaj Nainwal, Amandeep Singh1, Deepak Nanda, D.A.Jain, SOLUBILITY ENHANCEMENT OF AN ANTIHYPERLIPIDEMIC DRUG ROSUVASTATIN BY SOLID DISPERSION TECHNIQUE, International Journal of PharmTech Research IJPRIF ISSN : 0974-4304, March-June 2012; 2: 3.
61. Kshitiz Agrawal, Pragati Bailwal, Amandeep Singh. Prem Saini, DEVELOPMENT OF QUALITY STANDARDS OF SUPRABHATAM CHURNA: A POLY HERBAL FORMULATION, International Journal of Pharmaceutical Research & Development, IJPRD, 2011; 4, June 2012.
62. Kapil Kalra, Amandeep Singh, Manisha Gaur, Ravindra P. Singh, and D. A. Jain, ENHANCEMENT OF BIOAVAILABLITY OF RIFAPENTINE BY SOLID DISPERSION TECHNIQUE, International Journal Of Pharmacy & Life Sciences, Kalra et al., April, 2011; 2(4).
63. Pankaj nainwal, Ranveer batsa, Amandeep singh, Deepak nanda, MEDICINAL PLANT STUDIES INFLUECED BY THE BIOTECHNOLOGICAL METHODS: A UPDATED REVIEW, International Journal of Pharma and Bio Sciences, Apr-June-2011; 2(2).
64. Amandeep Singh, Sandhiya Pal, Prem Saini, IN- VITRO EVALUTION OF ANTI-INFLAMMATOTRY ACTIVITY OF TERMANALIA ARJUNA BARK EXTRACT, Journal of Innovative trends in Pharmaceutical Sciences, Vol-1(1): 9-12.
65. Amandeep Singh, Pramila Chauhan, Prem Saini, IN-VITRO ANTI-INFLAMMATORY EVALUTION OF HYDROALCOHALIC LEAVES EXTACT OF PINUS ROXBURGHII BY HRBC METHOD, International journal of Research in Pharmaceutical and Nano Sciences, 2013; 2(3): 268-271.
66. Amandeep Singh, Sumit Negi, Prem Saini, In Vitro Anti-Inflammatory Evaluation Of Leaves Using Hydroalcohalic Extract Of “Mangifera indica” International Journal of Pharmacy and Integrated Life Sciences, V1-(I7) PG (93-98).

67. Aman Deep Baghla, Kshitij Agarwal, Ramesh Verma and Deepak Nanda, Wound Healing Effect of the Aqueous Extract of the Leaves of Psidium guajava Linn., International Journal of chemicals and Life Sciences, 2013; 02 (03): 1104-1106.
68. Aman Deep Baghla, Kshitij Agarwal, Ramesh Verma and Deepak Nanda, WOUND HEALING EFFECT OF THE AQUEOUS EXTRACT OF THE LEAVES OF PSIDIUM GUAJAVA LINN., International Journal of chemicals and Life Sciences, 2013; 02(03): 1104-1106.
69. Bhupendra Kumar, Meenakshi Ghildiyal, Yogesh Tiwari, Deepika Chauhan, Amandeep Singh, IN-VITRO ANTI-INFLAMMATORY ACTIVITY OF GLYCINE MAX SEEDS, Indo American Journal Of Pharmaceutical Sciences, 2018; 05(02): 868-871.
70. Piyali Dey, Jyoti Pandey, Bhupendra kumar, Amandeep Singh, IN VITRO ANTHELMINTIC ACTIVITY OF BARK EXTRACTS OF ARTOCARPUS HETEROPHYLLUS, International Journal of Pharmacy & Pharmaceutical Research, 2018; 03(11): 33-40.
71. Bhupendra Kumar, Yogesh Tiwari, Amandeep Singh, Vineet Kumar, IN VITRO ANTIUROLITHIC ACTIVITY OF FICUS PALMATA LEAVES, International Journal Of Pharmaceutical Technology And Biotechnology, 2019; 6(1): 01-09.
72. Md. Daneyal Khurshid, Vivek Shukla, Bhupendra Kumar and Amandeep A Review Paper on Medicinal Properties of Phyllanthus emblica , International Journal of Pharmacy and Biological Sciences, 2020; 10(3): 102-109.
73. Mr. Dwivedi Vishal, Mrs. Nisha A Bhatt, Dr. Amandeep Singh PREPARATION AND STANDARDIZATION OF NAVKARSHIKA CHURNA, World Journal of Pharmacy and Pharmaceutical Sciences, 2020; 9(8).
74. Mitun Saha1, Mr. Bhupendra Kumar, Dr. Amandeep Singh Review Article on Various Phytochemicals and Different Medicinal Activities of Haritaki International Journal of Innovative Science and Research Technology, June 2020; 5(6).