

DESIGN, FORMULATION AND EVALUATION OF MEFENAMIC ACID EMULGEL FOR IMPROVED TOPICAL DELIVERY AND ANTI-INFLAMMATORY EFFICACY

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Abstract

Mefenamic acid is a non-steroidal anti-inflammatory drug with poor aqueous solubility and lipophilic properties, which may limit its suitability for conventional topical delivery. The present study was undertaken to develop and evaluate a Mefenamic acid emulgel for improved topical drug delivery. Ten formulations (F1F10) were prepared using Carbopol 934 as the gelling agent, isopropyl myristate as the oil phase, and Tween 80 and Span 80 as emulsifying agents. The prepared formulations were evaluated for physical appearance, homogeneity, pH, viscosity, spreadability, extrudability, drug content, in-vitro drug release, and stability. All formulations showed satisfactory physical characteristics with acceptable pH and good homogeneity. The drug content of the formulations ranged from 96.5% to 99.7%. Formulation F5 showed satisfactory overall characteristics, with a pH of 6.5, viscosity of 24,890 cP, spreadability of 22.4 g·cm/sec, extrudability of 91.2%, and drug content of 99.6%. F5 exhibited 98.2% cumulative drug release after 12 h and was selected as the optimized formulation based on its overall physicochemical and release profile. Stability studies showed that F5 maintained satisfactory physical appearance, pH, viscosity, and drug content without phase separation during storage. The results indicate that the developed Mefenamic acid emulgel provides satisfactory formulation characteristics and sustained in-vitro drug release, suggesting its potential as a suitable topical delivery system for Mefenamic acid. Further ex-vivo permeation and in-vivo studies are required to confirm its topical performance and anti-inflammatory efficacy. Previous research has also demonstrated the potential of Mefenamic acid emulgels for topical delivery and anti-inflammatory activity.

Keywords: *Mefenamic acid; Emulgel; Topical drug delivery; Carbopol 934; Isopropyl myristate; Anti-inflammatory*

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1. Introduction

Inflammation is a complex biological response to tissue injury, infection, or other harmful stimuli and is characterized by a series of vascular and cellular events that may produce pain, redness, swelling, and impaired tissue function. Although inflammation is an essential protective mechanism involved in tissue repair and host defense, excessive or prolonged inflammatory responses can contribute to the development and progression of several pathological conditions. Non-steroidal anti-inflammatory drugs (NSAIDs) are extensively used for the management of pain and inflammation, primarily through inhibition of cyclooxygenase enzymes and subsequent reduction in prostaglandin synthesis. However, conventional systemic administration of NSAIDs can be associated with gastrointestinal and other systemic adverse effects, particularly with prolonged use (Brune and Patrignani, 2015). Topical drug delivery has therefore attracted considerable interest as an alternative approach for the management of localized pain and inflammatory conditions. Administration through the skin can provide drug delivery directly to the site of application and may reduce the gastrointestinal exposure associated with oral administration. Evidence from clinical studies supports the therapeutic potential of topical NSAIDs. Mason et al. (2004) reported that topical NSAIDs were effective in reducing pain associated with osteoarthritis, particularly during the initial weeks of treatment. Similarly, Zeng et al. (2018), in a systematic review and network meta-analysis involving 36 randomized controlled trials and 7,900 patients, reported that topical NSAIDs were superior to placebo for pain relief and improvement of physical function in osteoarthritis. Wang et al. (2022) further reported that topical and oral NSAIDs demonstrated broadly comparable efficacy for pain relief and improvement of physical function in osteoarthritis, supporting the continued development of topical NSAID formulations.

Despite these advantages, effective topical delivery is challenging because the skin, particularly the stratum corneum, acts as a highly effective barrier to the penetration of many drug molecules. The extent of topical drug delivery depends on several factors, including molecular size, lipophilicity, aqueous solubility, partition coefficient, drug concentration, and the composition of the vehicle. Formulation components such as penetration enhancers, oils, surfactants, and co-solvents can modify drug partitioning and permeation through the skin and consequently influence therapeutic performance (Williams and Barry, 2004; Prausnitz and Langer, 2008). Therefore, selection of an appropriate topical vehicle is particularly important for drugs with unfavorable aqueous solubility or physicochemical characteristics.

Mefenamic acid is an anthranilic acid derivative belonging to the fenamate group of NSAIDs and possesses analgesic and anti-inflammatory properties. It exerts its pharmacological activity primarily through inhibition of cyclooxygenase-mediated prostaglandin synthesis. However, its poor aqueous solubility presents a significant formulation challenge and may influence its dissolution and delivery characteristics. Fang et al. (2003) investigated the use of alkanolamine complexation to facilitate the skin permeation of Mefenamic acid and demonstrated that formulation strategies can substantially influence its percutaneous delivery. Such findings indicate that appropriate modification of the delivery vehicle may be useful for improving the topical performance of Mefenamic acid.

Conventional topical gels are widely used because they are easy to apply, possess good spreadability, and are generally well accepted by patients. Nevertheless, incorporation of poorly water-soluble or lipophilic drugs into conventional aqueous gels can be difficult. Emulgels have consequently emerged as promising semisolid topical delivery systems that combine the characteristics of emulsions and gels. In an emulgel, an oil-in-water or water-in-oil emulsion is incorporated into a suitable gel matrix. The emulsion phase can facilitate incorporation of lipophilic drugs, whereas the gel phase provides desirable viscosity, spreadability, adhesion, and ease of application (Ajazuddin et al., 2013).

The advantages of emulgel systems include improved incorporation of hydrophobic drugs, ease of application, acceptable cosmetic properties, and the potential for controlled drug release. Talat et al. (2021) described emulgel as an effective topical drug delivery system particularly suited for hydrophobic drugs and highlighted its favorable spreadability, non-greasy characteristics, patient acceptability, and potential applications in analgesic and anti-inflammatory therapy. More recently, Kumbhar et al. (2025) reviewed the development and pharmaceutical applications of emulgels and emphasized their potential to improve topical administration, prolong drug release, and enhance the practical applicability of topical formulations. Jain et al. (2025) similarly reported that emulgel systems can combine the advantages of emulsion and gel phases and have been investigated for the topical delivery of analgesic, anti-inflammatory, anti-acne, and antifungal agents.

The performance of an emulgel is strongly influenced by the selection and concentration of formulation components. The oil phase, surfactant, co-surfactant, gelling agent, penetration enhancer, and other excipients can affect globule characteristics, viscosity, spreadability, drug release, skin permeation, physical stability, and overall therapeutic performance. A systematic review by Imani et al. (2023) highlighted the importance of appropriate selection of oils, emulsifiers, and gelling agents in the preparation and characterization of emulgel

systems. Parameters such as physical appearance, pH, viscosity, spreadability, particle-size distribution, drug release, and permeation are commonly considered during emulgel development.

The topical delivery of Mefenamic acid through an emulgel system has previously been investigated. Khullar et al. (2012) formulated Mefenamic acid emulgels using Carbopol 940 as the gelling agent and investigated the influence of Mentha oil and clove oil as penetration enhancers. The formulations were evaluated for rheological properties, spreading coefficient, bioadhesion, skin irritation, in-vitro and ex-vivo drug release, analgesic activity, and anti-inflammatory activity. Selected formulations demonstrated promising analgesic and anti-inflammatory activity compared with a marketed diclofenac sodium gel. This study establishes the feasibility of incorporating Mefenamic acid into an emulgel; however, the performance of an emulgel remains highly dependent on the formulation composition and processing conditions. Consequently, investigation of alternative formulation compositions and systematic evaluation remains relevant for improving its topical delivery characteristics.

The therapeutic relevance of topical anti-inflammatory systems is further supported by clinical evidence. Honvo et al. (2019), in a systematic review and meta-analysis of randomized controlled trials, reported that topical NSAIDs had a favorable safety profile, particularly with respect to gastrointestinal adverse effects, although local skin-related adverse events may occur. Wolff et al. (2021) similarly reported significant improvements in at least one osteoarthritis symptom parameter across the topical NSAID studies included in their systematic review and highlighted the influence of the topical carrier on the adverse-event profile. These findings emphasize that the design of the delivery vehicle is an important consideration when developing topical anti-inflammatory formulations.

Recent developments in topical drug delivery have further focused on improving drug solubilization, skin interaction, drug release, and patient acceptability through rational formulation design. Emulgels continue to be investigated because they provide a versatile platform in which the properties of both an emulsion and a gel can be adjusted according to the physicochemical characteristics of the drug and the intended therapeutic application (Talat et al., 2021; Kumbhar et al., 2025). In this context, development of a suitably optimized Mefenamic acid emulgel may provide a practical approach for improving topical drug delivery while maintaining desirable physicochemical and application characteristics.

Therefore, the present study was undertaken to design, formulate, and evaluate a Mefenamic acid emulgel for improved topical delivery and anti-inflammatory efficacy. The developed formulations were systematically evaluated for their physicochemical characteristics, pH,

viscosity, spreadability, extrudability, homogeneity, drug content, in-vitro drug release, stability, and anti-inflammatory activity to identify a formulation with desirable topical delivery characteristics and therapeutic potential.

2. Materials and Methods

2.1 Materials

Mefenamic acid was obtained as a gift sample from a reputed pharmaceutical manufacturer. Carbopol 934, isopropyl myristate, Tween 80, Span 80, and triethanolamine were used as the principal formulation excipients. All other chemicals and solvents used were of analytical or pharmaceutical grade and were used as received.

2.2 Preformulation Studies

Mefenamic acid was subjected to preliminary preformulation studies, including organoleptic evaluation, solubility, melting point, and partition coefficient determination. Solubility was determined in distilled water, methanol, and isopropyl myristate by the shake-flask method at $25 \pm 1^\circ\text{C}$ for 24 h. The equilibrated samples were filtered and the dissolved drug was quantified.

The melting point was determined by the capillary method using a calibrated melting point apparatus. Partition coefficient was determined using an n-octanol/water system after equilibration at $25 \pm 1^\circ\text{C}$, and the concentration of drug in both phases was determined to calculate the partition coefficient.

2.3 Formulation of Mefenamic Acid Emulgel

Mefenamic acid emulgel was prepared using isopropyl myristate as the oil phase, Tween 80 as surfactant, Span 80 as co-surfactant, and Carbopol 934 as the gelling agent. Triethanolamine was used for neutralization and adjustment of the gel consistency.

For preparation of the oil-in-water emulsion, the required quantities of isopropyl myristate and Span 80 were mixed and heated at $70\text{--}75^\circ\text{C}$ to obtain the oil phase. Tween 80 was dissolved in distilled water and heated separately to the same temperature. The oil phase was gradually incorporated into the aqueous phase under continuous mechanical stirring to obtain a uniform emulsion.

The gel base was prepared by dispersing Carbopol 934 in distilled water with continuous stirring, followed by hydration. The dispersion was neutralized gradually with triethanolamine until the desired gel consistency was obtained. The prepared emulsion was then incorporated slowly into the hydrated Carbopol gel under continuous stirring to produce a smooth and homogeneous emulgel.

2.4 Formulation Design

Ten formulations (F1F10) were prepared by varying the concentrations of Carbopol 934, isopropyl myristate, Tween 80, and Span 80 while maintaining the Mefenamic acid concentration at 1% w/w. The concentrations of Carbopol 934 ranged from 0.51.5%, isopropyl myristate from 57.5%, Tween 80 from 12%, and Span 80 from 0.51.5%.

2.5 Evaluation of Emulgel

The prepared formulations were evaluated for physical appearance, homogeneity, pH, viscosity, spreadability, extrudability, and drug content. Physical appearance and homogeneity were assessed visually for color, texture, smoothness, grittiness, lumps, and phase separation.

The pH was determined using a calibrated digital pH meter after dispersing 1 g of emulgel in 10 mL of distilled water. Viscosity was measured using a Brookfield viscometer at room temperature using a suitable spindle and rotational speed.

Spreadability was determined by the slip-and-drag method using two glass slides, while extrudability was evaluated using aluminium collapsible tubes by measuring the quantity of formulation extruded under a standardized load.

Drug content was determined by extracting a known quantity of emulgel in a suitable solvent followed by filtration and UV spectrophotometric analysis at the predetermined λ_{max} of Mefenamic acid. Drug concentration was calculated using the previously prepared calibration curve.

2.6 In-vitro Drug Release Study

In-vitro drug release was evaluated using a Franz diffusion cell. The receptor compartment was maintained at $37 \pm 0.5^\circ\text{C}$ and continuously stirred. A suitable membrane was placed between the donor and receptor compartments, and a known quantity of emulgel was applied to the membrane surface. Samples were withdrawn from the receptor medium at predetermined intervals and replaced with an equal volume of fresh pre-warmed medium. The samples were analyzed for Mefenamic acid content and cumulative drug release was calculated.

2.7 Stability Study

The optimized formulation was subjected to stability studies under room-temperature and accelerated conditions. Accelerated stability testing was performed at $40 \pm 2^\circ\text{C}/75 \pm 5\% \text{ RH}$, while samples stored under ambient conditions served as room-temperature controls. The formulations were periodically evaluated for changes in appearance, homogeneity, pH, viscosity, and drug content.

3. RESULTS AND DISCUSSION

3.1 Preformulation Studies

3.1.1 Organoleptic Properties

The organoleptic evaluation of Mefenamic acid showed a white to off-white, odourless, fine and uniform crystalline powder with a free-flowing nature. The absence of discoloration, aggregation, and visible impurities indicated satisfactory physical quality of the drug. The observed characteristics were considered suitable for subsequent formulation development.

3.1.2 Solubility Study

The solubility study demonstrated a marked difference in the solubility of Mefenamic acid in the investigated media. The drug exhibited very poor aqueous solubility (0.021 ± 0.002 mg/mL) compared with methanol (2.84 ± 0.06 mg/mL). The highest solubility was observed in isopropyl myristate (5.67 ± 0.09 mg/mL), indicating a strong affinity of Mefenamic acid for the lipid phase.

The high solubility in isopropyl myristate supported its selection as the oil phase for the emulgel. This approach is particularly relevant for poorly water-soluble drugs, as the oil phase of an emulgel can act as a vehicle for incorporating hydrophobic drugs before their dispersion within the gel network. Similar formulation principles have been described for emulgels intended for hydrophobic drug delivery (Ajazuddin et al., 2013; Talat et al., 2021).

Table 1. Solubility of Mefenamic acid in different solvents

S. No.	Solvent	Solubility (mg/mL)
1	Distilled water	0.021 ± 0.002
2	Methanol	2.84 ± 0.06
3	Isopropyl myristate	5.67 ± 0.09

3.1.3 Melting Point

Mefenamic acid exhibited a melting point range of 231-237°C. The relatively narrow melting range was consistent with the crystalline nature of the drug and supported its identity and satisfactory purity.

3.1.4 Partition Coefficient

The partition coefficient of Mefenamic acid was found to be **3.89 (log P)**, indicating pronounced lipophilicity. The result was consistent with the poor aqueous solubility observed in the solubility study. The relatively high lipophilicity is relevant to topical delivery because

drug partitioning into the lipid-rich stratum corneum is an important determinant of dermal drug transport.

3.2 Evaluation of Mefenamic Acid Emulgel

3.2.1 Physical Appearance and Homogeneity

All formulations (F1-F10) appeared white and homogeneous and were free from visible phase separation, grittiness, and lump formation. F4 and F9 exhibited a slightly thicker consistency, whereas the remaining formulations showed a smooth texture. The marketed product also showed a white, homogeneous and smooth appearance.

The absence of phase separation indicated satisfactory physical stability of the prepared emulsion-gel systems. The results are consistent with the general characteristics expected from properly formulated emulgels, in which the emulsion is incorporated into a structured gel network to improve physical stability and topical application properties (Ajazuddin et al., 2013).

Table 2. Physical appearance and homogeneity of emulgel formulations

Formulation	Appearance	Homogeneity	Texture	Phase separation
F1	White	Good	Smooth	Absent
F2	White	Good	Smooth	Absent
F3	White	Good	Smooth	Absent
F4	White	Good	Slightly thick	Absent
F5	White	Good	Smooth	Absent
F6	White	Good	Smooth	Absent
F7	White	Good	Smooth	Absent
F8	White	Good	Smooth	Absent
F9	White	Good	Slightly thick	Absent
F10	White	Good	Smooth	Absent
Marketed product	White	Good	Smooth	Absent

3.2.2 pH

The pH of the prepared formulations ranged from 6.1 ± 0.03 to 6.5 ± 0.02 , indicating only minor variation between batches. The marketed formulation exhibited a pH of 6.3 ± 0.02 . The relatively narrow pH range indicated that incorporation of the different concentrations of polymer and emulsifying components did not cause substantial variation in formulation acidity.

The observed values were considered appropriate for a topical formulation and were comparable with the marketed product. Maintaining an appropriate pH is important for minimizing discomfort and maintaining skin compatibility during topical application.

Table 3. pH of Mefenamic acid emulgel formulations

Formulation	pH (Mean $\pm$ SD)
F1	6.1 ± 0.03
F2	6.2 ± 0.02
F3	6.3 ± 0.02
F4	6.4 ± 0.03
F5	6.5 ± 0.02
F6	6.1 ± 0.03
F7	6.2 ± 0.02
F8	6.3 ± 0.02
F9	6.4 ± 0.03
F10	6.5 ± 0.02
Marketed product	6.3 ± 0.02

3.2.3 Viscosity

The viscosity values ranged from $18,250 \pm 120$ to $25,210 \pm 165$ cP. A progressive increase in viscosity was observed with increasing Carbopol 934 concentration. F5 exhibited a viscosity of $24,890 \pm 160$ cP, while F10 showed the highest viscosity ($25,210 \pm 165$ cP). The marketed product showed a viscosity of $22,050 \pm 140$ cP.

The increase in viscosity with polymer concentration can be attributed to the greater development of the Carbopol polymeric network within the formulation. Similar dependence of emulgel rheological properties on the concentration and type of gelling agent has been reported in the literature (Ajazuddin et al., 2013; Imani et al., 2023).

Table 4. Evaluation of Mefenamic acid emulgel formulations

Formulation	Spreadability (g·cm/sec, Mean ± SD)	Extrudability (% Mean ± SD)	Drug content (% Mean ± SD)	Viscosity (cP, Mean ± SD)
F1	18.2 ± 0.21	82.4 ± 0.25	96.8 ± 0.32	18,250 ± 120
F2	19.5 ± 0.18	85.1 ± 0.22	97.5 ± 0.28	19,840 ± 135
F3	20.8 ± 0.20	87.6 ± 0.24	98.2 ± 0.25	21,560 ± 140
F4	21.6 ± 0.22	89.3 ± 0.20	99.1 ± 0.22	23,210 ± 155
F5	22.4 ± 0.19	91.2 ± 0.23	99.6 ± 0.20	24,890 ± 160
F6	18.0 ± 0.20	83.0 ± 0.26	96.5 ± 0.30	18,520 ± 125
F7	19.2 ± 0.17	85.8 ± 0.21	97.8 ± 0.27	20,130 ± 130
F8	20.5 ± 0.21	88.4 ± 0.24	98.6 ± 0.24	21,840 ± 145
F9	21.3 ± 0.23	90.1 ± 0.22	99.3 ± 0.21	23,560 ± 150
F10	22.1 ± 0.18	92.0 ± 0.19	99.7 ± 0.18	25,210 ± 165
Marketed product	20.6 ± 0.19	88.7 ± 0.21	98.9 ± 0.23	22,050 ± 140

3.2.4 Spreadability

The spreadability values ranged from 18.0 ± 0.20 to 22.4 ± 0.19 g·cm/sec. F5 exhibited the highest spreadability (22.4 ± 0.19 g·cm/sec), while F6 showed the lowest value (18.0 ± 0.20 g·cm/sec). The marketed formulation showed a spreadability of 20.6 ± 0.19 g·cm/sec.

An inverse relationship was observed between viscosity and spreadability, with formulations exhibiting comparatively lower resistance to flow showing greater spreading ability. Good spreadability is desirable in topical systems because it facilitates uniform application over the affected area and improves user convenience. The importance of spreadability as a key quality attribute of emulgels has also been reported by Talat et al. (2021).

3.2.5 Extrudability

The extrudability of the formulations ranged from 82.4 ± 0.25% to 92.0 ± 0.19%. F10 showed the highest extrudability (92.0 ± 0.19%), followed by F5 (91.2 ± 0.23%) and F9 (90.1 ± 0.22%). The marketed product exhibited an extrudability of 88.7 ± 0.21%. The results indicated that all formulations could be readily dispensed from the collapsible tube. Adequate

extrudability is important for patient convenience and consistent application of semisolid topical formulations.

3.2.6 Drug Content

The drug content ranged from $96.5 \pm 0.30\%$ to $99.7 \pm 0.18\%$, indicating satisfactory incorporation and distribution of Mefenamic acid within the formulations. F10 showed the highest drug content ($99.7 \pm 0.18\%$), followed by F5 ($99.6 \pm 0.20\%$) and F9 ($99.3 \pm 0.21\%$). The marketed product showed $98.9 \pm 0.23\%$ drug content.

The relatively low standard deviations indicated good reproducibility between measurements. The results suggested that the preparation procedure provided reasonably uniform distribution of the drug throughout the emulgel matrix.

3.3 In-vitro Drug Release

The in-vitro drug release study showed a gradual increase in cumulative Mefenamic acid release throughout the 12-h period for all formulations. At 12 h, the cumulative release ranged from 85.1% to 98.2%. F5 exhibited the highest release (98.2%), followed by F10 (97.6%) and F4 (96.3%). The marketed product showed 93.2% release at 12 h.

The higher release from F5 may be associated with its formulation composition, particularly the balance between the oil phase, surfactants, and Carbopol 934 concentration. The incorporation of an emulsion into a gel can influence drug release through both the emulsion and polymeric gel phases, and formulation composition is therefore an important determinant of release behavior (Ajazuddin et al., 2013; Tefas et al., 2023).

Table 5. Cumulative in-vitro drug release of Mefenamic acid emulgel formulations

Time (h)	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	Marketed
1	12.4	14.1	15.8	17.2	18.6	11.9	13.5	15.2	16.8	18.9	16.1
2	22.6	25.3	27.9	30.4	32.1	21.8	24.6	26.8	29.5	31.7	28.2
4	38.5	42.1	45.6	48.9	51.3	37.2	40.8	44.1	47.5	50.9	45.2
6	52.8	56.4	60.2	63.5	66.8	51.0	54.7	58.6	62.1	65.4	59.3
8	66.3	70.5	74.8	78.1	81.6	64.2	68.9	72.4	76.8	80.5	73.1
10	78.9	83.6	87.2	90.4	93.8	77.5	81.3	85.6	89.7	92.9	86.4
12	86.5	90.8	94.1	96.3	98.2	85.1	88.9	92.7	95.4	97.6	93.2

3.4 Stability Study

Based on the overall physicochemical and release characteristics, F5 was selected for stability evaluation. The optimized formulation remained white and homogeneous throughout the 60-day study period under both room-temperature and accelerated conditions, with no visible phase separation or precipitation.

At room temperature, pH decreased slightly from 6.5 ± 0.02 to 6.4 ± 0.03 , viscosity decreased from $24,890 \pm 160$ to $24,620 \pm 150$ cP, and drug content decreased from $99.6 \pm 0.20\%$ to $98.8 \pm 0.24\%$ over 60 days. Under accelerated conditions, the corresponding values at 60 days were 6.2 ± 0.04 , $24,280 \pm 170$ cP, and $98.1 \pm 0.25\%$, respectively.

The relatively small changes in pH, viscosity, and drug content suggested satisfactory stability of the optimized formulation during the study period. The absence of visible phase separation was particularly important because emulsion instability can adversely affect the performance and acceptability of topical emulgels. Stability and formulation composition are recognized as important considerations in the development of emulgel systems (Ajazuddin et al., 2013; Tefas et al., 2023).

Table 6. Stability evaluation of optimized formulation F5

Storage condition	Time (days)	Physical appearance	pH (Mean $\pm$ SD)	Viscosity (cP, Mean $\pm$ SD)	Drug content (% Mean $\pm$ SD)
Room temperature	0	White, homogeneous	6.5 ± 0.02	$24,890 \pm 160$	99.6 ± 0.20
Room temperature	30	No change observed	6.4 ± 0.03	$24,710 \pm 155$	99.2 ± 0.22
Room temperature	60	Stable, no phase separation	6.4 ± 0.03	$24,620 \pm 150$	98.8 ± 0.24
Accelerated	0	White, homogeneous	6.5 ± 0.02	$24,890 \pm 160$	99.6 ± 0.20
Accelerated	30	Slight viscosity reduction	6.3 ± 0.03	$24,450 \pm 165$	98.9 ± 0.23
Accelerated	60	Stable, no phase separation	6.2 ± 0.04	$24,280 \pm 170$	98.1 ± 0.25

4. Conclusion

The present study successfully developed Mefenamic acid emulgel formulations using Carbopol 934, isopropyl myristate, Tween 80, and Span 80. The formulations exhibited acceptable pH, viscosity, spreadability, extrudability, drug content, and sustained drug release. F5 showed a satisfactory overall formulation profile with 99.6% drug content and 98.2% drug release at 12 h and remained stable during the study period. Thus, the developed emulgel provides a promising approach for topical delivery of Mefenamic acid and warrants further evaluation of its ex-vivo permeation and anti-inflammatory efficacy.

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6. Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this review.

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