

Formulation And Evaluation of Mucoadhesive Bilayer Tablet

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Abstract

Introduction: Domperidone is widely used as an antiemetic and gastroprokinetic agent; however, its therapeutic effectiveness is limited because of poor oral bioavailability, extensive first-pass metabolism, and the requirement for frequent administration. **Objective:** The present study was carried out to formulate and evaluate a Mucoadhesive Bilayer Tablet of Domperidone for sustained drug release and enhancement of oral bioavailability. To overcome these limitations, a mucoadhesive bilayer tablet approach was selected. **Material and Methods:** The formulation consisted of two functional layers: a drug-containing mucoadhesive layer and an impermeable backing layer. The mucoadhesive layer was designed to adhere to mucosal surfaces, prolong residence time, and provide sustained release, while the backing layer ensured unidirectional drug delivery and minimized drug loss. Three formulations (F1, F2, and F3) were prepared using wet granulation and direct compression techniques. Various excipients including HPMC K100M, chitosan, lactose monohydrate, citric acid, sodium saccharine, magnesium stearate, talc, and ethyl cellulose were incorporated to optimize swelling behavior, mucoadhesion, and release characteristics. Pre-formulation studies including solubility analysis, melting point determination, FTIR compatibility study, and calibration curve preparation confirmed drug purity and compatibility with selected excipients. **Results and Discussion:** FTIR analysis demonstrated preservation of characteristic peaks without evidence of chemical interaction. The prepared formulations were evaluated for physical and performance parameters such as hardness, thickness, friability, content uniformity, surface pH, swelling index, and in-vitro dissolution. The tablets demonstrated acceptable physical characteristics and good compressibility. Among all formulations, batch F3 showed superior performance, with 98% content uniformity, acceptable hardness, controlled swelling behavior, and 87.83% cumulative drug release over 8 hours, indicating effective sustained release. **Conclusion:** The study concluded that mucoadhesive bilayer tablets represent an effective strategy for improving Domperidone delivery by enhancing residence time, controlling release, reducing dosing frequency, and potentially improving patient compliance and therapeutic effectiveness.

Keywords: HPMC K100M, Chitosan, Mucoadhesive, Bilayer

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Introduction

Tablets are one of the most widely used pharmaceutical dosage forms for the administration of drugs. A tablet is defined as a solid unit dosage form containing one or more active pharmaceutical ingredients (APIs) along with suitable pharmaceutical excipients, prepared mainly by compression or molding methods. Tablets are designed to provide an accurate dose of medication in a convenient and stable form for patients. Due to their ease of administration, portability, dose accuracy, and cost-effectiveness, tablets account for a major portion of pharmaceutical products available worldwide.^[1]

Mucoadhesive Drug delivery system

since from the last 40 years the idea of mucoadhesion has supplied the awesome soft where in prolonging the residence time as well as controlled released effect of various bioadhesive dosage forms through different mucosal routs. the formulation based on the mucoadhesive drug delivery system have shown enhanced the bioavailability of many drug. Mucoadhesive drug delivery formulations were introduced in 1947 when gum tragacanth was mix with dental adhesive

powder to apply penicillin to the oral mucosa. Over the year's various others polymers for examples sodium alginate, CMS, guar gum, HEC, and tragacanth have been found to exhibit mucoadhesive properties. during the 1980s polyacrylic acids, HPC and SCMC where widely explored for the development of formulation having mucoadhesive properties. since then the use of acrylate polymers for the developments of the mucoadhesion formulation has increased many folds.^[2]

Theories of Mucoadhesion / Bonding Mechanism

There are six traditional theories which have resulted from studies on the performance of variety of materials and polymer- polymer adherence. The classification of these theories. The contact angle and time of contact plays a significant role in mucoadhesion

Wetting theory

The affinity between the liquid systems and the mucus membrane is obtained by ascertaining the contact angle.¹⁵ As a basic concept, as the contact angle decreases, the affinity increases. The contact angle must be near to zero to provide sufficient spreadability. In an illustrative diagram showing effect of contact angle between the dosage form and mucous

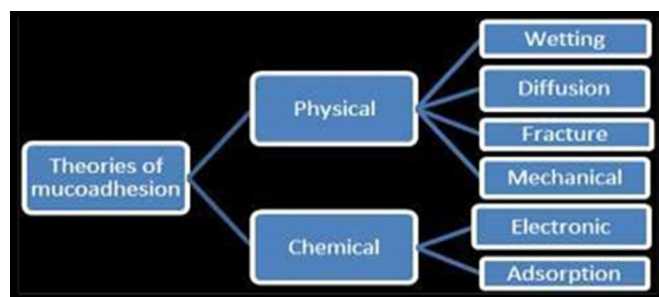


Figure 1: Classification of theories of Mucoadhesion.

membrane. The spreadability coefficient, SAB, is measured from the difference between the surface energies γ_B and γ_A and the interfacial energy γ_{AB} , as indicated in equation:

$$SAB = \gamma_B - \gamma_A - \gamma_{AB}$$

Higher the individual surface energy of mucus and device in relation to the interfacial energy, more is the work of adhesion, WA.

$$WA = \gamma_A + \gamma_B - \gamma_{AB} \quad [3]$$

Diffusion theory

The diffusion theory explains the phenomenon of the interpenetration and entanglement of the bioadhesive polymer chains and mucous polymer chains. As the bond strength enhances, the degree of the penetration increases. The secondary interactions due to inter-diffusion can be seen. Diffusion coefficient, polymer chain flexibility, nature of mucoadhesive chains, mobility and contact time of polymer chains are the factors on which the degree of penetration depends. The depth of interpenetration required to produce a firm bio adhesive bond lies in the range 0.2–0.5 μm . This depth of interpenetration of polymer and mucin chains can be found out by the following equation:

The interpenetration depth,

$$l = (tDb)^{1/2}$$

Where t = contact time and Db = diffusion coefficient of the mucoadhesive material in the mucus.

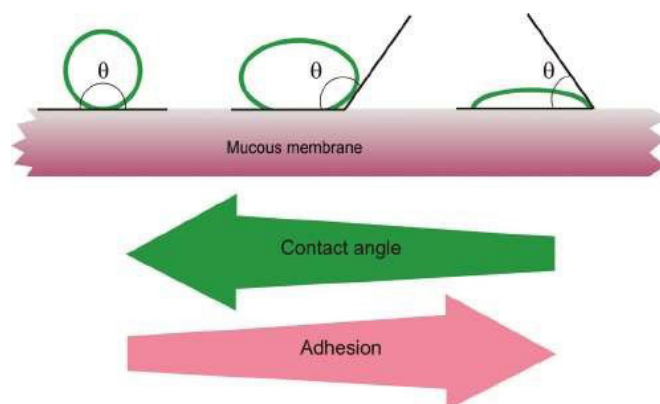


Figure 2: Wetting theory of mucoadhesion

For diffusion to ensue, it is crucial that the systems involved have good mutual solubility, that is, both the bio adhesive and the mucus should have identical chemical structure.^[4]

Fracture theory

This theory examines the force needed to dissociate two surfaces after adhesion is established. The work of fracture has been found to rise when the polymer network fibres are longer or if the degree of cross-linking within such a system is decreased. This concept aids in the measurement of fracture strength (σ) after the separation of two surfaces via its relationship to the Young's modulus of elasticity (E), the fracture energy (ϵ) and the critical crack length (L) through the following equation: $\sigma = (E\epsilon/L)^{1/2}$. The force, S_m , is frequently calculated in tests of resistance to rupture by the ratio of the maximal detachment force, F_m , and the total surface area, A_0 , involved in the adhesive interaction: $S_m = F_m/A_0$. The regions of mucoadhesive bond rupture can be seen

Mechanical theory

Mechanical theory proposes that the adhesion is because of the filling of the imperfections of a rough surface by a mucoadhesive liquid. The irregularities enhance the interfacial area available for interactions thus enhancing energy dissipation. The mechanisms ruling mucoadhesion are also determined by the intrinsic properties of the formulation and by the environment in which it is applied. Intrinsic factors of the polymer are related to its molecular weight, concentration and chain flexibility. For linear polymers, mucoadhesion is directly proportional to molecular weight, but the same does not hold for non-linear polymers

Electronic theory

The electronic theory relies on the hypothesis that the bioadhesive material and the target mucous membrane have diverse attributes of electronic surface. Based on this, when the surfaces come in contact with each other, there is an electron transfer to balance the Fermi levels, arising due to the formation of electrical double layer at the interface of the bioadhesive and the mucous membrane. The bioadhesive force is assumed to be present due to the attractive forces over this double layer

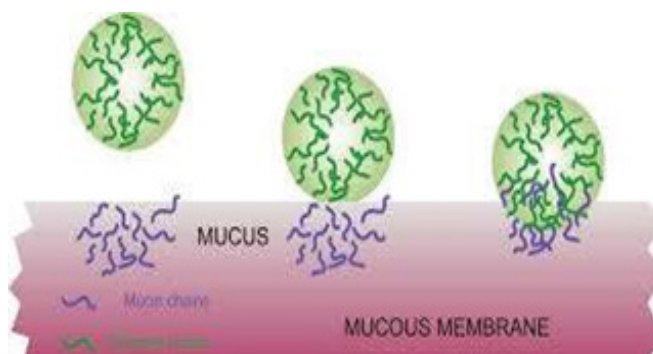


Figure 3: Theory of Diffusion theory

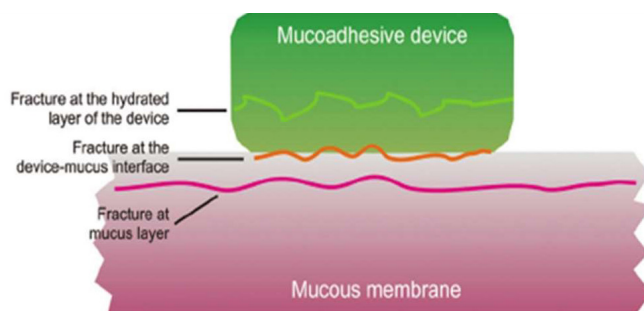


Figure 4: Regions of mucoadhesive bond rupture can occur

Adsorption theory

This theory states that the bioadhesive bond formed between an adhesive substrate and the tissue is due to the weak Van der Waals forces and hydrogen bond formation. Various mucoadhesive interactions are: Ionic bonding, Covalent bonding, Hydrogen bonding, Van der Waals bonding, Hydrophobic bonding. For example, hydrogen bonds are the dominant interfacial forces in polymers having carboxyl groups. These forces are very important in the adhesive interaction phenomena because they might be individually weak, a great number of interactions can result in a strong global adhesion.^[5]

Mucoadhesive Bilayer Tablet

Mucoadhesive bilayer tablets are advanced drug delivery systems designed to prolong the residence time of a dosage form at mucosal surfaces and improve the bioavailability of drugs that undergo extensive first-pass metabolism. These systems consist of two distinct layers: a mucoadhesive drug-containing layer and a backing layer. The mucoadhesive layer adheres to the mucosal membrane, swells upon hydration, and provides sustained drug release, whereas the backing layer prevents drug loss in the opposite direction and ensures unidirectional drug delivery toward the absorption site.^[6]

Domperidone is a dopamine D2 receptor antagonist widely used as an antiemetic and gastroprokinetic agent for the treatment of nausea, vomiting, gastric reflux, dyspepsia, and gastrointestinal motility disorders. Although Domperidone is an effective therapeutic agent, it possesses certain limitations such as short biological half-life, poor bioavailability, and extensive first-pass metabolism. Because of these drawbacks, frequent administration of conventional dosage forms is required to maintain therapeutic plasma concentration. To overcome these limitations, sustained release mucoadhesive bilayer tablets of Domperidone have been developed as an advanced drug delivery system. The sustained release layer of Domperidone is formulated using hydrophilic polymers such as hydroxypropyl methylcellulose (HPMC), chitosan. These polymers swell upon contact with biological fluids and form a gel-like matrix around the tablet. The gel barrier controls the penetration of dissolution medium and regulates the diffusion of Domperidone from the matrix. As a result, the drug is released slowly and

continuously over an extended period of time. Sustained drug release helps maintain a constant plasma drug concentration, reduces dosing frequency, minimizes side effects, and improves patient compliance.^[7]

Step 1: Sieving Pass all dry ingredients separately through sieve #40. Ingredients to sieve: Domperidone malate, HPMC K100M, Chitosan, Lactose, Citric acid & Sodium saccharin. This ensures uniform particle size. **Step 2: Dry Mixing** Transfer all sieved powders into a mortar, blender, or rapid mixer granulator. Mix for 10–15 minutes to obtain a uniform blend. **Step 3: Preparation of Binder Solution** Use isopropyl alcohol alone as the granulating fluid. **Step 4: Wet Granulation** Add IPA gradually to the powder blend while mixing. Continue mixing until a damp mass & coherent wet mass is formed. Do not overwet. **Step 5: Screening/Wet Sieving** Pass the wet mass through sieve #10 or #12 to produce wet granules. **Backing layer granule preparation** 1. Sieving Pass all ingredients separately through sieve no. 60 to obtain uniform particle size. 2. Weighing Accurately weigh: Ethyl cellulose, Talc, Magnesium stearate according to the formulation formula. 3. Mixing Transfer ethyl cellulose and diluent into a dry mortar or blender. Mix thoroughly for about 10–15 minutes to ensure uniform distribution.^[8]

Evaluation of Granules^[9]

Bulk Density

Weigh accurately 25g of powder, which was previously passed through 20# sieve and transferred in 100 ml graduated cylinder. Carefully level the granules without compacting, and read the unsettled apparent volume (V₀). Calculate the apparent bulk density in gm/ml by the following formula

$$\text{Bulk density} = \frac{\text{weight of powder}}{\text{Bulk volume}}$$

Tapped Density

Weigh accurately 25 g of granules, which was previously passed through 20# sieve and transfer in 100ml graduated cylinder. Then mechanically tap the cylinder containing the sample by raising the cylinder and allowing it to drop under its own weight using mechanically tapped density tester that provides a fixed drop of 14± 2mm at a nominal rate of 300 drops per minute. Tap the cylinder for 500 times initially and measure the tapped volume (V₁) to the nearest graduated units, repeat the tapping an additional 750 times and measure the tapped volume (V₂) to the nearest graduated units. If the difference between the two volumes is less than 2% then final the volume (V₂).

Calculate the tapped bulk density in gm/ml by the following formula:

$$\text{Tapped Density} = \frac{\text{weight of powder}}{\text{Tapped volume}}$$

Carr's Index

The Compressibility Index of the granules blend was determined by Carr's compressibility index. It is a simple test to evaluate the BD and TD of a granules and the rate at which it packed down. The formula for Carr's Index is as below

$$\text{Carr's Index} = \frac{\text{Tapped Density} - \text{Bulk Density}}{\text{Tapped Density}} \times 100$$

Hausner's Ratio

The Hausner's ratio is a number that is correlated to the flow ability of a granular material.

$$\text{Hausner's Ratio} = \frac{\text{Tapped density}}{\text{Bulk Density}}$$

Angle of Repose

The flow characteristics are measured by angle of repose. Improper flow of powder is due to frictional forces between the particles. These frictional forces are quantified by angle of repose. Angle of repose is defined as the maximum angle possible between the surface of a pile of the powder and the horizontal plane.

$$\theta = \tan^{-1}(h/r)$$

Where, h = Height of pile

. r = Radius of the base of the pile

. θ = Angle

Formulation batches of Mucoadhesive Bilayer Tablet

A total of three formulation of Mucoadhesive Bilayer tablet and optimization were using varying concentration of polymers. The tablet were prepared by wet granulation and direct compression method to ensure uniformity and reproductivity.^[10]

Evaluation of Mucoadhesive Bilayer tablet^[11]

Appearance

Round shaped bi convex with one side orange to off- orange colour and second as white to off-white colour tablet

Hardness

Hardness was measured using Monsanto hardness tester. For each batch three tablets are tested. The measured hardness (Kg/cm²) of tablets of each batch

Table 1: Effect of carr's index and Hausner's ratio on flow property

Sr. No	Carr's index (%)	Flow character	Hausner's ratio
1.	< 10	Excellent	1.00–1.11
2.	11–15	Good	1.12–1.18
3.	16–20	Fair	1.19–1.25
4.	21–25	Passable	1.26–1.34
5.	26–31	Poor	1.35–1.45
6.	32–37	Very poor	1.46–1.59
7.	>38	Very, very poor	>1.60

Table 2: Effect of angle of repose(θ) on flow property

Sr. No	Angle of repose (θ)	Type of flow
1.	< 20°	Excellent
2.	20°–30°	Good
3.	30°–34°	Passable
4.	>35°	Very poor

Thickness Test

Ten tablets were selected randomly and thickness was assessed using vernier caliper/Screw gauge. Closed the jaw of the caliper & adjust the zero point to ensure accurately. Ensured the vernier caliper is set to measure thickness. This usually involves selecting the mode where both the upper & lower jaws measure inwards. Place the tablet between the jaws of capiler .Ensure it sits flat and perpendicular to the jaws for accurate measurement. Gently close the jaws of capiler around the tablet until they make light contact with the tablet's surface. Looked at the scale on the vernier capiler to thickness measurement

Diameter

It also dimensionally described& controlled. Tablet diameter can be measured for six tablets by Vernier caliper.

Weight Variation

Tablets were checked to ensure that proper weight tablets are being made. Ten tablets were selected at random from each batch, weighed individually and the average weight was calculated. The batch passes the test for uniformity of weight if not more than two of the individual tablet weight deviate from the average weight by more than the 7.5 percentage.

Friability

Ten tablets were weighed and placed in the Roche friabilator and apparatus was rotated at 25 rpm for 4 minutes. After revolutions the tablets were dedusted and weighed again. The percentage friability was measured using the formula
 $\% F = \{1 - (W_t/W)\} \times 100$

Where,

% F = Friability in percentage

W = Initial weight of tablet

Wt = Weight of tablets after revolution

Dissolution studies

Dissolution is the process in which a substance forms a solution. Dissolution testing measure the extent and the rate of solution formation from a dosage form, such as tablets, capsule, ointment etc. The dissolution of a drug is important for its bioavailability and therapeutic effectiveness. The USP paddle type II was used for in vitro dissolution research. For sink condition, an aliquot of 05ml of dissolution media was taken at regular intervals and replaced with new fresh medium. UV spectroscopy was used to establish the absorbance of filtered liquids. For both core and compress coated formulations, the rate of dissolution was investigated.

Table 3: Formulation of Mucoadhesive Bilayer tablet

Sr. No	Ingredient	F1 (mg)	Percentage (%)	F2 (mg)	Percentage (%)	F3 (mg)	Percentage (%)
1.	Domperidone	20	20	20	20	20	20
2.	Citric acid	20	20	20	20	20	20
3.	HPMC K100M	5	5	7.5	7.5	10	10
4.	Chitosan	5	5	7.5	7.5	10	10
5.	Lactose onohydrate	46	46	41	41	36	36
6.	Sodium saccharrine	2	2	2	2	2	2
7.	Isopropyl alcohol	Q.s	Qs	Q.s	Qs	Q.s	Qs
8.	Magnesium sterate	1	1	1	1	1	1

Content Uniformity

Twenty tablets were weighed and powdered in a glass mortar. Quantity of powder equivalent to 10 mg of Domperidone was accurately weighed and transferred to 100 ml 0.1 N HCl in volumetric flask. From the resulting solution 10 ml of the sample was withdrawn and adjusted final volume in volumetric flask up to 100 ml using 0.1 N HCl. The solution was analyzed at λ_{max} value of 284 nm by using UV-Visible spectrophotometer. The content of drug was calculated from calibration curve.

In Vitro Swelling or Swelling Index

This test was carried out by using Petri dishes having 10 ml of 0.1 N HCl and tablet was placed in Petri dish. The initial weights of the drug loaded tablets in each batch were determined (W0) using an electronic balance. Tablets from each batch were removed at different time intervals (1, 2, 3, 4, 6 and 8 hrs), wiped with filter paper to remove excess water from the tablet surface, and then reweighed (W1). The swelling index (% w/w) was determined from the following relationship and plotted against time. The experiment was performed in triplicate.

$$\text{Swelling index} = \frac{[w_1 - w_0]}{W_0} \times 100$$

Surface pH measurement

The Mucoadhesive tablets were first allowed to swell by keeping them in contact with 5 ml of 0.1 N HCl for 2 hrs. The surface pH was then found by bringing a combined glass electrode near the surface of the tablets and allowing the reading to stabilize for at least 1 min. The measurements were taken in triplicate for each batch of the Mucoadhesive tablet.

Result And Discussion

Organoleptic Properties

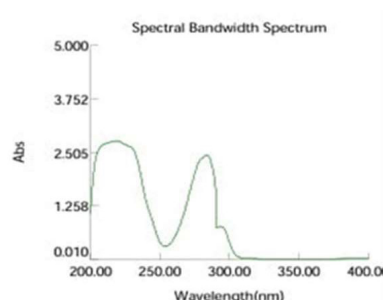
The organoleptic properties of Domperidone Malate were evaluated for colour and odour. The drug was found to be white to off-white in colour and odourless in nature and in crystalline form

Table 4: Organoleptic property

Parameters	Result
Physical state	Crystalline powder
Colour	White to off white
Odour	Odourless

Table 5: Solubility of drug in different solvent

Sr. No	Solvent	Solubility
1.	Distilled Water	Insoluble
2.	0.1 N HCl	Soluble
3.	Ph 6.8	Insoluble
4.	Ethanol	Soluble
5.	Methanol	Soluble

**Figure 5:** Calibration curve of Domperidone Malate**Table 6:** Calibration curve of Domperidone Malate

Sr. No	Concentration (ug/ml)	Absorbance
1.	2	0.132
2.	4	0.167
3.	6	0.205
4.	8	0.239
5.	10	0.270
6.	12	0.305

Solubility study

The Solubility study revealed that Domperidone malate was insoluble in water and PH 6.8, while it was found to be soluble in Methanol, ethanol and 0.1 N HCl.

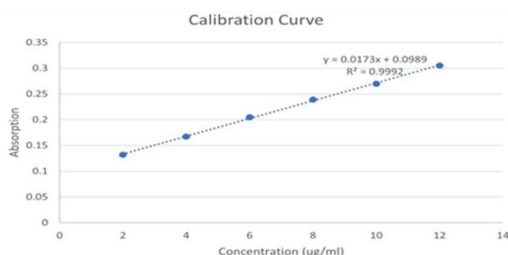


Figure 6: Calibration curve of Domperidone malate

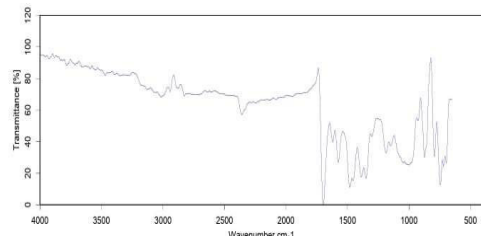


Figure 7: FTIR OF Domperidone drug

Table 7: Precompression parameter of layer 1

Sr. No	Evaluation parameters	F001	F002	F003
1.	Bulk density	0.44 g/cm ³	0.42 g/cm ³	0.96 g/cm ³
2.	Tapped density	0.51 g/cm ³	0.48 g/cm ³	1.06 g/cm ³
3.	Angle of Repose	28.6°	27.4°	27.68°
4.	Carr's Index	13.72%	12.5%	9.00%
5.	Hausner ratio	1.15%	1.14%	0.1%

Table 8: Precompression parameter of layer 2

Sr. No	Evaluation parameters	F001	F002	F003
1.	Bulk density	0.49g/cm ³	0.48g/cm ³	0.49g/cm ³
2.	Tapped density	0.57g/cm ³	0.54 g/cm ³	0.57g/cm ³
3.	Angle of Repose	28.64°	28.12°	28.64°
4.	Carr's Index	14.29%	14.5%	14.5%
5.	Hausner ratio	1.17%	1.19%	1.17%

Table 9: Physical evaluation

Sr. No	Evaluation parameters	F001	F002	F003
1.	Appearance	Round shape orange to off orange on one side& white to off white colour on another side	Round shape orange to off orange on one side& white to off -white colour on another side	Round shape orange to off orange on one side& white to off white colour on another
2.	Hardness	5.5-6	5-6	6-7
3.	Thickness	2.03-2.04	2.02-2.03	2.04-2.05
4.	Diameter	3.60	3.60	3.60
5.	Friability	0.63 %	0.51%	0.61%
6.	Content uniformity	92%	94%	98%
7.	Surface PH	6.75	6.76	7.03
8.	Weight variation	150	149	151

Table 10: Swelling index

Batch	Swelling index
F1	40.21
F2	53.58
F3	40.35

Table 11: Particle size Distribution

Sieve No	Particle size range (µm)	Weight retain	Percentage retained
#10	2000	0.36	7.2
#20	850	0.92	18.4
#30	600	1.54	30.8
#40	425	1.32	26.4
#60	250	0.18	3.60
Pan	-	0.05	1.00
Total		5.00	100.00

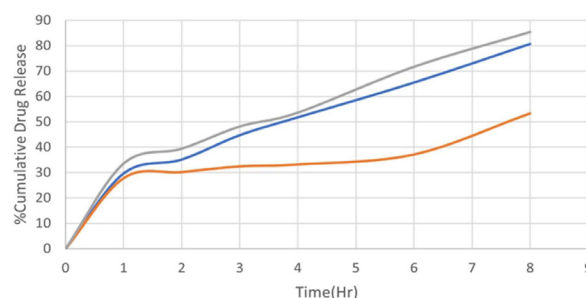


Figure 8: Dissolution study graph

Melting point

Melting point of Domperidone malate was found to be in the range 244°C–246°C confirming of purity

Determination of absorption maximum

The UV spectrophotometric analysis of Domperidone malate in 0.1 N Hcl showed maximum absorbance (λ max) at 284 nm

The calibration curve of Domperidone malate was prepared in 0.1 N Hcl at concentration range 2-12 µg/ml and analyzed at 284 nm using a UV-visible spectrophotometer.

Dissolution Study

Table 12: Dissolution study

	F1	F2	F3
0 min	0	0	0
1 hr	29.66	27.85	43.83
2 hr	35.12	30.25	58.79
3 hr	44.72	32.48	65.19
4 hr	51.74	33.24	69.27
5 hr	56.34	36.18	74.93
6 hr	65.43	37.17	78.27
7 hr	73.72	45.54	83.96
8 hr	80.63	53.36	87.83

Summary & Conclusion

The objective of this research was to develop and evaluate a Mucoadhesive Bilayer Tablet of Domperidone capable of delivering the drug in a controlled manner over an extended duration. Domperidone was selected because of its low oral bioavailability and extensive first-pass metabolism, which reduce therapeutic efficiency and require repeated dosing. A literature review demonstrated that mucoadhesive systems can enhance drug absorption by increasing contact time at the absorption site and reducing drug loss. Bilayer tablet technology further improves therapeutic outcomes through directional release and sustained delivery. The formulation work involved preparation of three batches (F1–F3) with different concentrations of polymers. Chitosan was incorporated to provide mucoadhesion, while HPMC K100M functioned as a releasecontrolling matrix former. Ethyl cellulose served as the backing layer polymer. Drug–excipient compatibility studies confirmed no significant interaction between Domperidone and selected excipients. Solubility and melting point studies supported suitability of the drug for formulation development. Evaluation of tablets showed acceptable physicochemical properties: Hardness remained within suitable limits for mechanical stability, Friability values indicated good resistance to breakage, Weight variation and thickness were within acceptable limits., Surface pH remained close to physiological conditions. Content uniformity confirmed proper drug distribution. Swelling studies demonstrated that F2 exhibited maximum swelling (53.58), whereas F3 showed controlled swelling (40.35) suitable for sustained release behavior. Dissolution studies revealed progressive drug release in all formulations. Batch F3 consistently showed the highest release profile, achieving 43.83% at 1 hour, 69.27% at 4 hours, and 87.83% at 8 hours, indicating sustained and controlled release behavior. Overall, the developed formulation demonstrated the feasibility of using mucoadhesive bilayer technology to improve Domperidone delivery and therapeutic performance.

Conclusion

The present investigation successfully developed and evaluated a Mucoadhesive Bilayer Tablet of Domperidone using wet granulation and direct compression methods. The formulation strategy effectively addressed the limitations associated with conventional Domperidone dosage forms, particularly poor bioavailability and frequent dosing requirements. The combination of HPMC K100M and chitosan produced a formulation capable of maintaining prolonged contact with mucosal surfaces and controlling drug release. The incorporation of an ethyl cellulose backing layer supported unidirectional drug diffusion and improved release efficiency. Among all developed batches, F3 emerged as the optimized formulation due to Excellent tablet integrity, Acceptable physical evaluation parameters, Good content uniformity (98%), Controlled swelling behavior & Maximum sustained drug release (87.83% in 8 hours). The findings suggest that the developed mucoadhesive bilayer tablet can improve therapeutic efficacy, reduce administration frequency, enhance patient compliance, and potentially increase Domperidone bioavailability. Further in-vivo pharmacokinetic and stability studies are recommended to confirm long-term performance and clinical applicability of the optimized formulation.

References

- Juveria A, Mannan A. Formulation and Evaluation of Buccal Mucoadhesive Bilayer Tablets of Apixaban. *Journal of Drug Delivery & Therapeutics*. 2025 Dec 1;15(12).
- Chettupalli AK, Bukke SP, Babu MR, Amarachinta PR, Boggula N, Mohammed A. Mucoadhesive lyophilized wafers loaded with nano-spanlastic felodipine formulation: development and characterization. *Scientific Reports*. 2025 Nov 7;15(1):39037.
- Dalvi SS, Dighe SB, Bhawar SB. Novel Approach and Current Application of Bilayer Tablet–A Review. *Asian Journal of Pharmacy and Technology*. 2024 Mar 1;14(1):43-9.
- Abdullah D, Saeed R, Ali M, Sohail M, Naeem S, Hussain T. Formulation and evaluation of mucoadhesive gastro-retentive tablets of domperidone. *Journal of Contemporary Pharmacy*. 2024 Dec 31;8(2):87-95.
- Alagusundaram M, Jain NK, Begum MY, Parameswari SA, Nelson VK, Bayan MF, Chandrasekaran B. Development and characterization of gel-based buccoadhesive bilayer formulation of Nifedipine. *Gels*. 2023 Aug 26;9(9):688.
- Chauhan V, Agrawal A, Singh UK. A comprehensive review on mucoadhesive drug delivery. *Journal of Drug Delivery & Therapeutics*. 2022 Jul 2;12(4-S):199-209.
- Omer M, Shahidulla SM. Formulation and evaluation of mucoadhesive bilayered buccal tablet of Ziprasidone Hydrochloride. *J Drug Delivery Ther*. 2022;12(5-S):174-180. doi:10.22270/jddt.v12i5-s.5757
- Li KL, Castillo AL. Formulation and evaluation of a mucoadhesive buccal tablet of mefenamic acid. *Brazilian*

- Journal of Pharmaceutical Sciences. 2020;56:e18575.
9. Manogna K, Nagaveni P, Thyagaraju K. A Review On Mucoadhesive Bilayer Buccal Tablets. AJPTR. 2018;8(1):101-5.
 10. Aulton ME, Taylor K, editors. Aulton's pharmaceuticals: the design and manufacture of medicines. Elsevier Health Sciences; 2013
 11. Witika BA, Aucamp M, Mweetwa LL, Makoni PA. Application of fundamental techniques for physicochemical characterizations to understand post-formulation performance of pharmaceutical nanocrystalline materials. Crystals. 2021 Mar 21;11(3):310.

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