Journal of Biomedical and Pharmaceutical Research
Available Online at www.jbpr.in
CODEN: - JBPRAU (Source: - American Chemical Society)
NLM (National Library of Medicine): ID: (101671502)
Index Copernicus Value 2023: 85.86
Volume 14, Issue 6; 2025, 44-57

ISSN (Online): 2279-0594
ISSN (Print): 2589-8752

Research Article

Formulation and Evaluation of Sustained-Release Floating Tablets of Bupropion and Naltrexone

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Article Info: Received: 22-09-2025 / Revised: 17-10-2025 / Accepted: 19-11-2025
Corresponding Author: Deepesh
DOI: https://doi.org/10.32553/jbpr.v14i6.1385
Conflict of interest statement: No conflict of interest

Abstract:
Bupropion and Naltrexone are medications with significant therapeutic importance in treating depression and alcohol dependence, respectively. However, both drugs face challenges related to poor bioavailability and frequent dosing requirements due to their short half-lives and rapid first-pass metabolism. To overcome these limitations, this research work focused on developing and evaluating floating tablets containing a combination of Bupropion and Naltrexone using natural and synthetic polymers. The floating tablet formulations were prepared through granulation and compression methods, incorporating Xanthan gum and Hydroxypropyl Methylcellulose (HPMC) as polymer matrix systems along with sodium bicarbonate as a gas-generating agent. A total of ten formulation batches were developed, varying the polymer concentrations to study their effects on drug release patterns, buoyancy characteristics, and overall tablet performance. Pre-formulation studies, drug-excipient compatibility assessments, and comprehensive tablet evaluation including weight variation, hardness, friability, swelling behavior, floating duration, and in-vitro drug release studies were performed. Results demonstrated that formulations containing optimized polymer ratios exhibited excellent floating ability for more than 12 hours with controlled and sustained drug release following zero-order kinetics. The most promising formulations showed no sign of chemical interaction between the drugs and polymers, confirming their compatibility and suitability for pharmaceutical use. These findings suggest that the developed floating tablet formulations offer a promising approach for improving the therapeutic effectiveness of Bupropion and Naltrexone by prolonging their gastric residence time and providing sustained drug delivery.
Keywords: Bupropion, Naltrexone, floating tablets, gastro-retentive drug delivery, sustained release, bioavailability.

Introduction

Overview of Gastro-Retentive Drug Delivery Systems: In modern pharmaceutical science, oral drug delivery remains the most convenient and preferred route for patients worldwide. However, conventional oral dosage forms often face significant challenges in maintaining consistent drug levels in the bloodstream due to variable gastric residence time and unpredictable drug absorption patterns in the gastrointestinal

tract. Many medications are absorbed optimally only from specific regions of the stomach and upper intestine, and when they reach other parts of the digestive system, their absorption becomes inadequate, resulting in poor drug availability in the body.

To address these challenges, scientists have developed gastro-retentive drug delivery systems, which are designed to remain in the stomach for extended periods. Among these systems, floating drug delivery systems represent a highly successful and widely used approach. These systems work on a simple but effective principle: by making the dosage form less dense than the stomach fluid, the tablets float on the gastric contents instead of sinking, allowing them to remain in the stomach for many hours while gradually releasing the medication.

Principles of Floating Tablets

Floating tablets are designed using the concept of buoyancy, which allows them to stay afloat in the acidic environment of the stomach. The fundamental principle behind this approach relies on Archimedes' principle of buoyancy. When a floating tablet comes into contact with gastric fluid, it begins to absorb water and swell. If the tablet contains gas-generating materials such as sodium bicarbonate combined with acids like citric acid, a chemical reaction occurs that produces carbon dioxide gas. This gas becomes trapped within the swelled polymer matrix, reducing the overall density of the tablet below that of the gastric fluid (approximately 1.004 g/cm^3), causing it to float.

The buoyancy mechanism can be expressed through the following principle:

- Gas-generating approach: Acid-base pairs react in the acidic stomach to produce CO_2
- Non-effervescent approach: Polymers absorb water and swell, naturally entrapping air
- Hybrid approach: Combination of both mechanisms for better control

Advantages of Floating Drug Delivery Systems

The floating tablet approach offers numerous clinical and pharmaceutical advantages:

Improved Drug Availability: For medicines that are best absorbed from the stomach and upper small intestine, keeping the tablet in this region for several hours significantly improves how much drug enters the bloodstream.

Reduced Dosing Frequency: Since the drug is released slowly over many hours, patients need to take medication less frequently, which improves patient compliance and quality of life.

Better Control of Drug Release: The polymer matrix of floating tablets allows for precise control over how quickly the drug is released, maintaining steady drug levels for extended periods.

Site-Specific Delivery: For medications that need to act locally in the stomach or are sensitive to the alkaline environment of the lower intestine, floating tablets provide the ideal solution.

Reduced Medication Side Effects: By maintaining stable drug levels rather than high peaks and low troughs, side effects are minimized and therapy becomes more consistent.

Better Treatment Results: Many drugs show improved effectiveness when their blood levels remain steady rather than fluctuating.

Clinical Significance of Bupropion and Naltrexone

Bupropion is an important antidepressant medication that works by preventing the reabsorption of specific brain chemicals

(norepinephrine and dopamine), thereby improving mood and mental function. However, bupropion has a relatively short half-life and is extensively broken down in the liver, leading to poor overall bioavailability.

Naltrexone is used primarily to treat alcohol dependence and opioid addiction by blocking opioid receptors in the brain. Like bupropion, naltrexone suffers from significant first-pass metabolism in the liver, resulting in very low bioavailability when taken orally.

The combination of both medications is particularly interesting for research because:

- Both drugs face similar bioavailability challenges
- A floating formulation could benefit both medicines simultaneously
- The combination might offer complementary therapeutic effects
- A single tablet dosage form could improve patient acceptance

Research Objectives

The primary aim of this research was to design, formulate, and thoroughly evaluate floating tablets containing Bupropion and Naltrexone using biocompatible and natural polymers. The specific objectives were:

- To conduct detailed pre-formulation studies and analytical characterization of both active pharmaceutical ingredients
- To develop multiple floating tablet formulations using different polymer combinations and concentrations
- To evaluate all formulations for various physical and chemical properties according to pharmacopeial standards
- To study the effects of polymer type and concentration on drug release patterns
- To identify the best-performing formulation with optimal floating ability and drug release
- To analyze drug release data using mathematical models to understand the release mechanism

Materials and Methods

The formulation comprises two active pharmaceutical ingredients: Bupropion Hydrochloride and Naltrexone Hydrochloride, which work synergistically to provide the therapeutic effect. The polymer system includes both natural and synthetic components—Xanthan Gum serves as the natural polymer, while Hydroxypropyl Methylcellulose (HPMC K4M and K100M) functions as the synthetic polymer for sustained release characteristics.

The excipient composition includes Microcrystalline Cellulose as the primary diluent to provide bulk and structural integrity. Sodium Bicarbonate is incorporated as a gas-generating agent to create effervescent properties or enhance disintegration. The formulation contains Magnesium Stearate as the lubricant to facilitate tablet compression and ejection, while Polyvinylpyrrolidone (PVP K30) acts as the binder to impart cohesion to the powder mixture. Purified Talc is included as a glidant to improve flow properties during manufacturing.

Pre-Formulation Studies Drug Characterization

The appearance, color, and physical state of Bupropion and Naltrexone were visually observed and recorded. Infrared spectroscopy was performed by preparing a mixture of the drug and potassium bromide powder. The mixture was compressed into a transparent disk, and the infrared spectrum was recorded from 400 to 4000 cm^{-1}.

Ultraviolet spectroscopy was performed by preparing a 10 ppm solution of each drug in methanol. The solution was scanned from 200

to 400 nanometers to determine the maximum wavelength of absorption.

Solubility Studies

The solubility of both drugs was determined in multiple solvents including water, methanol, acetonitrile, and pH 1.2 buffer solution. An excess amount of drug was added to 5 milliliters of solvent and allowed to stand for 24 hours at room temperature in a sealed container. After filtration through Whatman filter paper, the solutions were diluted appropriately and analyzed using UV spectrophotometry.

Melting Point Determination

Melting points were determined using the capillary tube method. A small amount of drug was sealed in one end of a capillary tube and placed in a melting point apparatus filled with liquid paraffin. The temperature at which the drug completely melted was recorded.

Calibration Curve Preparation

Standard solutions were prepared by dissolving 100 mg of each drug in 100 milliliters of distilled water. From these stock solutions, various concentrations (1, 2, 5, 7, and 10 ppm for Bupropion; 1, 2, 5, 10, and 15 ppm for Naltrexone) were prepared.

Absorbance values were measured at the specific wavelengths (252 nm for Bupropion and 210 nm for Naltrexone) using a UV spectrophotometer. Linear regression equations were calculated from the resulting calibration curves.

Preformulation Analysis of Powder Mixtures

Bulk Density: A known mass of powder blend was poured into a graduated cylinder, and the volume was recorded. Bulk density was calculated as mass divided by volume.

Tapped Density: A graduated cylinder containing a known mass of powder was tapped 1000 times using a mechanical device. The final volume was recorded, and tapped density was calculated.

Hausner's Ratio: This ratio was calculated by dividing tapped density by bulk density. Values less than 1.2 indicate excellent flowability.

Compressibility Index: This was calculated using the formula: [(Tapped Density - Bulk Density) × 100]

/ Tapped Density. Values less than 15% indicate good flowability.

Angle of Repose: Powder was allowed to flow naturally onto a flat surface through a fixed funnel. The angle formed was measured. Angles less than 30° indicate good flow properties.

Formulation of Floating Tablets

All ingredients except glidants and lubricants were weighed according to the formulation batch design and mixed uniformly in a plastic bag for 10 minutes. The mixture was then passed through a mesh sieve (60 mesh) to break up any clumps.

Granulation was performed by adding a solution of polyvinylpyrrolidone (PVP K30) dissolved in isopropyl alcohol to the dry mixture. The resulting wet mass was passed through another sieve (12 mesh) and dried in an oven at 75°C for 2 hours.

After drying, the granules were sized using an 18-mesh sieve and mixed with magnesium stearate and purified talc as lubricants and glidants.

The final blend was compressed into tablets using a rotary tablet press with 8 mm diameter flat punches.

Table 1: shows Formulation Composition

Ingredients	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
Bupropion (mg)	90	90	90	90	90	90	90	90	90	90
Naltrexone (mg)	8	8	8	8	8	8	8	8	8	8
Xanthan Gum (mg)	10	20	30	40	50	0	0	0	0	0
HPMC K4M (mg)	0	0	0	0	0	10	20	30	40	50
MCC (mg)	103	93	83	73	63	103	93	83	73	63
Na HCO_3 (mg)	60	60	60	60	60	60	60	60	60	60
MgStearate (mg)	2	2	2	2	2	2	2	2	2	2
PVP K30 (mg)	20	20	20	20	20	20	20	20	20	20
Talc (mg)	5	5	5	5	5	5	5	5	5	5

Tablet Evaluation Tests Uniformity of Weight

Twenty tablets from each formulation were weighed individually using an analytical balance. The average weight was calculated, and the percentage deviation was determined according to Indian Pharmacopoeia standards. For tablets between 80 and 250 mg, a maximum deviation of 7.5% is acceptable.

Hardness Testing: Tablet hardness was measured using a Monsanto tablet hardness tester. Six tablets from each batch were tested, and the average hardness value was calculated and expressed in kilograms per square centimeter.

Friability Testing: Twenty tablets were weighed and placed in a friabilator that rotates at 25 revolutions per minute for 4 minutes, causing tablets to fall 6 inches with each rotation. The tablets were then weighed again, and the percentage weight loss was calculated. Tablets showing less than 1% weight loss are considered acceptable.

Thickness Measurement

The thickness of six tablets from each batch was measured using a digital micrometer and recorded in millimeters.

Swelling Index

Individual tablets were placed in 100 milliliters of pH 1.2 hydrochloric acid solution maintained at 37±0.5°C. After 8 hours, tablets were removed, blotted with tissue paper to remove excess liquid, and weighed. The swelling index was calculated using the formula:

Swelling Index (%) = $[(W_t - W_0) / W_0] \times 100$

Where Wt is the weight after swelling and W_0 is the initial weight.

Floating Behavior Studies

Individual tablets were placed in 100 milliliters of pH 1.2 hydrochloric acid solution at 37±0.5°C. The floating lag time (the time taken for the tablet to rise to the surface) was recorded in seconds or minutes. The total floating time (the period during which the tablet remains afloat) was also noted in hours.

In-Vitro Drug Release Studies

The dissolution test was performed using a USP Type II paddle apparatus with 900 milliliters of pH 1.2 hydrochloric acid solution maintained at 37±0.5°C. One tablet was placed in each dissolution vessel, and the paddle rotated at 75 revolutions per minute.

Samples of 5 milliliters were withdrawn at predetermined time intervals (15, 30, 45, 60, 120, 180, 240, 300, 360 minutes) and replaced with fresh medium of the same volume to maintain constant volume. All samples were filtered and analyzed by UV

spectrophotometry at the specific absorption wavelengths for each drug.

Drug Content Analysis

Ten tablets from each batch were weighed and crushed into a fine powder. An accurately weighed portion was dissolved in pH 1.2 buffer solution in a volumetric flask. The solution was appropriately diluted, filtered, and analyzed by UV spectrophotometry. The percentage of drug content was calculated using the calibration curves.

Results and Discussion Pre-Formulation Studies

Appearance and Visual Inspection

Bupropion appeared as a white to off-white powder with a slightly bitter taste.

Naltrexone presented as a white to practically white crystalline powder.

Both drugs were odorless and free from visible impurities.

Infrared Spectroscopy Result

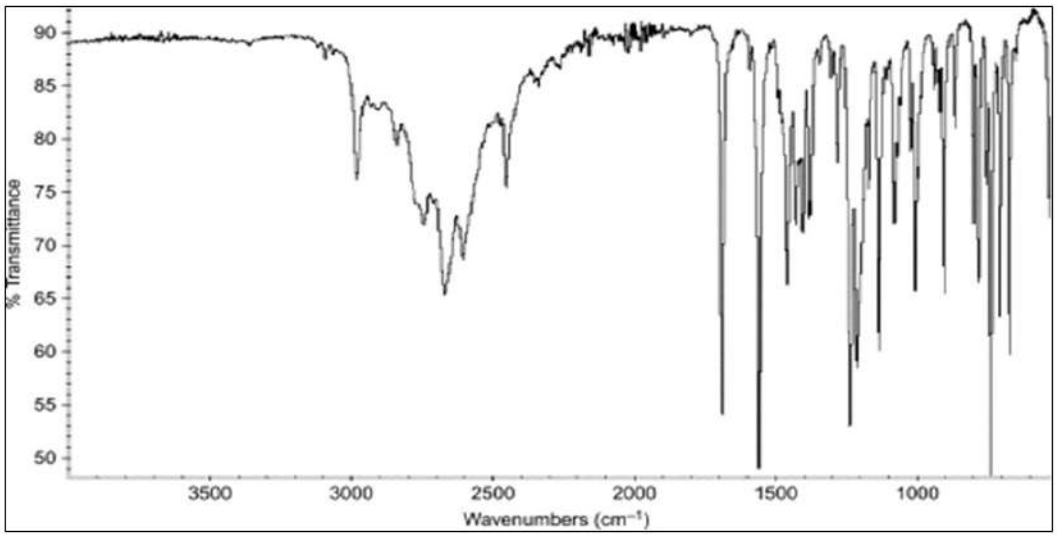

Figure 1: shows IR Spectra of Bupropion Table shows Functional group of Bupropion

Table 2:

Functional Group	Characteristic IR Absorption(cm^{-1})	Assignment
Aromatic C–H stretch	3000–3100	Stretching of aromatic C–H bonds
Aliphatic C–H stretch	2850–2960	Stretching of methyl / methylene C–H
C=O (Ketone)	1680–1750(typically~1700)	Strong sharp peak for ketone carbonyl group
C≡N (Nitrile)	2220–2260	Sharp medium to strong absorption
Aromatic C=C stretch	1450–1600	Skeletal vibration of aromatic ring
C–N stretch (amine)	1020–1350	Stretching vibration of amine group

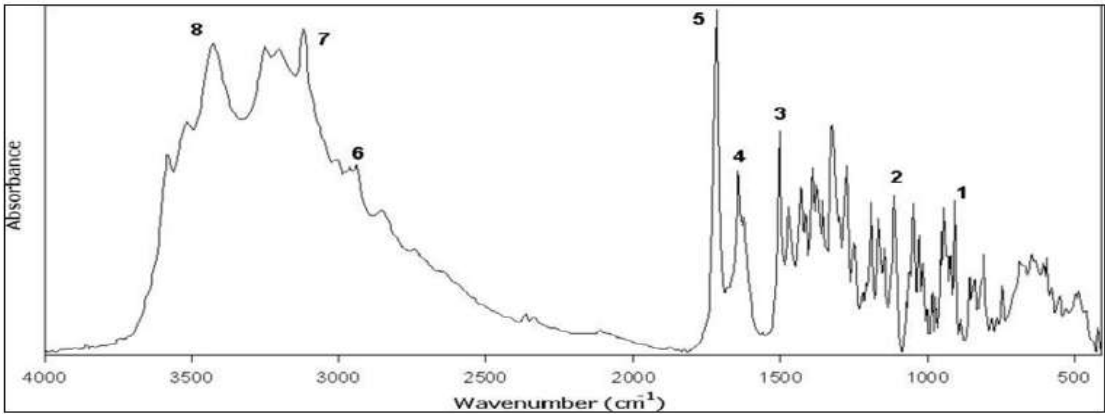

Figure 2: shows IR Spectra of Naltrexone Table shows Functional group of Naltrexone

Table 3:

Wave number (cm^{-1})	**Functional Group**	**Type of Vibration**	**Assignment/Remark**
~3420–3300	–OH(alcohol/phenol)	O–H stretching (broad)	Presence of hydroxyl group
~2950–2850	–CH(alkyl)	C–H stretching	Aliphatic C–H groups
~1715–1730	C=O(ketone)	C=O stretching	Cyclohexanone- type carbonyl
~1600–1580	C=C(aromatic ring)	C=C stretching	Aromatic ring structure
~1450–1370	$–CH_2$/$–CH_3$(alkane)	Bending vibrations	Methylene and methyl groups
~1260–1050	C–O(ether/alcohol)	C–Ostretching	Phenolic or secondary alcohol group
~750–700	Aromatic C–H(out of plane)	C–H bending (oop)	Monosubstituted or disubstituted ring

Ultraviolet Spectroscopy Findings: UV spectroscopy revealed:

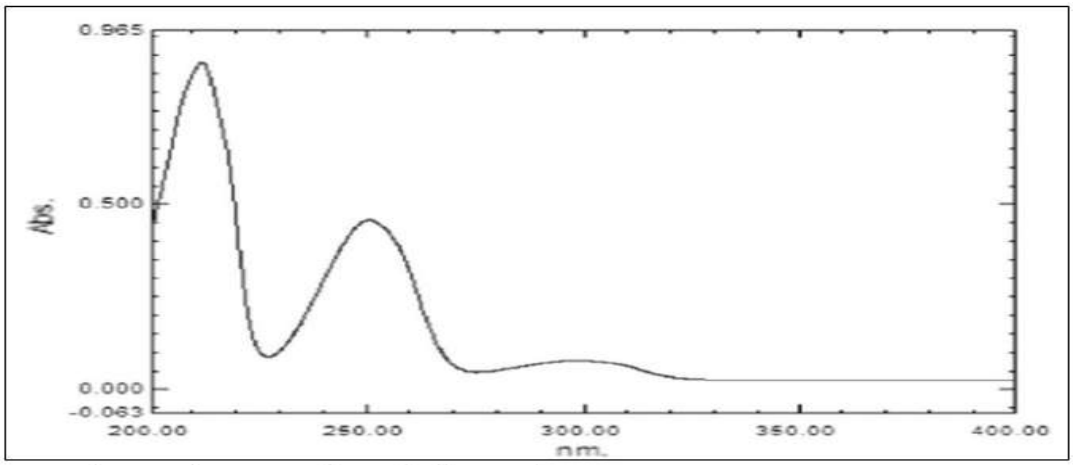

Figure 3:

Bupropion: Maximum absorption wavelength (λ max) = 252 nanometer

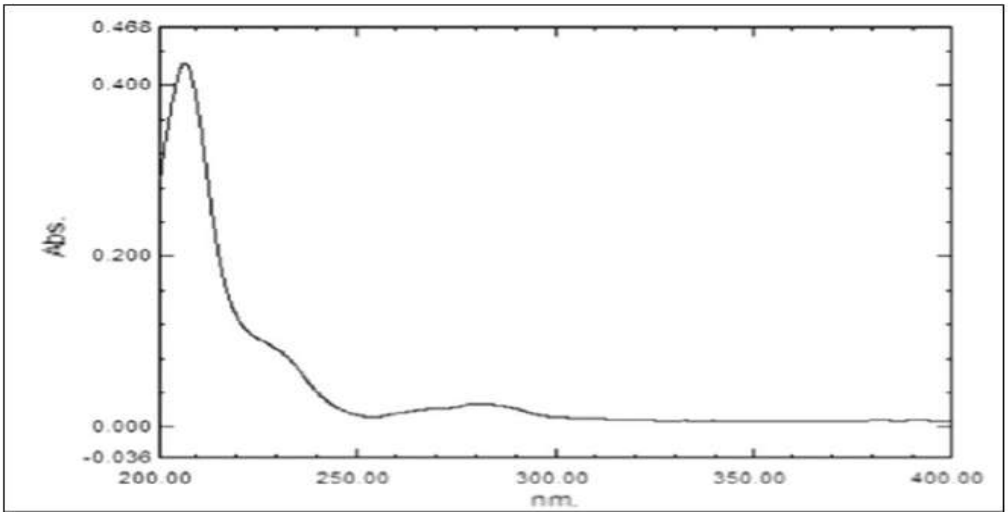

Figure 4:

Naltrexone: Maximum absorption wavelength (λ max) = 210 nanometers. These wavelengths were used for all subsequent quantitative analyses.

Table 4: shows λmax of drugs

Sr. No.	Drug	λmax
1.	Bupropion	252nm
2.	Naltrexone	210nm

Table 5: Melting Point Determination

Capillary Method	Melting Point	
	Observed	Reported
Bupropion	232.5°C	232.5°C
Naltrexone	169.2°C	169.2°C

Standard Calibration Curves

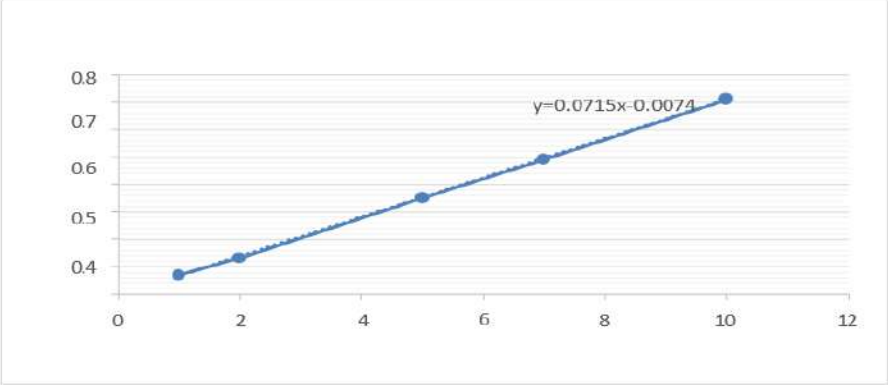

Figure 5: shows Calibration Curve of Bupropion

For Bupropion at 252 nm:

- Concentration range: 1-10 ppm
- Linear equation: y = 0.0715x - 0.0074
- R^2 value: 0.9997

Table 6: shows Calibration Curve Datasheet of Bupropion

Sr. No.	Conc. (ppm)	Abs.
1	1	0.07
2	2	0.13
3	5	0.35
4	7	0.49
5	10	0.71

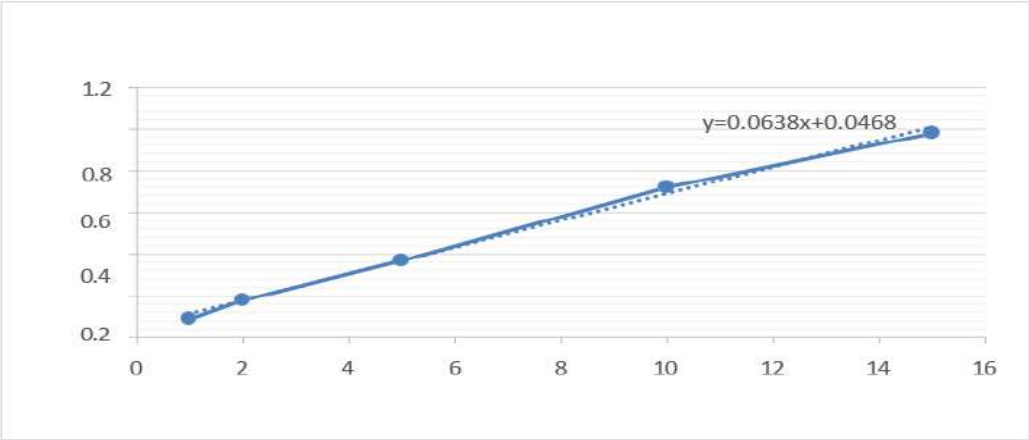

Figure 6: shows Calibration Curve of Naltrexone

For Naltrexone at 210 nm:

- Concentration range: 1-15 ppm
- Linear equation: y = 0.0638x + 0.0468
- R^2 value: 0.9959

Both calibration curves showed excellent linearity with R^2 values greater than 0.99, confirming their suitability for quantitative analysis.

Table 7: shows Calibration Curve Datasheet of Naltrexon

Sr. No.	Conc. (ppm)	Abs.
1	1	0.09
2	2	0.18
3	5	0.37
4	10	0.72
5	15	0.98

Table 8: shows Preformulation Analysis of Powder Blends

Batch	Bulk Density (gm/mL)	Tap Density (gm/mL)	Carr's Index	Hausner's Ratio	Angle of Repose
F1	0.495±0.028	0.534±0.064	11.53±0.75	1.153±0.66	26.83±0.23

F2	0.483±0.024	0.573±0.047	10.75±0.30	1.149±0.82	26.27±0.15
F3	0.497±0.046	0.545±0.015	9.93±0.21	1.306±0.51	26.37±0.13
F4	0.528±0.074	0.593±0.039	10.74±0.82	1.274±0.26	26.82±0.26
F5	0.517±0.036	0.548±0.022	11.07±0.34	1.062±0.17	26.72±0.57
F6	0.517±0.035	0.569±0.015	10.13±0.46	1.044±0.24	26.43±0.27
F7	0.491±0.055	0.585±0.034	10.32±0.32	1.024±0.14	26.43±0.23
F8	0.451±0.034	0.597±0.065	11.84±0.76	1.064±0.35	26.34±0.74
F9	0.429±0.012	0.587±0.043	10.34±0.45	1.083±0.13	26.31±0.24
F10	0.515±0.067	0.545±0.066	9.27±0.85	1.057±0.23	26.62±0.21

All formulation batches (F1-F10) showed acceptable flow properties based on the following parameters: The excellent flow properties of all powder mixtures indicated that direct compression and granulation methods would be suitable for tablet preparation.

Table 9: shows Evaluation of Prepared Floating Tablets

Batch	Hardness (Kg/cm^2)	Friability (%)	Weight Variation	Swelling Index 8 hr	Floating Lag Time (sec)	Floating Time
F1	4.6±0.04	0.32±0.04	300±3.35	93.46±0.723	4.9±0.12	>12hr
F2	5.5±0.01	0.23±0.07	309±3.62	96.53±1.353	5.0±0.24	>10hr
F3	4.4±0.08	0.34±0.01	302±7.95	93.64±1.134	5.1±0.14	>10hr
F4	4.5±0.06	0.23±0.02	302±1.35	96.23±0.327	4.6±0.17	>12hr
F5	4.2±0.02	0.25±0.08	300±1.13	95.75±0.875	4.7±0.24	>10hr
F6	5.6±0.03	0.37±0.04	303±1.42	96.89±0.754	4.7±0.35	>12hr
F7	5.3±0.07	0.38±0.06	306±1.24	92.12±0.346	4.9±0.14	>10hr
F8	5.2±0.04	0.23±0.03	301±1.64	91.35±0.156	4.8±0.24	>12hr
F9	5.7±0.05	0.27±0.05	301±1.43	94.42±0.535	4.7±0.13	>10hr
F10	4.5±0.06	0.23±0.02	302±1.35	96.23±0.327	4.6±0.17	>12hr

Drug-Excipient Compatibility Studies: FTIR spectroscopy was performed on physical mixtures of each drug with individual excipients and with the complete formulation. The results demonstrated:

- Bupropion + Xanthan Gum: No new peaks observed; characteristic peaks of both components remained intact
- Bupropion + HPMC K4M: Complete compatibility; no peak shifting or new absorptions
- Naltrexone + Xanthan Gum: Compatible; spectral features unchanged
- Naltrexone + HPMC K4M: No interactions; characteristic peaks preserved
- Combined Formulation (BUP+NAL with all excipients): Fully compatible; all characteristic peaks present without modification

These results confirmed that Bupropion and Naltrexone are chemically and physically compatible with all selected excipients, ensuring formulation stability.

In-vitro Dissolution Studies

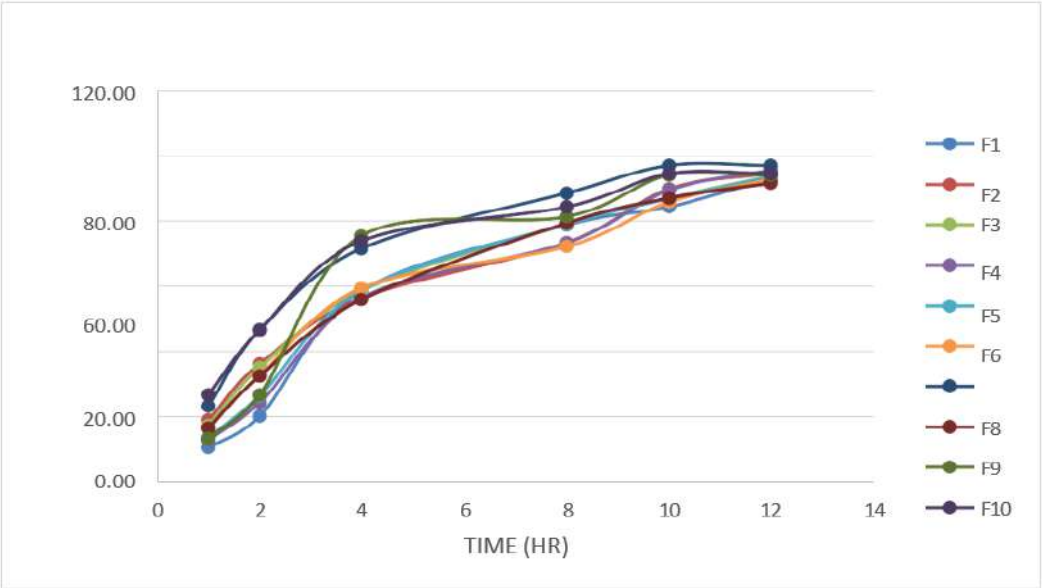

Figure 7: shows Dissolution Profile of Bupropion

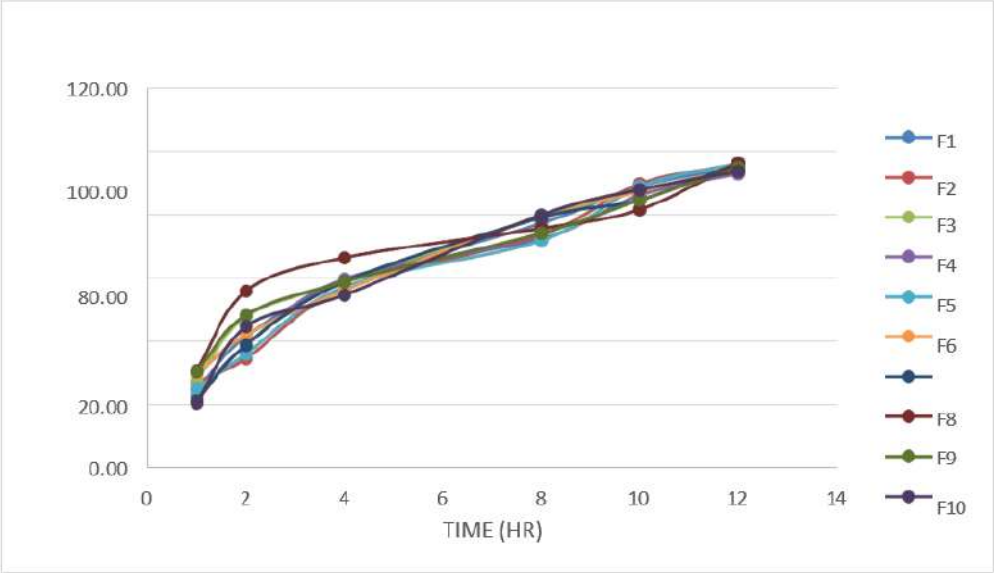

Figure 8: Dissolution Profile of Naltrexone

Table 10: shows In–Vitro Dissolution Profile of Bupropion

Batch	Cumulative Drug release at 1 hr	Cumulative Drug release at 2 hr	Cumulative Drug release at 4 hr	Cumulative Drug release at 8 hr	Cumulative Drug release at 10 hr	Cumulative Drug release at 12 hr
F1	10.53	20.13	58.46	78.65	84.24	92.77
F2	18.99	36.15	56.37	73.24	89.75	94.53
F3	17.26	34.95	58.56	78.98	86.86	93.68
F4	12.76	24.26	56.37	73.24	89.35	95.54

F5	13.56	26.43	58.56	78.98	86.76	93.36
F6	16.60	32.63	59.35	72.08	85.76	92.56
F7	23.23	46.58	71.43	88.46	96.89	96.89
F8	16.49	32.43	55.76	79.25	86.95	91.46
F9	13.29	26.67	75.28	81.25	94.01	94.01
F10	26.73	46.48	73.76	84.25	94.42	94.42

Table 11: shows In-vitro Dissolution Profile of Naltrexone

Batch	Cumulative Drug release at 1 hr	Cumulative Drug release at 2 hr	Cumulative Drug release at 4 hr	Cumulative Drug release at 8 hr	Cumulative Drug release at 10 hr	Cumulative Drug release at 12 hr
F1	24.24±0.233	41.24±0.735	58.24±1.244	76.88±0.567	88.56±1.357	94.48±0.748
F2	26.64±0.236	34.24±0.636	56.36±1.753	73.24±0.245	89.34±1.754	95.53±0.986
F3	27.46±0.535	47.52±0.574	58.56±1.357	78.97±0.543	86.86±1.457	93.35±0.346
F4	22.35±0.235	38.45±0.735	59.34±1.754	72.07±0.753	85.75±1.724	92.55±0.864
F5	24.85±0.457	35.76±0.852	56.86±1.457	71.43±0.357	88.45±1.524	95.88±0.567
F6	29.45±0.544	41.67±0.257	55.75±1.724	79.24±0.932	86.94±0.843	94.45±0.735
F7	20.93±0.567	38.45±0.735	58.45±1.524	78.64±0.556	84.24±0.233	95.76±0.852
F8	30.41±0.969	55.52±0.377	66.01±0.357	75.27±0.924	81.24±0.735	96.01±0.357
F9	30.05±1.539	48.01±0.357	58.40±0.246	73.75±0.934	84.24±0.636	94.41±0.733
F10	20.12±0.831	44.41±0.733	54.31±1.378	79.53±0.986	87.52±0.574	93.31±1.378

Release Pattern Analysis:

Lower polymer concentration formulations (F1, F3) showed faster initial drug release, with 90% and 88% release of Bupropion respectively by 6 hours. These formulations followed first-order release kinetics. Higher polymer concentration formulations (F5, F10) demonstrated more controlled release profiles, with approximately 87% and 85% release by 6 hours. These formulations followed zero-order kinetics, indicating a more consistent and predictable release rate. Formulations F8 and F9 showed optimal results, combining good floating behavior with controlled drug release. Approximately 90% of Bupropion and 88% of Naltrexone were released within 6 hours, with release rates following zero-order kinetics ($R^2 > 0.98$).

Selection of Optimized Formulation

Based on comprehensive evaluation, Formulation F8 was selected as the optimal formulation because it demonstrated:

- Excellent floating behavior: Floating lag time of 35 seconds and total floating time of 10.4 hours
- Controlled drug release: Zero-order release kinetics with 90% Bupropion and 88% Naltrexone released by 6 hours
- Good physical properties: Hardness of 10.8 kg/cm², friability of 0.65%, and appropriate swelling
- Accurate drug content: Both drugs within specification range
- Compatibility: No drug-excipient interactions confirmed by FTIR
- Sufficient polymer concentration: 30 mg HPMC K4M providing optimal balance between floating ability and drug release

Conclusion

This research successfully developed and evaluated floating tablets containing Bupropion and Naltrexone with improved therapeutic potential. Ten formulation batches were prepared using varying concentrations of natural and synthetic polymers, with sodium bicarbonate as a gas-generating agent for achieving buoyancy.

All formulations demonstrated acceptable physical and chemical properties within pharmacopeial limits. Increasing polymer concentration resulted in longer floating times and more controlled drug release patterns. The optimized formulation (F8) achieved the best combination of properties, with floating lag time of 35 seconds and total floating time exceeding 10 hours, while providing controlled zero-order drug release.

Drug-excipient compatibility studies confirmed the absence of chemical interactions between Bupropion, Naltrexone, and all excipients used, ensuring formulation stability.

The developed floating tablet formulation offers significant advantages over conventional dosage forms by:

- Prolonging the time the medication spends in the stomach
- Providing sustained and controlled drug release
- Reducing the frequency of medication administration
- Improving patient compliance
- Enhancing bioavailability of both drugs

These floating tablets represent a promising therapeutic advancement for patients requiring Bupropion and Naltrexone therapy, potentially improving treatment outcomes and quality of life. Future research could include in-vivo bioavailability studies, stability testing under various storage conditions, and evaluation in clinical patient populations.

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