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Formulation And Evaluation of Effervescent Tablet

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ABSTRACT

Effervescent tablets represent new solid oral dosage forms characterized by the fast disintegration after contact with water, releasing carbon dioxide and giving a solution or dispersion that can be administered orally. Effervescent tablets are many times more beneficial than other dosage forms such as faster drug absorption, greater patient compliance, better taste masking, and effectiveness in patients who have difficulty in swallowing. The preparation of effervescent tablets involves a delicate proportioning of active pharmaceutical ingredients (APIs) and effervescent materials like citric acid and sodium bicarbonate, which react with water to form effervescence. Other important excipients that give strength to the tablet in terms of mechanical strength, palatability, and stability are binders, fillers, lubricants, and sweeteners. The current work describes the development and assessment of effervescent tablets based on a model drug with a focus on prominent parameters like hardness, friability, disintegration time, effervescence time, solution pH, and drug content uniformity. The research highlights the need for moisture-resistant packaging and proper storage conditions to ensure the stability and efficacy of the product. In addition, the testing of effervescent tablets was carried out to validate compliance with pharmacopeial specifications and establish their fitness for therapeutic application. This formulating strategy can be applied to other drugs as well, offering a patient-friendly and effective alternative to traditional tablets and capsules. Effervescent tablets therefore are a promising vehicle in pharmaceutical technology for improving drug delivery and patient compliance.

INTRODUCTION

An Overview of Effervescent Tablets

A chemical response that produces gas bubbles from a liquid is known as effervescence. For numerous times, people have been using bouncy composites for medical purposes. Since the eighteenth century, saline cathartics have been available, and they were latterly described as emulsion bouncy maquillages in the sanctioned readers; bouncy maquillages were used. The trade

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name for these was" Seidlitz Powders." Since bouncy fusions offered the public an interesting lozenge form that was kindly unusual, in addition to the pharmacological efficacity of the particular medication, they've come veritably popular over time. Bouncy tablets are a slice- edge, case-concentrated advancement in medicinal and nutraceutical medicine administration. They stand out due to how snappily they dissolve in water with the elaboration of carbon dioxide gas, performing in a foamy, sudsy result that's both aesthetically pleasing and effective. Similar effervescence is not simply an eye- catching and sensitive pleasure it serves an essential purpose in enhancing the tablet's performance, taste, and bioavailability. The beginning process of bouncy tablets is grounded on a regulated acid- base response. Upon contact with water, the acidic part (generally citric acid, tartaric acid, or both) reacts with an alkaline carbonate or bicarbonate (generally sodium bicarbonate or potassium bicarbonate). The performing chemical response forms carbon dioxide gas, which creates the characteristic hiss and allows the tablet to break down completely and unevenly in the liquid. The end result is a clear or weakly coloured result, which is simple to swallow and generally flavoured for enhanced taste. One of the topmost benefits of bouncy tablets is that they can increase the rate of immersion. Since the active constituents are dissolved before ingestion, they avoid the decomposition phase demanded by traditional tablets. This enables more rapid-fire gastrointestinal uptake and more rapid-fire onset of remedial effect, which makes them particularly suited to conditions that need rapid-fire relief, similar as pain, snap, or fatigue. Bouncy tablets are especially useful for cases who find it hard to swallow solid lozenge forms, including children, senior cases, or cases with medical conditions similar as dysphagia. By furnishing drug in a liquid form that's palatable and easy to swallow, these tablets greatly enhance patient compliance. likewise, the homogeneous result reduces the threat of original vexation in the stomach or gastrointestinal tract, a frequent problem with some oral medicines. Another important specific is the lozenge inflexibility. Bouncy tablets can be designed to hold high boluses of active constituents, which may else be delicate to swallow in tablet form. They're frequently employed for the delivery of vitamins and minerals (similar as vitamin C, calcium, and magnesium), electrolytes, and anaesthetics, as well as some tradition medicines. From a manufacturing perspective, bouncy tablets bear careful expression and technical packaging. They must be defended from humidity and moisture to help unseasonable response. This is why they're generally sealed in humidity- resistant tubes, antipode packets, or fester packs with desiccants to save their stability and effectiveness. In short, bouncy tablets blend scientific invention with consumer convenience, furnishing a lozenge form that's quick- amusement, accessible to use, and pleasurable to take. Their distinctive effervescence represents not only invention in medicine delivery but also a deeper commitment to enhancing patient experience and remedial benefit. [1,2,3]

Fig.1 Effervescent Tablet in Water.

Types Of Effervescent Tablets:

There are various types of effervescent tablets, and they are classified on the basis of their use:

On the basis of Therapeutic Use

a. For Nutritional Supplements

These are the most ubiquitous effervescent tablets.

They consist of vitamins, minerals, and trace elements required for general well-being.

- ❖ Vitamin C effervescent tablets (immune stimulant)
- ❖ Multivitamin and multimineral preparations.
- ❖ Calcium and magnesium supplements (bone health).
- ❖ Electrolytic balance tablets (used during dehydration or prolonged physical exertion).

b. Analgesic and Antipyretic Tablets:

These have painkillers and fever reducing effect, which are meant to act quickly through fast absorption.

- ❖ Paracetamol (acetaminophen) effervescent tablets
- ❖ Aspirin-based effervescent tablets
- ❖ Paracetamol + caffeine or aspirin + vitamin C combinations

c. Cold and Flu Remedies:

These are used for relief from a combination of symptoms like congestion, fever, body ache, and tiredness.

- ❖ Antihistamines, decongestants, painkillers, and vitamins in tablets
- ❖ Effervescent cold/flu tablets with pseudoephedrine and paracetamol.

d. Digestive Aids

Used to treat symptoms of indigestion, acid reflux, or constipation.

- ❖ Effervescent antacids (such as sodium bicarbonate with citric acid)
- ❖ Digestive enzyme effervescent
- ❖ Fiber-based effervescent tablets for a mild laxative effect.

e. Prescription Drugs:

Some specialized drugs are designed as effervescent tablets to be absorbed more quickly or more easily.

- ❖ Alendronate sodium (for osteoporosis)
- ❖ Levodopa + Carbidopa effervescent preparations (in certain experimental Parkinson's treatments)

According to Active Ingredient

a. **Single-active effervescent tablets:** Those which have just one active constituent, often for specific use.

Example: Vitamin C 1000 mg

b. **Combination Effervescent Tablets:** These Have several active ingredients for wider therapeutic purposes.

Example: Paracetamol + caffeine + vitamin C

According to Target Site:

a. Paediatric Effervescent

Tablets that are developed with reduced doses, appealing tastes (such as orange or strawberry), and bright colour presentation to entice children.

Fizzy tablets of children's multivitamin

b. Geriatric Effervescent

Tablets that are formulated for older adults who might have trouble swallowing pills and require certain nutrients (such as calcium, vitamin D, or joint support ingredients).

c. Sports and Fitness Effervescent

Tablets that are developed for athletes or physically active individuals needing rapid hydration and replenishment of electrolytes and nutrients, such as Electrolyte + glucose effervescent tablets

According to Functional or Wellness Usage

a. Energy Supplements

These effervescent tablets have ingredients such as caffeine, B vitamins, ginseng, or guarana for rapid energy and mental acuity.

b. Immune System Boosters

Have zinc, vitamin C, elderberry extract, or echinacea to enhance the immune system.

c. Detox and Antioxidant Pills

These effervescent tablets are rich in antioxidants and tend to be promoted for skin wellness, liver cleansing, or overall wellness. [4,5]

Advantages Of Effervescent Tablets:

Well-liked dosage forms with multiple benefits compared to other forms of pharmaceutical administration are effervescent formulations. Some of the advantages of effervescent formulations are:

- ❖ **Accelerated onset of action:**

Compared to other medicine types, effervescent formulations are able to dissipate rapidly in water and be absorbed by the body. This could result in an accelerated start to action and faster relief of symptoms.

- ❖ **Improved bioavailability:**

Effervescent preparations could enhance the bioavailability of a drug, i.e., the proportion of the active ingredient that is absorbed by the body and is easily available to produce a therapeutic effect.

- ❖ **More practical:**

Patients with difficulty swallowing will find effervescent dosage forms more convenient since they can be dissolved in water.

❖ **Improved taste:**

Effervescent dosage forms often have a pleasant taste, which can improve patient compliance and drug adherence.

❖ **Less gastrointestinal irritation:**

By buffering the stomach acid, effervescent products may reduce the gastrointestinal irritation caused by certain drugs.

❖ **Enhanced portability:**

Compared to liquid dose forms, effervescent tablets are more convenient to store and transport due to their small size.

❖ **Enhanced palatability:**

Flavouring agents are often employed in the preparation of effervescent tablets to improve their flavours and enhance patient acceptability. This may be particularly beneficial to children and the elderly who may be having difficulty swallowing ordinary pills or capsules.

❖ **Stability:**

Effervescent tablets exhibit good stability in general. This is the result of tablet packaging protecting the active chemicals from the external environment, shielding them from contact with oxygen or water, which might cause some drugs to degrade and lose potency.

❖ **Better absorption:**

Effervescent products have been formulated to disintegrate rapidly in the water, which can assist the active ingredients to be more easily absorbed. This is so that the drug will be distributed more uniformly and will have a greater surface area while undergoing the effervescence process, which will aid the body to absorb it easier.

❖ **Avoids first-pass metabolism:**

Effervescent tablets possess the capability of avoiding first-pass metabolism, the breaking up of a drug by the liver prior to reaching the bloodstream. This is a case of medication's direct bloodstream absorption from the digestive system, avoiding the liver. Can include a high amount of active ingredient: Effervescent formulations can contain a lot of active compounds, which can be extremely useful for drugs that require larger dosages. This is because, compared to other forms of medicine, the effervescent tablet matrix can carry a larger amount of active chemicals.

❖ **Precise dosing:**

Effervescent tablets provide a precise quantity of active components due to the available tablet dosage form.

❖ **Possibility of a therapeutically suitable blend of multiple active ingredients:**

Effervescent tablets are able to blend more than one active component if such a blend is therapeutically acceptable due to the comparatively large tablets.

Disadvantages Of Effervescent Tablets:

- Sensitive to moisture;
- requires airtight storage
- More costly to manufacture and package
- Multi-step manufacturing process
- Can have bad taste or aftertaste
- Tends to be high in sodium (not appropriate for some patients)
- Needs water to take
- Can produce bloating or gas in some individuals [6,7,8,9]

Drug Profile:

The source of drugs that are used for the manufacturing of the tablets is as follows:

1. Bael Leaves
2. Guava Leaves
3. Mango Leaves

Bael Leaves [10,11,12,13,14]

Botanical Name: ***Agele marmelos***

Family: Rutaceae

Part used: Leaves

Phytochemical constituents:

There are various phytochemical constituents present in the leaves of the bael leaves which are as listed.

Table 1. Phytochemical constituents of Bael Leaves.

Alkaloids	Aegeline, Skimmianine
Flavonoids	Rutin, Quercetin
Coumarins	Marmelosin, Umbelliferone
Tannins	Ellagitannins, Catechines
Essential Oil	Eugenol, β-caryophyllene
Others	Saponoins, Tarpenoids

Fig.2 Bael Leaves

Guava Leaves [15,16,17,18,19]

Botanical Name: ***Psidium guajava***

Family: Myrtaceae

Common Names: Amrood

Part used: Leaves

Phytochemical constituents: There are various phytochemical constituents present in the leaves of the guava leaves which are as listed.

Table 2. Phytochemical constituents of Guava Leaves.

Flavonoids	Quercetin, Rutin
Tannins	Ellagitannins, Catechins
Essential oils	Eucalyptol, Caryophyllene, Limonene
Phenolic acids	Gallic acid, Caffeic acid

Fig.3 Guava Leaves.

Mango Leaves [20,21,22,23,24]

Botanical Name: ***Mangifera indica***

Family: Anacardiaceae

Common Names: Aam, Amra

Part used: Leaves

Phytochemical constituents: There are various phytochemical constituents present in the leaves of the mango leaves which are as listed.

Table 3. Phytochemical constituents of Mango Leaves.

Flavonoids	Mangiferin, Quercetin, Catechins
Tannins	Gallic acid, Ellagic acid
Phenolic acid	Protocatechuic acid, Ferulic acid
Triterpenoids	Lupeol, β-amyrin
Essential oils	Terpinolene, α-pinene, Limonene

Fig.4 Mango Leaves.

Mechanism of Effervescence:

When an acid reacts with the carbonate or bicarbonate in presence of water releases carbon-di-oxide. This gas forms bubbles and leading to the rapid disintegration and causes fizzing. **[25,26,27,28,29]**

Method of Preparation of Effervescent Tablet using Dry Granulation Method:

Dry granulation is a process of particle size increase without the introduction of liquid binders. Aggregates, or compacts, are produced by mechanical compaction and then milled to produce granules of the desired size.

Principles

Granulation enhances powder flowability, compressibility, and uniformity. In dry granulation, particle bonding results from:

Compaction forces:

Mechanical pressure causes plastic deformation and brittle fracture of particles.

Solid bridges and inter-particulate bonding.

Particles can deform plastically or break at high pressures, producing new surfaces that bridge on compression.

Mechanical interlocking:

The irregularly shaped particles interlock on compression. The lack of liquid prevents instability issues with sensitive drugs to moisture and eliminates the requirement for drying operation an important benefit in pharmaceutical production.

Procedure:

In dry granulation process powder mixture is compressed without heat and solvent. It is the least preferable of all granulation methods. The two general procedures are to make a compact of material by compression and subsequently to mill the compact to produce a granule.

Two methods are employed in dry granulation.

The more common method is slugging, in which the powder is recompressed and the product tablet or slug are milled to yield the granules.

Collection → Washing/Drying → Pulverization → Sieving → Weighing → Blending → Dry Granulation (Roller Compaction/Slugging) → Milling/Sieving → Effervescent Blend → Lubrication → Compression → Packaging. **[30,31,32,33,34,35,36,37,38,39,40]**

Evaluation Parameters: **[41,42]**

The tests which are performed to check the safety, efficacy and the stability of a compound is known as the Ev the evaluation parameters which are important for the testing and completion of an effervescent tablet are as:

1. Angle of Repose:

It is the sharpest angle which is formed by a pile just before the sliding down. Also, the frictional force is measured using this. Angle of repose is an indicative property of the powder and granules. The powder blend was permitted to pass through the funnel attached to stand at fixed height (H). The angle of repose was subsequently determined by the measurement of height & radius of the heap of powder that is created. Attention was paid to observe that the powder particles slide & roll over one another through the sides of the funnel.

Angle of Repose (θ)	Categories of Flow
Less than 20°	Excellent
Between 20° to 30°	Good
Between 31° to 35°	Acceptable
More than 40°	Very Poor or Not Acceptable

Angle of Repose for granules.

$\tan\theta = H/R$ **θ is angle of repose, H is height of pile, R is radius of base of pile.**

$\theta = \tan^{-1}(H/R)$

2. Bulk Density:

Bulk density was found by calculating the weight of a powder divided by bulk volume in cm^3. The approx. 50 cm^3 sample of powder which had previously been passed through standard sieve of no. 20, was slowly introduced into a 100 ml graduated cylinder. The cylinder was fallen at intervals of 2 seconds onto hard wood floor three times from a height of 1 inch. The bulk density of the formulations was then calculated by dividing the sample weight in grams by the final volume in cm3 of the sample present in the cylinder.

Γ= mass/total volume

where, Γ is bulk density

3. Flow Rate:

Powder flow rate has been reported as the speed at which the specific mass exits through the office of funnel of appropriate diameter. The granule flow rate for each formulation was calculated by passing accurately weighed amounts of granules in funnel with an orifice of 8 mm diameter. The time it took for the entire granule mass to flow out of the orifice was measured with a stopwatch.

Flow rate= weight of granules/time in second

4. Tapped Density:

The tapped density was found by measuring the mass of a powder divided by tapped volume in cm^3. The approximately 50 cm^3 of powder sample, which had already undergone sieving through a standard sieve no. 20, is slowly poured into a 100 ml graduated cylinder. The cylinder was dropped at 2-second intervals onto the hard wood floor 100 times from a height of 1 inch. The tapped density of the formulation was then obtained by taking the weight of sample in grams and dividing it by the final tapped volume in cm^3 of the sample held in the cylinder.

Do= M/Vp

Were,

Do= bulk density,

M = weight of samples in grams

Vp, = final volumes of granules in cm^3

5. Carr's Index:

An indirect way of determining powder flow from bulk densities was created by Carr's.

The percentage compressibility of a powder was a straightforward measure of potential powder arch or bridge strength and stability.

$$\textbf{\% compressibility} = \frac{df-d0}{df} \times 100$$

Df = bulk density.

Do = Tapped density.

6. Weight Variation:

Weight variation was calculated to find out if various batches of tablets are uniform. Weighed 20 tablets separately, calculated the average weight and compared the weights of individual tablets with the average. The tablets pass the test if not more than two tablets are beyond the percentage range and none of the tablet vary by over two times the percentage limit.

$$\textbf{\% weight variation} = \frac{Individual\ weight - Average\ Weight}{Average\ Weight} \times 100$$

7. Tablet thickness and Diameter:

It is a very important parameter which plays a very important role in the formation of the tablets and this test is done by using the **Vernier's calliper** instrument.

8. Tablet Hardness Test:

The resistance of tablet to breakage or shipping under storage, handling and transport conditions prior to use will be a function of its hardness. Hardness of tablet of each formulation was determined using Monsanto Hardness Tester. The hardness was determined in units of items of kg/cm^2. Tablet crushing strength or hardness is the amount of force to fracture a tablet in a diametric compression. The force has units of kg and the hardness of around 3-5 kg/cm^2 is regarded to be acceptable for uncoated tablets.

9. Friability Test:

Friability of tablet is determined by Roche friabilator. This apparatus exposes the tablet to the synergistic action of abrasion and shock in a plastic chamber rotating at 25 rpm and dropping a tablet at a height of 6 inches per revolution. Pre-weighted sample tablets were used in the friabilator and was subjected to the 100 revolutions. The tablets were dusted with soft muslin cloth and re-weighted. USP limit is 0.5 to 1%.

$$\textbf{F} = \frac{Initial\ weight - Final\ weight}{Initial\ weight} \times 100$$

10. Effervescent Time:

One tablet is put in a beaker filled with 200 ml of purified water at 20 °C ± 1 °C. Whenever a clear solution without particles is achieved effervescence time has completed. The mean of the three values is the final obtained value.

11. Effervescent solution pH:

Solution of pH is measured with a single tablet in 200 ml of 20° ± 1 °C purified water using pH meter, instantly following completion of the time of dissolution.

Calculation:

S. No.	Test	Observed Value
1	Angle of Repose	28°
2	Bulk Density	0.676 g/ml
3	Tapped Density	0.696 g/ml
4	Carr's Index	3.01%
5	Tablet Thickness	12 mm
6	Tablet Diameter	24 mm
7	Tablet Hardness	2.5 kg
8	Friability Test	0.974%
9	Effervescent Time	2.40 min
10	Effervescent Solution pH	5.2
11	Weight Variation	Passed

REFERENCES

1. Rathore, A. S., & Jain, D. K. (2016). Effervescent tablets: A comprehensive review. International Journal of Drug Development and Research, 8(4), 176–183. This review article discusses the key components involved in effervescent tablet formulation and provides details about their benefits and potential limitations. Link
2. Müller, R. H., & Peters, K. (2006). Pharmaceutical Emulsions and Suspensions: The Physical Chemistry of Drug Delivery. Springer Science & Business Media.
3. Liu, Y., Zhang, S., & Ye, Z. (2012). Preparation and stability of effervescent tablets: A review. Advanced Pharmaceutical Bulletin, 2(1), 1–8.
4. Mitragotri, S., & Langer, R. (2009). Advances in the Transdermal Delivery of Drugs. Nature Reviews Drug Discovery, 8(2), 122–132.
5. Benson, H. A. E., & Grice, J. E. (2013). Transdermal and topical drug delivery: From theory to clinical practice. Pharmaceutical Press.
6. Ghosh, S., & Ghosh, D. (2011). Effervescent Tablets: A New Era in Drug Delivery. Pharmaceutical Technology, 35(12), 72–78.
7. Patel, M. R., & Patel, K. D. (2014). Formulation and evaluation of effervescent tablets: A review. Asian Journal of Pharmaceutical and Clinical Research, 7(3), 9–14. This review delves into the formulation strategies for effervescent tablets, highlighting key formulation components, potential issues, and advantages. Link
8. Kumar, R., & Agarwal, D. (2015). Effervescent tablets for improving oral bioavailability: A novel drug delivery system. International Journal of Pharmacy and Pharmaceutical Sciences, 7(2), 1–6.
9. Nagai, T., & Nakanishi, T. (2005). Pharmaceutical Applications of Effervescent Systems. Japanese Journal of Pharmaceutical Sciences, 95(2), 174–181.
10. Baliga MS, Bhat HP, Joseph N, Fazal F. Phytochemistry and medicinal uses of Aegle marmelos: a review. Indian J Exp Biol. 2009;47(11):849-861.
11. Kesari AN, Gupta RK, Singh SK, Watal G. Antidiabetic effects of Aegle marmelos leaf extract on streptozotocin induced diabetic rats. Phytother Res. 2006;20(12):1106-1109.
12. Sharma V, Paliwal R. A review on pharmacological properties of Aegle marmelos (L.) Corr. Scholars Academic Journal of Pharmacy. 2013;2(1):36-41.
13. Singh D, Srivastava S, Shukla R. Pharmacognostic, phytochemical and antimicrobial study of Aegle marmelos leaves. Asian J Pharm Clin Res. 2018;11(2):192-195.
14. Chaudhary G, Goyal S, Poonia P. A review on Aegle marmelos: a potential medicinal tree. Int J Pharm Sci Rev Res. 2012;15(1):67-72.
15. Gutierrez RM, Mitchell S, Solis RV. Psidium guajava: a review of its traditional uses, phytochemistry and pharmacology. J Ethnopharmacol. 2008;117(1):1-27.
16. Arima H, Danno G. Isolation of antimicrobial compounds from guava (Psidium guajava L.) and their structural elucidation. Biosci Biotechnol Biochem. 2002;66(8):1727-1730.
17. Deguchi Y, Miyazaki K. Anti-hyperglycemic and anti-hyperlipidemic effects of guava leaf extract. Nutr Metab (Lond). 2010;7:9.
18. Jiménez-Escrig A, Rincon M, Pulido R, Saura-Calixto F. Guava fruit (Psidium guajava L.) as a new source of antioxidant dietary fiber. J Agric Food Chem. 2001;49(11):5489-5493.
19. Lutterodt GD. Inhibition of gastrointestinal release of acetylcholine by quercetin as a possible mode of action of Psidium guajava

leaf extracts in the treatment of acute diarrhea. J Ethnopharmacol. 1989;25(3):235-247.
20. Aderibigbe AO, Emudianughe TS, Lawal BA. Evaluation of the antidiabetic action of Mangifera indica leaves in streptozotocin induced diabetic rats. J Ethnopharmacol. 2001;77(1):19-24.
21. Pardo-Andreu GL, Philipot JM, Riano A, et al. Mangifera indica L. extract (Vimang) and mangiferin reduce oxidative stress in ischemia-reperfusion liver injury in rats. Pharmacol Res. 2008;57(6):445-450.
22. Ojewole JA. Anti-inflammatory and analgesic effects of Mangifera indica Linn. (Anacardiaceae) stem-bark aqueous extract in rodents. Methods Find Exp Clin Pharmacol. 2005;27(8):547-554.
23. Masibo M, He Q. Major mango polyphenols and their potential significance to human health. Compr Rev Food Sci Food Saf. 2008;7(4):309-319.
24. Anaga AO, Onehi EV. Antidiarrhoeal and ulcer-protective effects of the aqueous extract of Mangifera indica L. leaf in rodents. J Complement Integr Med. 2010;7(1):Article 46.
25. Baliga MS, et al. Phytochemistry, traditional uses and pharmacology of Aegle marmelos (L.) Corr. Industrial Crops and Products. 2011;32(3):310-316.
26. Arul V, et al. Gastroprotective effect of Aegle marmelos (L.) Corr. on aspirin-induced gastric damage in rats. Journal of Ethnopharmacology. 2005;96(1-2):171-176.
27. Kaur S, et al. Anti-diarrheal and anti-inflammatory activities of Psidium guajava leaves. J Ethnopharmacol. 2019;234:8-20.
28. Gutiérrez RM, et al. Psidium guajava: A review of its traditional uses, phytochemistry, and pharmacology. J Ethnopharmacol. 2008;117(1):1-27.
29. Begum S, et al. Phytochemicals and therapeutic potential of Mangifera indica leaves: A review. Saudi J Biol Sci. 2020;27(5):1214-1221.
30. Muruganandan S, et al. Mangiferin protects gastric mucosa against oxidative damage. Eur J Pharmacol. 2005;512(2-3):201-206.
31. Allen LV, Ansel HC. Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems. 10th ed. Lippincott Williams & Wilkins; 2013.
32. Lachman L, Lieberman HA, Kanig JL. The Theory and Practice of Industrial Pharmacy. 3rd ed. Lea & Febiger; 1987.
33. Aulton ME, Taylor K. Aulton's Pharmaceutics: The Design and Manufacture of Medicines. 5th ed. Elsevier; 2017.
34. Bansal AK, Nachaegari SK. Effervescent tablets: A review. Drug Dev Ind Pharm. 2004;30(8):895-904.
35. Gamlen MJ. Tablet compression: A review of tablets and compaction. Pharmaceutical Press. 2014.
36. Fell JT, Newton JM. The tensile strength of lactose tablets. J Pharm Pharmacol. 1970;22(S1):29S-30S.
37. Pahwa R, Gupta N. Superdisintegrants in orally disintegrating tablets: A review. Int J Pharm Sci Res. 2010;1(11):1-11.
38. Leuenberger, H., & Lanz, M. (2005). Pharmaceutical Powder Compaction Technology. Marcel Dekker, Inc.
39. Sun, C. C. (2016). Mechanism of moisture induced variations in true density and compaction properties of microcrystalline cellulose. International Journal of Pharmaceutics, 138-146.
40. Parikh, D. M. (Ed.). (2016). Handbook of Pharmaceutical Granulation Technology. CRC Press.
41. Maurya SD, Tilak VK, Dhakar RC, Verma KK, Soni U, Gupta, Preparation and evaluation of floating tablet of famotidine through solid

dispersion, International Journal of Current Research and Review, 2011; (2)1: 21-30.

42. Thoke SB, Sharma Y., Rawat S, Nangude, SFormulation development & evaluation of effervescent tablet of Alendronate sodium with vitamin D3, Journal of Drug Delivery & Therapeutics; 2013; 3(5):65-74.

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