



## A Review on Effervescent Tablets.

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### ABSTRACT

Effervescent tablets are designed to break in contact with liquid like water or juice, often causing the tablet to dissolve into solution. Effervescent means CO<sub>2</sub> gas emission in reaction to acid and bicarbonate in the presence of H<sub>2</sub>O other common acids used in citric, malic, tartaric, adipic and fumaric acids and bicarbonate uses in the effervescent reaction is sodium bicarbonate, potassium bicarbonate, sodium carbonate and potassium. The definition of effervescent includes liberation of dissolved gas from solution containing water or from an aqueous solution and this process is complemented with bubbling, foaming and fizzing. Gases can be inducted to liquid media with the help of pressurization or in situ by chemical under change.

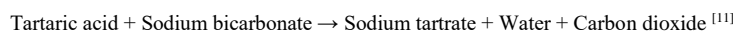
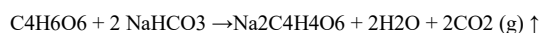
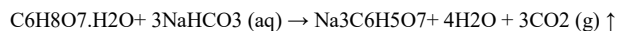
Keywords: Effervescent tablets, Fast dissolving tablets.

### Introduction

Limited gastric residence times (GRTs) challenge oral continuous medication administration systems. The effectiveness of the dose given can be decreased by quick GI transit, which can limit full medication release in the absorption zone. [1, 2, 3] Effervescent tablets are made to burst when they come into contact with liquids, such as juice or water, which frequently results in the tablet dissolving into solution. Effervescent refers to the release of CO<sub>2</sub> gas in response to acid and bicarbonate in the presence of H<sub>2</sub>O. Common acids, malic, tartaric, adipic and fumaric acids and bicarbonate uses in the effervescent reaction is sodium bicarbonate, potassium bicarbonate, sodium carbonate and potassium.<sup>[4,5]</sup>

The term "effervescent" refers to a mixture of bubbling, foaming, and fizzing that accompany the release of dissolved materials from aqueous solutions or solutions containing water. Gases can be inducted to liquid media with the help of pressurization or in situ by chemical under change.<sup>[6]</sup> Effervescence is derived from a Latin word which means the escape of gas from an aqueous or water solution.<sup>[7]</sup> Effervescent tablets are becoming increasingly popular in a variety of sectors including supplements and pharmaceutical use due to the ease in which they can be consumed. Effervescent tablets are designed to break in contact with liquid such as water or juice, often causing the tablet to dissolve into a solution.<sup>[8]</sup> Effervescent granules are having high solubility, high stability, fast dissolving property and are also convenient dosage forms. These granules should be dissolved in a glass of water just before administration, and the resulting liquid should be consumed right away. As a result of the interaction between acid and base in the presence of water, the granules are rapidly distributed by the development of carbon dioxide in water. Due to the liberation of Carbon dioxide gas, we observe the dissolution of the API in water as well as taste masking effect is also enhanced.<sup>[9,10]</sup>

Mechanism of Effervescence:



### ADVANTAGES OF EFFERVESCENT TABLETS:

- Fast onset of action.
- No need to swallow tablet.
- Good stomach and intestinal tolerance.
- More portability. • Improved palatability.
- Superior stability. • More consistent response.

- Incorporation of large amounts of active ingredients.
- Accurate Dosing. • Improved Therapeutic Effect.
- In remote areas, especially where parenteral forms
- Are not available due to prohibitive cost, lack of
- Qualified medical staff, effervescent tablets could
- Become an alternative.<sup>[12]</sup>

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### **DISADVANTAGES OF EFFERVESCENT TABLETS:**

- Unpleasant taste of some active ingredients.
- Larger tablets requiring special packaging materials.
- Relatively expensive to produce due to large amount of more or less expensive excipients and special production facilities.
- Clear solution is preferred for administration, although a fine dispersion is now universally acceptable.<sup>[12]</sup>

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### **BENEFITS OF EFFERVESCENT TABLETS OVER REGULAR TABLETS**

#### **Good Taste**

Effervescent tablets are very popular because they can be dissolved in a liquid such as water or fruit juice, which means they often taste better than regular tablets. Regular tablets dissolve slowly which can result in reduced absorption rates, effervescent tablets, in contrast, have good speed, which means you get the full advantage of the ingredients<sup>[13,14,15]</sup> Good Distribution Regular tablets dissolve slowly in the stomach if imported and can sometimes be slightly dispersed which can lead to irritation in some cases. The advantage of an effervescent tablet is that they completely dissolve equally meaning the ingredients cannot accumulate. This translates to the greatest taste, reduced risk of discomfort, and increased performance in terms of ingredient addition options. Increased Fluid Consumption In addition to their nutritional advantages, effervescent pills promote increased fluid intake.

#### **More Liquid Intake**

Effervescent pills boost fluid consumption in addition to offering nutritional advantages. This is beneficial if you are dehydrated or ill and not ingesting as much fluid. Effervescent tablets can be the best way of rehydrating as well as taking the benefits you are taking the tablets for whether this is a dietary supplement, herbal or medicinal.<sup>[16]</sup>

#### **Alternative to Regular**

They are thought to be a great alternative for those who may have trouble swallowing due to illness or age. Older age people sometimes have difficulty in swallowing but need to take medication or supplements regularly so, effervescent tablets can be a lot easier. Furthermore, they are a fantastic way to give medication to people who have sore throats or other health conditions that make swallowing difficult. good option to regular tablets Simple and Easy Measurement.<sup>[17]</sup> Effervescent tablets dissolve easily into water or a liquid of your choice and are consistent, mixed, and ready to drink. Traditional tablets or powders, however, need to be measured and stirred repeatedly to avoid a lumpy bit. Although arousing and measuring it is common to have an inconsistent drink with bumps and bumps and this is where effervescent pills work. Just install them and dispose of them fully and evenly to ensure you get all the benefits of the tablet, as well as being able to drink it properly.<sup>[18]</sup>

#### **Fast onset of Action**

Effervescent tablet has main advantage that the drug product is already in solution on the time it is consumed. Therefore, the absorption is earlier and further complete than with predictable tablet. Earlier absorption means faster onset of action. Effervescent drug is distributed to the stomach at a pH that is just correct for absorption. Numerous medications. Portable slowly through the stomach or have absorption that is hindered by food or another drug.<sup>[19]</sup>

#### **No need to Swallow Tablet**

Effervescent tablets are administered in liquid form so they easy to take. The number of persons who cannot gulp tablet or who dislike swallowing tablet and capsule is rising. Through an effervescent dosage form, one dose can usually transport in just 3 or 4 ounces of water.<sup>[20]</sup> More Portability Effervescent tablet is more simply delivered than liquid medication because no water is added until it is complete to use.<sup>[21]</sup>

#### **Improved palatability**

Drugs transported with effervescent base, taste improved than most liquids, mixture and suspensions. Greater taste masking is attained by limiting offensive characteristics and adding formulations with flavor and fragrances.<sup>[22]</sup>

### Good stomach and Intestinal Tolerance

Effervescent tablet liquefies completely in a buffered solution. Reduced localized contact in the upper stomach leads to fewer irritation and greater acceptability. Buffering also prevent intestinal acids from interrelating with drug themselves, which can be a main cause of stomach tolerance. <sup>[23]</sup>

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## FORMULATION METHODS <sup>[24]</sup>

Different Methods for formulation of Effervescent

### Method A

#### A) Wet Granulation

- Shear granulation
- Fluidized-bed granulation

### Method B

#### B) Dry Granulation

- Sluggers
- Roller compaction

### Method A

#### A) Wet Granulation

Wet granulation remains the foremost preferred method for effervescent granulation. This method gives homogeneous granules for compression, and is in a position to produce uniform tablets either in terms of weight or active ingredient content. Depending on how many important phases are involved in the process, the wet granulation method can be further classified into two types. wet granules drying. combining the powder combination and binder solution to create a moist mass.. Preparation of binder solution. Mixing of the drug(s) and excipients Mixing of screened granules with disintegrate, gliding, and lubricant. <sup>[25]</sup>

- Shear Granulation

The pharmaceutical sector has been effectively using shear granulators as a granulation shaping technique for many years. A binding fluid is introduced to the powdery particles in a closed tank with an agitator blade and chopper using high-shear granulation. Effective granulation is ensured by the agitator blade's high shear and compaction. Dense granules are formed. The chopper prevents excessive granule growth and distributes the granulation fluid throughout the product.e.g. Hobart, Collette, Beken <sup>[26,27]</sup>

- Fluidized-Bed Granulation The fluid bed granulation process (also known as agglomeration) involves suspending particles in an air stream and spraying a liquid from the top of the system down onto the fluidized bed (top-down spray). Particles in the path of the spray get slightly wet and become sticky. The sticky particles collide with other particles in the bed of material and adhere to them to form granules. <sup>[28]</sup>

### Method B

#### Dry Granulation

The Dry granulation the product to be granulated may be sensitive to heat and moisture, the dry granulation technique is used to generate granules without the use of a liquid solution. Compressing and solidifying the powders is necessary to form granules without the need for moisture. When a tablet press is used for dry granulation, the powders might not have enough natural flow to feed the product evenly into the die cavity. Instead, dry granulation can be carried out using a roller compactor, also known as a. Because the product to be granulated may be sensitive to heat and moisture, the dry granulation technique is used to generate granules without the use of a liquid solution. uniformly into the die cavity. The dry granulation process is used to form granules without using a liquid solution because the product to be granulated may be sensitive to moisture and heat. Forming granules without moisture requires compacting and densifying the powders. <sup>[29,30]</sup>

#### Sluggers

A big, powerful rotary press is typically employed for compressing the dry powders, though a traditional tablet machine can also be used. This procedure is commonly referred to as "slugging," because the compact created while it is called a "slug." Slugs are normally 25 mm in diameter and 10 to 15 mm thick.A hammer mill is suitable for breaking the compacts. <sup>[31,32]</sup>

#### Roller compaction

Roller compaction is an alternative gentler method; the powder mix being squeezed between two rollers to form a compressed sheet. The sheet normally is weak and brittle and breaks immediately into flakes. A big, powerful rotary press is typically employed for compressing the dry powders, though a traditional tablet machine can also be used. This procedure is commonly referred to as "slugging," because the compact created while it is called a "slug."

Slugs are normally 25 mm in diameter and 10 to 15 mm thick in the manufacturing of tablets and capsules using production equipment. [33,34] effervescent tablet formulations generally include an agent that is capable of releasing CO<sub>2</sub> (sodium carbonate and sodium bicarbonate) and an agent that induces releases of CO<sub>2</sub> (adipic acid, malic acid, tartaric acid, ascorbic acid, fumaric acid, maleic acid, succinic acid, or citric acid). The chemical reaction that takes place between a weak organic acid and a carbonate or bicarbonate salt (such as sodium bicarbonate) produces carbon dioxide. (e.g., sodium bicarbonate) and a weak organic acid (e.g., citric or tartaric acid) in the presence of water. [35,36]

### 1. Weight Variation

The weight variation test would be a satisfactory method for determining drug content uniformity of drug distribution. Weight variation test is applicable when the table containing 50 mg or more of drug substance. the drug substance represents 50% or more (by weight) of the dosage form unit. Weight 20 tablet selected at random, each one individually. Determine the average weight.  $X = (X_1 + X_2 + X_3 + \dots + X_n) / 20$ . [37,38]

### 2. Thickness

The thickness of the Effervescent Tablet is measured by using a sliding caliper scale, twenty Effervescent Tablets are selected randomly in a holding tray and total crown thickness is measured. [39]

### 3. Hardness [40]

The Hardness of the Tablet is also called as Tablet Crushing strength. Harness test is used to check the Hardness of the prepared tablet. In this test we can Measured the force which is required for the breaking of the tablet.

### 4. Friability

After being weighed, twenty Effervescent Tablets are added to the Roche friabilator. The Effervescent Tablet is dropped every time it revolves at a speed of 25 rpm, six inches away., dropping the Effervescent Tablet at a distance of six inches with each revolution. The Effervescent Tablets are then dusted and reweighed. [41]

Disintegration time [42] Place an Effervescent Tablet in a beaker containing 200 ml of water at 1500 C to 2500 C; numerous bubbles of gas are evolved. When the evolution of gas around the Effervescent Tablet stops in the water and no agglomerate of particles remains. The test is repeated for five other Effervescent Tablets

### 6. Solution pH

Solution of pH is measured with a digital pH meter in standardized water volume and temperature. Place an Effervescent Tablet in a beaker containing 200 ml of water at 1500C to 2500C. The pH is measured after complete disintegration of the Effervescent Tablet is done. [42,43]

### 7. Drug content

Determination Drug content is determined by dissolving the Effervescent Tablet in 200 ml of water. Determine Drug content absorbance of this solution, using UV Spectrophotometer to know how much drug is present in the tablet. [44]

### 8. In-vitro drug release study [45]

In-vitro release studies were carried out using various apparatus with appropriate dissolution medium. The temperature of the dissolution medium was maintained at  $37 \pm 0.5^\circ\text{C}$ . The release study is carried out for 3.30 hrs. The aliquot of the dissolution medium is withdrawn at a specific time interval and is filtered. Then absorbance is measured

### 9) Measurement of CO<sub>2</sub> content [45]

One effervescent tablet is dissolved in 100 ml of 1N sulphuric acid solution and weight changes are determined after dissolution ends. The obtained weight difference shows the amount (mg) of CO<sub>2</sub> per tablet. Averages of determinations are taken.

### 10) Evaluation of the water content

10tablets of the formulation are dried in a desiccator containing activated silica gel for 4 hours. The water content of 0.5 % or less is an acceptable parameter. [45]

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