



A REVIEW OF FORMULATION ,CHARACTERIZATION AND EVALUATION OF EFFERVESCENT TABLETS

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Abstract : Effervescent tablet is a tablet intended to be dissolved or dispersed in water before administration. The word Effervescent or Effervescence means to react with water and forming bubbles, the compound is Carbon and combination with acids are made to dissolve in water and release carbon dioxide. The effervescent tablets are so popular due to they dissolve easily in liquids like fruit juice or water, Here are five advantages of effervescent tablets over conventional tablets, (1) Pleasant Taste in Comparison to Ordinary Tablets, (2) More Evenly Distributed, (3) A Greater Intake of Liquids, (4) Easy Alternative to Regular Tablets, (5) To Sum up, All these factors combine to make effervescent tablets a very popular choice for those taking tablets for either dietary supplementation or medicinal reasons. In case, regular tablets may not fully dissolve in the stomach after being consumed. This incomplete dissolution can cause irritation or discomfort in some individuals. On the other hand, effervescent tablets dissolve completely and evenly, preventing localized concentrations of the ingredients. The basic mixture of effervescent itself have anti-gastric and immunological functions. The effervescent tablets can dissolve by easily react with water and this can improve the bio-availability of the components and this make the quality of product. The effervescent tablets are easy to combine with any other functional or nutrient components as a medicine and provide health benefits.

Index Terms -An Alternative to conventional tablets, refreshment drink, Easy to alternate with flavors.

I. INTRODUCTION

A revised definition of an effervescent tablet filed to the US FDA states that a tablet is one that is intended to dissolve or scatter in water before being administered. "A tablet designed to dissolve or disperse in water prior to administration is called an effervescent tablet." Effervescent tablets, which are uncoated tablets with an acidic content, usually include carbonates or bicarbonates, which react rapidly with water to produce carbon dioxide. They are intended to dissolve or spread in water before use (Palaniswamy, P., et, al 2011).

The word Effervescent or Effervescence means to react with water and form bubbles, the compound is Carbon and combination with acids are made to dissolve in water and release carbon dioxide. Its rarely mean as well living, enthusiastic and entertaining. When an acid like citric or tartaric acid reacts with a substance that contains bicarbonate, such sodium or magnesium bicarbonate, carbon dioxide is produced (Srishand.S, Jodhana.L, et, al, 2010).

Effervescent tablets are tablets that are designed to dissolve in water and release carbon dioxide. The carbon dioxide is generated by a reaction of a compound containing bicarbonate such as sodium bicarbonate or magnesium bicarbonate, with an acid such as citric acid or tartaric acid. Effervescent tablets are becoming increasingly popular due to their ease of administration and rapid onset of action. They typically contain acidic materials and carbonates or bicarbonates that react quickly in the presence of water, releasing carbon dioxide and improving API solubility and flavour masking (Radha rani., et, al., 2020)

The effervescent tablets are so popular due to they dissolve easily in liquids like fruit juice or water, effervescent pills are very popular because they frequently taste nicer than conventional tablets. While effervescent tablets dissolve rapidly and completely, ensuring you receive the full benefit of the substances, conventional tablets dissolve slowly, which can lead to lower

absorption rates. The effervescent tablets are become increasingly popular they are so simple to take, effervescent pills are seeing a rise in popularity across a number of industries, including supplements and pharmaceuticals(Fattahi, F,2013).

When effervescent tablets come into contact with liquids like juice or water, they are meant to burst, which frequently results in the tablet dissolving into a solution. This makes effervescent pills the go-to option for many, even for those who use them as nutritional supplements in addition to for medical purposes. Here are five advantages of effervescent tablets over conventional tablets, (1) Pleasant Taste in Comparison to Ordinary Tablets, (2) More Evenly Distributed, (3) A Greater Intake of Liquids, (4) Easy Alternative to Regular Tablets, (5) To Sum up, All these factors combine to make effervescent tablets a very popular choice for those taking tablets for either dietary supplementation or medicinal reasons (Limpanuparb T.,2019).

Pleasant Taste in Comparison to Ordinary Tablets; Because they dissolve easily in liquids like fruit juice or water, effervescent tablets are very popular. Because of this, their taste is far superior to that of a typical tablet. Conventional tablets dissolve more slowly and to a smaller extent than effervescent tablets, which allows for optimal absorption and the full benefits of the effervescent tablet's substance.

More Evenly Distributed; In contrast, the dissolution of an effervescent tablet is complete and even throughout the stomach, preventing the accumulation of ingredient in the local area. The dissolution of a conventional tablet occurs gradually at times and may even be a portal that causes irritation in certain cases. This improves the taste and reduces irritativeness of the effervescent tablet while maintaining the effervescent form of the component. In addition to offering the desired nutritional benefit, effervescent tablets also promote liquid intake.

A Greater Intake of Liquids; In times of dehydration, when fluid intake is lower, increased fluid intake is more advantageous. Effervescent tablets are a great way to both rehydrate and benefit from dietary supplements, whether taken orally or medicinally.

Easy Alternative to Regular Tablets; Effervescent tablet can use in place of regular tablet. Which cause difficulty in swallowing either due to illness or age, old age people who administer medication or supplement on daily basis reports problem related to swallowing of tablet to overcome these problems effervescent tablets are of great significance and can be on easier way to swallow a tablet. Individuals with sore throats or medical issue having swallowing. Can use effervescent tablet to remove swallowing difficulty, so these are beneficial alternative to regular tablet; Effervescent tablets are getting increasingly popular and it's easy to work out why. They supply a way more efficient way of taking supplementary medication because of being distributed evenly and far more quickly than regular tablets. Additionally to the present, they taste better as are often added to water or a liquid drink of your choice additionally as being easier to require for those that may find it difficult to swallow of these factors combine to create effervescent tablets a really popular choice for those taking tablets for either dietary supplementation or medicinal reasons. As per revised definition proposed to US FDA, Effervescent tablet may be a tablet intended to be dissolved or dispersed in water before administration. Effervescent tablets are uncoated tablets that generally contain acid or acid salts (Citric, tartaric, Malic acid or the opposite suitable acid or acid anhydride) and carbonates or bicarbonates (radha rani.,2020).

Because they dissolve easily in liquids like fruit juice or water, effervescent tablets are very popular. As a result, their taste significantly improves over ordinary tablets. Conventional tablets dissolve more slowly and to a smaller extent than effervescent tablets, which allows for optimal absorption and the full benefits of the effervescent tablet's substance (Radha rani.,etal.,2020).

II. THE FOUNDATION OF EFFERVESCENTS

An alkaline metal carbonate salt and a soluble organic acid, one of which is often the API, combine to produce effervescence. Carbonated, soda bicarbonate, sodium carbonate, hydrogen carbonate. This mixture produces greenhouse emissions when it comes into contact with water. The compounds involved are carboxylic acid, acid, malic acid, hydroxy acid, and acid. Examples of common acids and alkalis that are utilised.

III. INDUSTRIAL APPLICATION OF EFFERVESCENT TABLETS

- In the pharmaceutical industries for compress the dosage of conventional tablets; Tablet compression plays a pivotal role in drug formulation, enhancing dissolution properties, improving bioavailability, and facilitating further processing. Whether it's conventional tablets, capsules, or powders, this unit operation is fundamental in pharmaceutical manufacturing
- For increasing bioavailability of functional ingredients; Other than conventional tablets, the mixture of effervescent tablets are quit friendly foreign mixtures like nutraceutical or extracted of food components.
- Pleasant tasting: Flavoring agents in pharmaceutical formulations are substances that impart taste and aroma to medicines. They enhance palatability and patient acceptance. masking Many drugs taste bitter, which can be aversive, especially for children.
- Gentle on the stomach; Effervescent tablets are readily soluble in water before consumption, this method will improve its digestion and reduce possibilities of sedimentation.

IV. RDA OF SPECIFIC INGREDIENTS OF DEVELOPED EFFERVESCENT TABLETS

Recommended Dietary Allowances (RDAs) are essential guidelines that help ensure individuals receive adequate nutrients for optimal health. RDAs represent the levels of nutrient intake that, based on scientific knowledge, are deemed sufficient to meet the known nutrient needs of practically all healthy individuals. These guidelines focus on providing nutritionally adequate diets across various life stages, from conception to old age.

INGREDIENTS	RDA (g/d)
Lactose	1
Citric acid	30
Tartaric acid	30
Malic acid	30 (2-3 teaspoon)
Sodium bicarbonate	<16

Table 1, Ingredients and it's RDA of effervescent tablets

V. ADVANTAGES OF EFFERVESCENT TABLETS

- **Fast onset of action;** Fast Dissolving Tablets (FDTs) are a fascinating innovation in drug delivery. Let's explore their rapid onset of action and how they benefit patients: (1) **Rapid Onset of Action:** FDTs are designed to disintegrate or dissolve rapidly in the oral cavity without the need for additional water. When you take an FDT, it gets disintegrated quickly, leading to swift dissolution and absorption within the mouth. This rapid action is particularly beneficial for drugs used to treat acute conditions, such as migraines or psychiatric incidents, as well as conditions like insomnia. **Patient Convenience:** Since FDTs don't require water for swallowing, they are convenient for patients who are traveling or don't have immediate access to water. **Geriatric Patients:** Traditional tablets and capsules can be inconvenient for some geriatric patients due to changes in physiological and neurological conditions associated with aging. FDTs address this challenge by providing a user-friendly alternative.
- **No need to swallow tablet;** Due to dissolving tablet in water it don't need to swallow .
- **Good stomach and intestinal tolerance;** If the carbonate is taken in an effervescent formulation, the calcium dissolves in water, is instantly available for the body to soak up, and there's no risk of excessive gas within the stomach and there's no constipation caused due to less amount of acid within the stomach.
- **More portability;** Effervescent tablets offer several advantages, including enhanced portability. Effervescent tablets are thin, lightweight, and easy to carry. Unlike liquid medications, they don't require the addition of water before use, making them simpler to transport.
- **Improved palatability;** Drugs delivered with an effervescent base tend to taste better than most liquids, mixtures, and suspensions. Superior taste masking is achieved by limiting objectionable characteristics and complementing formulations with flavors and fragrances. Effervescent tablets essentially include flavoring, making them taste much better than a mixture of non-effervescent powder in water. Moreover, they produce fizzy tablets, which may have better consumption appeal than traditional dosage forms.
- **Superior stability;** Effervescent tablets are designed with a protective packaging that shields the active ingredients from external elements such as oxygen and moisture. This packaging prevents exposure to environmental factors that could lead to degradation of the medication. As a result, effervescent tablets maintain their potency and effectiveness over time.
- **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.**

VI. LIMITATIONS OF EFFERVESCENT TABLETS

- **Bulk Size:** Effervescent tablets tend to be larger due to the inclusion of effervescent components. This increased bulk requires special packaging materials.
- **Taste Considerations:** Some active pharmaceutical ingredients (APIs) have an unpleasant taste. Effervescent tablets may not always mask this taste effectively, impacting patient compliance.
- **Cost:** The excipients used in effervescent tablets can be costly, contributing to higher production expenses.
- **Special Production Facilities:** Manufacturing effervescent tablets requires specialized facilities, which can add complexity and cost to the production process.

- Sodium and Potassium Content: Effervescent tablets often contain sodium or potassium bicarbonate. For patients with heart failure or cardiac insufficiency, high sodium or potassium levels may be inappropriate.

VII. MEDICATIONS CONTAINED IN EFFERVESCENT TABLETS

- Drugs that are difficult to digest or upset the stomach: When calcium carbonate is taken in an effervescent formulation, it dissolves in water and becomes instantly available for the body to absorb. Additionally, there is no chance of excessive gas in the stomach or constipation from the stomach's decreased acid production.
- pH-sensitive medications, such as antibiotics and amino acids: Effervescent formulations can buffer the water-active solution to raise the stomach's pH (make it less acidic) and so stop the active ingredient from degrading or becoming inactive due to the stomach's low pH.
- Medication that calls for an excessive dosage: An ordinary effervescent tablet, measuring one inch in diameter and five grammes in total weight, can contain up to two grammes of water-soluble active components in a single dosage. The sachet (powder form) is the usual mode of delivery if the prescribed dosage exceeds that.

VIII. GRANULATION

8.1 Dry Granulation

A roller compactor or chilsonator is a type of specialised processing equipment that can be used to achieve dry granulation. Under extreme pressure, premixed powders are compressed between two counterrotating rollers in these devices. The resulting material can take the shape of a brittle ribbon, sheet, or piece, depending on how the roller is configured. The material is compressed until it reaches the appropriate size for tablet granulation.

8.2 Wet Granulation

The preparation of a granulation for effervescent tablets follows a largely similar premise to that of regular tablets. In order to create a workable mass, wet-granulating procedures combine the dry ingredients with a granulating solution. To create a compressible granulation, the mass—which could naturally be cohesive and plastic—is reduced to the ideal particle size distribution and dried. It is also feasible to use several processes that involve drying the produced mass before reducing the particle size.

8.2.1 Advantages of wet granulation

- Allows powders to be handled mechanically without sacrificing mix quality.
- Boosts and enhances the homogeneity of powder density.
- Enhances powder flow by increasing particle size and sphericity.

8.2.2 Limitations of wet granulation

- fabric loss during different processing phases.
- Two-phase granulation technique Wet granulation's greatest drawback is its expense. Because of the labour, time, energy, equipment, and area needs, it's a popular technique.

IX. EVALUATION OF TABLETS

Physical and chemical qualities are the two main categories into which effervescent tablet evaluation parameters can be separated. There is no discussion of how effective they are for the purpose for which they are intended.

9.1 Physical Characteristics

The duration of tablet disintegration is Other than offering a method for tablet disintegration, one of the most significant features of effervescent systems is the visual impression of the dissolving tablet and its following carbonation. If quick disintegration is not achieved, there is obviously little advantage over compressed, noneffervescent pills.

9.2 chemical characteristics

The pH of the solution formed after the pill dissolves. because of the characteristics of the effervescent system's parts. buffer systems have been furnished. and as a result, distinct pH measurements are possible. The stable measurement of pH in the solution indicates that the raw components are evenly distributed throughout the tablet.

9.3 stability of the effervescent tablets

Effervescent tablet stability testing and shelf-life prediction are straightforward, and the results of the following tests can be used to use the standard Arrhenius equation kinetic principles. Every tablet comes in a standard-sized aluminium foil laminate pouch that is hermetically sealed. Following the measurement and recording of the tablet and foil pouch thickness, the pouches are positioned at 25, 37 and 45. if breakdown takes place. The bag will enlarge when tiny volumes of carbon dioxide gas are released into it. The amount of gas evolved is correlated with the degree of swelling, as determined by the rise in pouch thickness.

X. APPLICATIONS OF EFFERVESCENT TABLETS

- Enhanced stability and effortless transportation.
- Substitute for parenteral forms in situations when parenteral administration is challenging. By including tiny quantities of effervescent mixes into the tablet matrix, zero order release is accomplished.
- It works well with pulsatile systems; a fast-releasing core was developed to release drugs quickly upon the rupture of the polymer coating.
- One important factor influencing the floating time in floating medicine delivery systems is the concentration of effervescent agents.
- The medication is delivered according to plan For regulated release, effervescent osmotic pump pills were utilised.
- Effervescent cosmetic tablets were offered. Enhancement caused by effervescence is observed as tight connections opening and Make the intestinal membranes of rats and rabbits more hydrophobic.

XI. CONCLUSION

These studies about effervescent tablets are invented for replacing limitations of conventional tablets or regular tablets. The pharmaceutical and medical companies have always prescribed tablets together with capsules containing vitamins and a gastrointestinal pill. Here is the roll of the effervescent pills mixed with beneficial components from natural sources. Studies over the years have shown that these will produce numerous negative effects, including immunity loss and respiratory troubles. Functional chemicals are made from foods or natural sources and have positive health impacts, including the ability to prevent disease.

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