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Effervescent Floating Drug Delivery System: A Review

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ABSTRACT

Oral sustained release gastro-retentive dosage forms offer many advantages for drugs with the absorption from upper parts of the gastro intestinal tract. Gastric emptying is a complex process and it is highly variable. The floating drug delivery systems are useful methods to avoid this variability which increases the retention time of the drug delivery systems for more than 12 hours.these systems are useful for many of the problem occurred during development of pharmaceutical dosage form. The objective of the review is to understand the current approaches of this drug delivery system.

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INTRODUCTION:

Floating systems or dynamically controlled systems are low density systems that have sufficiently buoyancy to flow over the gastric contents and remain buoyant in the stomach without affecting the gastric emptying rate for a prolonged period of time. This result is an increased gastric retention time and a better control of the fluctuations in plasma drug concentration. Oral controlled release dosage forms have been developed over the past three decades. Drug absorption from the gastrointestinal tract is a complex procedure and is subject to many variables. Gastroretentive systems can remain in the gastric region for several hours and hence significantly prolong the gastric residence time of drugs. The drug is released slowly as desired rate from the system and after released of drug the residual system is emptied from the stomach. e.g. Chitosan and effervescent components such as sodium bicarbonate and citric or tartaric acid or matrices containing chambers of liquid that gasify at body temperature.

CLASSIFICATION:

1. Effervescent floating tablet:

These are the matrix type preparations in which swellable polymers are used, when they come in contact with gastric juice in the stomach, Carbon dioxide is liberated and is trapped in the swollen hydrocolloids. This provides buoyancy to the dosage form.

A) Gas generating system: In these types the co2 containing agents are coupled with matrix tablet.

B) Volatile liquid: These systems can be made to float in the stomach because of floatation chamber, which may be a vacuum or filled with air or a harmless gas, while drug reservoir is encapsulated inside a microporous compartment.

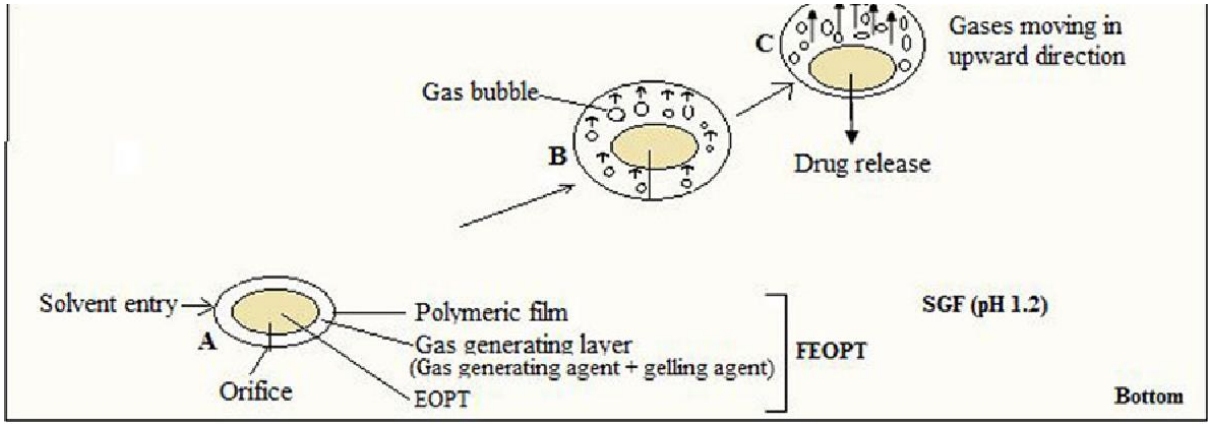
2. Non effervescent floating tablet:

Based on mechanism that it adher to mucous layer of GI tract. The most commonly used excipients in non-effervescent FDDS are gel forming or highly swellable cellulose type hydrocolloids, polysaccharides and matrix forming material such as polycarbonate, polyacrylate, polymethacrylate, polystyrene as well as bio-adhesive polymer such as chitosan and carbopol.

MECHANISM:

Mechanism of Floating Effervescent Tablets:

After administration of effervescent floating dosage form coming in contact with the gastric fluid the dosage form get swells up and the slowly release of the drug without disintegration of the tablet takes place. When the tablet comes in the contact of gastric fluid, it produces effervescence by releasing CO2 gas. When the fluid penetrates into the tablet, tablet starts to float



ADVANTAGES:

- Floating dosage forms such as tablets or capsules will remains in the solution for prolonged time even at the alkaline pH of the intestine
- Have advantage for drugs having local action
- Advantageous in case of dairrhoea.
- Enhancement of bioavailability.
- High variability in gastric emptying.

DISADVANTAGES:

- Not suitable for dosage form having stability and solubility difficulty.
- Patients should not be dosed with floating forms just before going to bed.
- They require a sufficiently high level of fluids in the stomach, so that the drug dosages form float therein and work efficiently.
- High variability in gastric emptying.

METHODS OF PREPARATIONS:

Wet Granulations:

- Mixing of drugs and excipient.
- Preparation of binder solution.
- Mixing of binder solution with drug mixture and form wet mass.
- Drying.

Dry Granulation:

In dry granulation process the powder mixture is compressed without the use of heat and solvent. It is the least desirable of all methods of granulation. The two basic procedures are to form a compact of material by compression and then to mill the compact to obtain a granules. Two methods are used for dry granulation. The more widely used method is slugging, where the powder is recompressed and the resulting tablet or slug are milled to yield the granules. The other method is to recompress the powder with pressure rolls using a machine such as Chilosonator.

Roller Compaction:

The compaction of powder by means of pressure roll can also be accomplished by a machine called chilsonator. Unlike tablet machine, the chilsonator turns out a compacted mass in a steady continuous flow. The powder is fed down between the rollers from the hopper which contains a spiral auger to feed the powder into the compaction zone. Like slugs, the aggregates are screened or milled for production into granules.

APPLICATION:

1.Enhanced Bioavailability

2.reduced fluctution of drug concentration.

3.Site-Specific Drug Delivery.

4. Sustained Drug Delivery.

5. Minimized adverse activity at the colon.

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