



The Review On Suppositories With There Evaluation Test

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Abstract:

Suppositories are drug portion shapes that hold an essential put inside the space of prescription transport. This study gives a complete show of suppositories. This article examines the various points of suppository definitions and supportive applications. This review underscores the significance of suppositories as a significant steady transport elective and the part they play in watching out for specific calm necessities. It also discusses the essential parts of suppositories, counting bases, and dynamic drug trimmings, next to the methodologies of suppository arranging. The headway and enumerating of suppositories require a significant comprehension of various factors, counting base decision, calm similarity, and calm tendencies. The decision of base effects the release and digestion qualities of the steady, making it a critical idea in the suppository plan. Their centrality lies not in a manner of speaking in their extraordinary method of association however besides in their ability to offer game plans for specific persevering necessities, counting instances of disorder, hurling, or difficulties with verbal medication.

Keywords: suppositories; kinds of bases; techniques for planning; assessment tests; calm tendencies; hurling.

Introduction:

Suppositories are sedated, strong bodies of different sizes and shapes appropriate for presentation into body cavities. The medicament is joined into a base such as cocoa butter which softens at body temperature, or into one such as glycerinated gelatine or PEG which gradually breaks down within the mucous emissions. Suppositories are suited especially for creating nearby activity, but may moreover be utilized to deliver a systemic impact or to apply a mechanical impact to encourage purging the lower bowel. [1] The perfect suppository base ought to be nontoxic, congruous with medicaments, and effectively shaped by compression or shaping. It ought to also dissolve or deteriorate within the nearness of mucous emissions or liquefy at body temperature to permit for the discharge of the medicine. As with the treatment bases, suppository base composition plays an critical part in both the rate and degree of discharge of medications.[2]



Fig.1: Suppositories [28]

Defination:

Suppositories are solid dosage forms meant for insertion into body cavities, where they melt or dissolve to produce local or systemic effects. Their effectiveness relies on the drug's composition, concentration, and absorption rate.[3] These forms are frequently used to deliver analgesics, antispasmodics, sedatives, tranquilizers, and antibacterial agents, with systemic effects being particularly important.

Suppositories are classified as:

- Rectal suppositories.
- Vaginal Suppositories.
- Urethral Suppositories.
- Nasal Suppositories.
- Ear cone.

Rectal suppositories:

Rectal suppositories come in many shapes and sizes, but they usually come in at one end. Rectal suppositories can provide a variety of medications. For example, it may contain glycerin to treat arthritis and acetaminophen to treat fever. Rectal suppository medicine works quickly. This is because the suppository dissolves in the body and enters the bloodstream directly.

Vaginal suppositories:

Vaginal suppositories are solid medications that are inserted into the vagina with a special application. Drugs from vaginal suppositories are quickly absorbed by the body. It works faster than medications you take by mouth. This is because suppositories dissolve in the body and enter the bloodstream directly.

Urethral suppositories:

Pen-shaped urethral cysts are called bougies. Males weigh 4 grams and are 100 to 150mm long. Each female weighs about 2 grams and is 60 to 75 mm long.

Nasal suppositories:

Nasal suppositories called nasal buggies or buginaria for insertion into the nasal cavity. They are developed with a glycerol gelatin base. The weight is 1 gram and the length is 9-10 cm.

Ears Cones :

- Aurinaria and introduction to the ear.
- Not used
- Theobroma oil is used as a base.
- The shape of the urinal is cut to size.

There are 4 different types from of suppositories in the form of other doses

- Pill suppositories
- Layer suppositories
- Coated suppositories
- Capsule suppositories.

Pill suppositories: It's the same as tablets in a compressed sense. It is used for straight and curved roads.

Layer suppositories: They are made of different substances in different layers so that there is no compatibility between these substances.

Coated suppositories: Lubricants are made with free unsaturated fatty acids, polyethylene glycol, etc. because they are smooth lubricants.

Capsule suppositories: They are made of soft gelatin and come in different sizes and shapes. It is filled with solid, semi-solid and liquid drugs. [27]

1.2 Ideal Characteristics Of Suppositories :

It should be non-irritant and non-reactive.

It should melt at body temperature.

It must maintain the proper shape and size.

It should be stable in store house conditions.

It should shrink sufficiently to remove earth.

It ought not to impact the drug's release or absorption.[4]

Advantage of suppositories

It is easy to use even for patients who cannot take oral medications.

Increases the bioavailability of drugs. •

It is very useful for gaining local effects.

This will avoid the metabolism of the first aisle.

Provides a quick effect.

It is desirable for vaginal and rectal fungal infections.

Disadvantage of suppositories:

This can cause stimulation to certain patients.

Some patients feel embarrassing.

It is more difficult to prepare than liquids or tablets.

It requires low temperature for storage.

Very few drugs can be delivered using this type of dosage form. [5]

Mechanism Of Action:

The dissolution of a suppository depends on its hydrophilic or lipophilic nature, as it will either dissolve in the liquid or melt on the mucous layer. The dissolving vehicle's osmotic properties draw water to the rectum or vagina, allowing the drugs within the suppository to diffuse toward the mucosal epithelial surfaces. If the drug is water immiscible, it needs to separate from the base of the suppository via gravity or ambulation before it can dissolve in liquid. Lipophilic melting suppositories soften and disperse independently of fluid presence, and the same method of medication administration applies to suppositories that dissolve when heated [6].

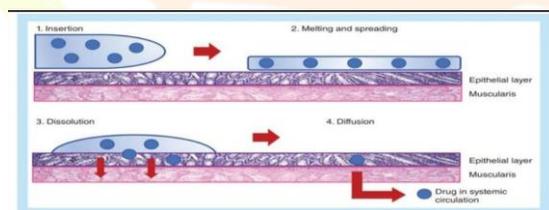


Fig.2 : Showing Mechanism of action

Main Classes Of Suppository Bases:

A) Cocoa Butter:

Cocoa Butter, also known as Theobroma oil, is derived from Theobroma cocoa seeds through the compression of the seed oil or the use of a solvent. It contains both saturated and unsaturated fatty acid triglycerides and appears as a solid yellow substance at room temperature, melting at body temperature and emitting a distinct, strong aroma. Due to the lack of emulsifiers, cocoa butter does not absorb water, but this can be improved by adding Tween-61, a non-ionic, waxy, solid, tan surfactant. Despite this limitation, cocoa butter offers numerous benefits, including its gentle base that does not irritate sensitive membranes, wide availability, ease of use in suppository production without requiring specialized tools, and affordability [7].

B) Cocoa Butter Substitute:

The starting materials are derived from different vegetable oils such as coconut or palm kernel oil. These materials undergo etherification, hydrogenation, and fractionation processes to produce products with different compositions and melting points. They can be tailored to reduce rancidity during extended storage periods. This type of suppository base is primarily comprised of mixtures of saturated fatty acid triglyceride esters [8].

C) Fatty Base:

This substance is a white, waxy, and flavorless opaque solid. It is a combination of triglycerides from coconut oil and palm kernel oil, serving as both suspending and emulsifying agents. The melting temperatures of this base

range from 32 °C to 36.5 °C. It is important to gently and consistently heat the base to 49–54°C without exceeding the required temperature before adding the active medicinal components. Once the liquid reaches a temperature of 43 to 49 °C, the suppositories should be poured.[8], [9]

D) Polyethylene Glycol:

The blends consist of polymers containing polyethylene glycol with different molecular weights. In commercial suppositories, surfactants and other additives like polyethylene glycol bases are sometimes utilized. Polybase, produced by Paddock Labs in the US, and PEG blend, manufactured by Gallipot Inc. in the US, are among the most popular bases. They both contain a mix of polyethylene glycols along with the emulsifier polysorbate-80. Prior to use, polyethylene glycol bases need to be moistened with water as they are often designed not to melt at body temperature but to dissolve in bodily fluids instead [10].

Emulsifying Base:

The bases mentioned are synthetic and of high quality, and there are several proprietary bases available, with a few examples detailed below.

a) Witepsol:

The composition includes saturated vegetable acid triglycerides (with chain lengths ranging from C 12 to C 18) along with different amounts of partial esters.

b) Massa Esteriun:

This range includes a combination of di-, tri-, and mono- glycerides of saturated fatty acids with chain lengths ranging from C11 to C17.

c) Massuppol:

The composition includes primarily glyceryl esters of lauric acid, with the addition of a small quantity of glyceryl monostearate to enhance its ability to absorb water. [11]

Methods Of Preparation: - Rolling by hand

- Moulding through compression
- Moulding through fusion
- Method of mold automation



Fig.3 : Moulds [29]

- Rolling by hand:

The simplest and oldest method for preparing suppositories involves using a cocoa butter base, which is useful when making only a small number of suppositories. This method has the advantage of not requiring the cocoa butter to be heated. To begin, grated cocoa butter and active ingredients are mixed together in a mortar to form a plastic-like mass. The mass is then shaped into a ball by hand and rolled into a consistent cylinder using a large spatula or small flat board on a pill tile. Afterward, the cylinder is cut into the appropriate number of pieces, each of which is rolled at one end to create a conical shape.[12]

- Moulding through compression:

The process involves creating suppositories by combining grated suppository base and medications and then pressing the mixture into a specific compression mold. To start, the molds' capacity must be established by compressing a small quantity of the base into the dies and weighing the resulting suppositories. When adding active ingredients, a portion of the suppository base needs to be omitted, taking into account the density of the active ingredients.[12]

- Moulding through fusion:

The first is to dissolve the base of the suppository, which disperses or dissolves the medicine in the molten base. The mixture is removed from the heat and poured into a suppository form. When the mixture hardens, the suppositories are removed from the mold. A combination method can be used with all types of suppositories that should be used with most of them.[13]

- Method of mold automation:

Using this machine, you can produce up to 10,000 suppositories per hour. The production speed with automatic casting machine is higher than manual casting. In this case, there may be no gas or impurities in the suppository. There are two types of machines used to do this process.[14]

Pre formulation studies:

Because physical and chemical properties vary with the internal structure of a solid drug, including melting point, density, hardness, crystal form, optical properties, and vapour pressure, the the description of polymorphs and dissolved forms will be included in the quantitative analysis of these chemical compounds. Various techniques for studying solids are as follows.[26]

- 1) microscopy
- 2) Hot stage microscopy, or the Fusion Method
- 3) D. S.C. (differential scanning calorimetry)
- 4) I. R. spectroscopy
- 5) Diffraction of X-ray powder
- 6) Electron Microscopy Scan
- 7) Thermogravimetry
- 8) Evaluation of solubility or dissolution.

Evaluation Test:

The suppositories were evaluated based on formal and informal parameters including weight change, content consistency, hardness, liquefaction time and temperature, dissolution test, filtration and macro melting range test. [15 16 17]

1. Uniformity of weight
2. Content Uniformity test
3. Melting point determination test
4. Visual Examination test
5. Liquefaction time and temperature
6. Hardness test
7. Disintegration test
8. Dissolution test

1. Uniformity of weight: • Weigh 20 separate suppositories

- Determine the average weight.

• No more than two individual weights should deviate from the average weight by more than 5%, and none of those weights should deviate by more than 10%.[18]

2. Content Uniformity test:

Take 10 suppositories. Determine the active ingredients in each of the 10 suppositories using an appropriate analytical method.

If not more than one of the individual values is obtained outside the limit, i. e. % of the mean value, and none is outside the limit, i. e. 25% of the mean value .

3. Melting point determination:

- Melt the suppositories rapidly at a temperature not exceeding 100°C above complete melting, inserting one end of a glass-capped tube into the melt until one material column to a height of 8-12 inches.
- Cool the tube to 150°C and maintain the temperature at 15-170°C for at least 16 hours. Connect the tube to a thermometer in a heating vessel containing water at 150°C so that the bottom end of the column of material is 30 mm below the surface of the water. Heat the water and stir continuously until the temperature rises at a rate of 20 degrees per minute.
- The temperature at which the molten material starts to rise in the pipe is called the melting point. The dissolution of suppositories should not exceed the information mentioned in the monograph.[19]

4. Visual Examination test :

Shape:

It is recommended to check the shape of the suppository to see if the shape of the suppository is the same, even if the shape of the suppository is desired

Surface appearance:

The following can be checked: shiny, dull, rocky, cracked, dark spots, pits, cracks, air bubbles, pits, and others

Color:

Strength, shape and consistency of color should be confirmed.

Smell:

Confirmation of smell can avoid confusion when prescribing similar drugs. A change in smell is also a sign of the decay process.

Weight:

Suppositories can be weighed on an automatic scale that can obtain the weight of 10 suppositories. If the weight is too low, it is worth checking if the mold is properly filled and if there are axial cavities or air bubbles due to improper mechanical stirring or the presence of unwanted surfactant.[20]

5. Liquefaction time and temperature:

Liquefaction time and temperature were determined using an on-board device. A large pipe was taken with a narrow opening at one end and a wide opening at the other end. The pipette was immersed in warm water at 37 °C. keep the narrow end facing the hot water. The suppository sample was inserted from the tip of the pipette to the wide end and gently pushed along its length to the narrow end. A glass rod is placed over the suppository. The temperature of the glass rods is indicated by falling naturally, which indicates the liquid formation temperature. The time when the glass rod reaches the narrow end after the suppositories are completely dissolved indicates the liquefaction time.[21]

6. Hardness test:

The ability of a suppository to with stand the hazards of packaging, dispensing and handling before use depends on its mechanical strength (hardness). The hardness of randomly selected suppositories can be measured with Monsanto's or Erweka hardness tester. The weight required to dissolve the suppository is recorded in kilograms.[22 23]



Fig. 4: Erweka hardness tester [30]

7. Disintegration test:

- A metal unit consisting of two stainless steel discs, each disc having 39 holes, each disc having a diameter of 4 mm.
- The diameter of the disk is equal to the diameter of the inside of the hand.
- The boards are 30 mm apart. The metal tool is connected to the outer covering by means of three uniformly spaced hooks.

• Method:

- Place a suppository in the lower hollow disk of the metal assembly, then insert the assembly into the cylinder and connect it to the hand.
- Repeat the process with the other two items, the metal assembly and the hand. Place each device in a container containing five liters of water at 37°C with slow stirring, until the device is 90 mm below the surface of the water. [24].

Complete dissolution when:

1. Completely dissolved.
2. Dissolved into components.
3. Softened.
4. Disintegrated in less than 30 minutes for fat-based investment occurs for disintegration of water-soluble suppositories takes less than 60 minutes.



Fig. 5: Disintegration apparatus [31]

8. Dissolution test:

- Testing the release rate of medicinal substances from suppositories in laboratory conditions has always presented problems due to dissolution, dispersion and dispersion in the suspension medium. The first test was done by simply placing it in a beaker containing medium. [25]
- In an attempt to control mass or interfacial changes, various devices have been used, including a cellular membrane or a membrane to separate sample room reservoir
- Samples sealed in a vacuum tube or natural membranes have also been studied. A cell flow device has been used to hold the sample with thread, wire mesh and glass beads. [26].

Conclusion:

The direct route of drug delivery is not used despite its many benefits. Although the oral route of drug administration is the most appropriate way to administer the drug. This article is presented with a description of suppositories. This article also contains descriptions of different types of suppositories or different dosages of suppositories that have already been found and have proven successful in treating a variety of ailments. Suppositories can be customized to provide controlled release, site-specific targeting and increased compliance. Their capabilities extend to hydrophobic and hydrophilic drugs, increasing their effectiveness. One of the main advantages of giving medicine to the amputated patient is that it is easy to use for children and elderly patients. It can also be given directly to an elderly patient or a mentally challenged patient.

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