

Understanding the Emerging Perspectives of Taste Masking of Bitter Drugs for Enhancing Patient Compliance: A Bird's Eye Review

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ABSTRACT

Scientists struggle to conceal the bitterness of medications. Many oral medicines and bulking agents are bitter. Bitterness masking is vital for patient compliance. Many formulations with increased performance and acceptance have been developed to improve palatability. The disagreeable taste of formulation has been disguised by sensory, barrier, chemical, and complexity methods. Taste is acknowledged as a crucial component in patient compliance, especially in youngsters, where acceptability and hence ease of administration may be considerably altered. The methods used to hide the taste of medications are detailed in this review. Taste is a key factor in oral product adoption. Many oral medications, foods, and bulking agents have unpleasant bitter flavours. Oral administration of bitter medications is a major concern for health care practitioners, particularly for juvenile patients. Masking a drug's disagreeable taste increases patient compliance and thereby profits. Various known procedures have been used to remove or reduce the bitterness of these medications, but no generally applicable methodology has been identified.

Keywords: Taste masking, Tongue, Drug, Patient compliance, Techniques, Technology

INTRODUCTION

The creation of a dosage form is influenced by taste. Sweetness, sourness, saltiness, bitterness, and umami or savoury are the five fundamental flavour characteristics. Bitter testing is rejected by infants within hours of birth, and they prefer sweet tastes. Children have a much higher number of taste buds than adults, which are responsible for taste sensitivity. Taste masking is used to disguise a drug's harsh taste in order to increase the drug's palatability, which improves patient compliance.¹

In terms of patient compliance, taste is one of the most essential features of oral liquid, dissolving tablets, and chewing tablets formulation development. The capacity to recognise the flavour of items such as food and medications is known as taste. Because the medications are taken orally, it has become more important. The unpleasant taste of unappealing pharmaceuticals makes it difficult to administer them, especially to children and the elderly.²

For juvenile and geriatric patients, taste masking of bitter-tasting medications has been shown to be acceptable. The

bitterness of pharmaceutical medications is important for patient compliance since bitter pharmaceuticals' oral administration is sometimes inhibited by their unpleasant taste, which leads to noncompliance and worsening of the sick state. Unwillingness to take solid dose forms such as pills is an issue that affects people of all ages, but primarily the elderly and children, owing to physiological changes. Dysphasia is reported by 45 percent of stroke survivors, 33 percent of nursing home residents, and 63 percent of cancer patients receiving palliative care in the community or hospital. It is possible to enhance the palatability of oral medications by applying different current conventional techniques for reducing bitterness. Taste sensations in humans are triggered by chemicals in the tongue, which are then sent to the brain, where a distinct taste experience is identified. A chemical combines with taste receptors through taste buds, which are tiny organs situated in the mouth, mostly on the surface of the tongue, and produces sensations such as sweet, sour, bitter, and salty.³

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TASTE POINTS IN TONGUE



Figure 1: Taste Points in Tongue.⁴

It can be seen in **Figure 1** that each taste is represented by a different receptor on the tongue: sweet sensations are located at the tip of the tongue, sour sensations are located at the sides of the tongue, bitterness is located at the back of the tongue, and salty sensations are located at both sides and the tip. An umami flavour has just been found, which is a fundamental taste. A taste sensation caused by monosodium glutamate (MSG), which is found mostly in seaweed, and disodium inosinate (IMP), which is found primarily in meat and fish, is known as umami. These above-mentioned taste receptors, which bind to chemicals released by saliva, transfer electrical impulses to the 7th, 9th, and 10th cranial nerves, which in turn transport them to the parts of the brain that are involved in the experience of taste.⁴

Among various approaches two are commonly used to diminish the bitter taste of drug:

- Increasing the solubility of the medication in saliva lowers its solubility (5.6-6.8).
- This is accomplished by modifying the affinity and type of the medication, which will interact with the taste receptor.

Taste masking is not a simple or straightforward technique; much work is necessary before bitter medicines are suitable for use in clinical studies. There are a lot of stages required. Chemical and pharmaceutical companies devote a great deal of effort to creating appetising and pleasant tasting goods, and they use a variety of taste-masking procedures to create a suitable formulation. As a result, in order to minimise unnecessary waste of time and money, it may be inferred that optimum flavour masking formulas should be developed by:

- Require fewer pieces of equipment and processing procedures.

- Use as few excipients as possible that are both inexpensive and readily accessible in order to effectively hide flavour.
- Have no negative impact on the solubility or bioavailability of the medication.
- Be as cost-effective as possible.

Pharmaceutical formulations that are pleasant or at least tolerable in taste are increasingly expected and demanded by patients. Aroma boosters are the most basic and oldest means of masking moieties, however they are ineffective in 90% of cases. As soon as these methods fail, some new conventional methods are introduced, such as microencapsulation, which includes coating, spray drying techniques, by chemicals, inclusion complexes with cyclodextrins, use of ion exchange resins, prodrugs, and other different techniques such as liposomes, multiple emulsions, and so on. When these methods fail, some new conventional methods are introduced, such as encapsulation by cyclodextrins.⁵

PHYSIOLOGY OF TASTE

In order to perceive taste, sensory neurons in the brainstem communicate with the central nervous system (CNS) through taste buds, which are groups of taste receptor cells (50-100 cells) that are bundled together in clusters like bananas and transmit the experience of taste to the central nervous system. To stimulate taste buds, chemicals dissolved in saliva from orally ingested medications are introduced through the taste pore and interact with surface proteins known as taste receptors, which results in electrical changes within taste cells and the transmission of signals to the brain. Taste buds are chemoreceptors that detect chemicals dissolved in saliva from orally ingested medications and enter through the taste pore, where they interact with taste receptors and cause electrical changes within taste cells, which results in the transmission of signals to the brain. The physiology of taste bud is as shown in **Figure 2**.⁶

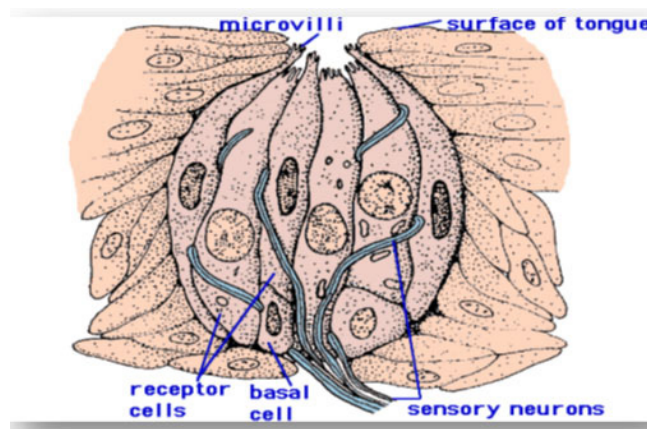


Figure 2: Physiology of taste bud.⁶

MECHANISM OF TASTE SENSATION

The taste receptors on the tongue are activated when the molecules dissolve in saliva, resulting in the perception of bitter, sweet, or other flavours. This feeling is the consequence of signal transduction from the taste receptor organs, also known as taste buds, which are located on the tongue. It is believed that these taste buds have very sensitive nerve endings, which create and transfer electrical impulses via the seventh, ninth, and tenth cranial nerves to those parts of the brain that are dedicated to the experience of flavour and flavour perception.⁷

TASTE BUDS

- In most vertebrates, taste buds (Figure 3) are a tiny sensory organ that assists in the detection of flavour.
- There have been discoveries of taste buds on the soft palate, in the pharynx, and in the epiglottis, allowing for the recognition of diverse kinds of flavour.

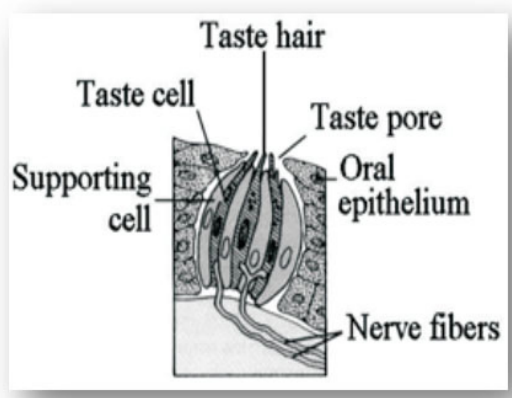


Figure 3: Structure of a taste bud.⁸

The sensation of taste can be categories into:

- Salty Taste (edge, upper portion):** It is one of the four taste receptors located on the surface of the tongue. They are placed on the border of the tongue and on the top front region of it.
- Sour Taste (tip):** The taste receptor on the tongue is one of the four taste receptors on the body of the tongue. They are found on the sides of the tongue and are most triggered by acids.
- Sweet Taste (along sides in back):** It is one of the four taste receptors located on the tongue's surface. It is on the tip of the tongue that you will find them.
- Bitter Taste (back):** It is the fourth and last taste receptor on the tongue, and it is the last to be discovered. There are many different chemical substances that may induce it, the majority of which are organic molecules, while certain inorganic chemicals such as magnesium and calcium can also create bitter feelings.⁸

TASTE MASKING

It is described as the perceived decrease of bad taste caused by the use of an appropriate substance in a certain situation. Technologies that conceal the taste of medications are very significant for increasing patient compliance and boosting therapeutic effectiveness. It is usual practise to employ one of two ways to alleviate the unpleasant taste of the medication.

- The first step is the decrease of drug solubility in saliva, where a balance between lowered solubility and bio-availability must be reached.
- The second step is the reduction of drug solubility in urine. Another strategy is to modify the drug's capacity to interact with the taste receptors in the brain.⁹

IDEAL PROPERTIES OF TASTE MASKING PROCESS

An ideal taste masking process and formulation should have the following properties:

1. Use the fewest amount of equipment and processing procedures possible.
2. Require the smallest number of excipients possible for the best formulation.
3. There is no negative impact on the bioavailability of the medicine.
4. Require excipients that are both cost-effective and conveniently accessible.
5. The lowest possible production cost.
6. The procedure may be completed at room temperature.
7. Require excipients to have a high margin of safety in their formulation.
8. It is quick and simple to make.¹⁰

FACTOR AFFECTING SELECTION OF TASTE MASKING TECHNOLOGY

Factors that are taken into consideration during the taste masking formulation include:

1. The extent to which the API has a bitter flavour.
2. The dosage load that is required.
3. The shape and size distribution of drug particulates.
4. The solubility and ionic properties of the drug.
5. The pace at which the end product must disintegrate and dissolve is required.
6. Desired bioavailability should be considered.
7. The release profile that you want to use.
8. The dose form that is required.

TASTE MASKING TECHNIQUES

Various techniques reported are as follows¹¹:

Spray drying method

These procedures are similar in that they both entail scattering the core material in a liquid coating substance and spraying or injecting the core coating mixture into an environment wherein a relatively quick solidification (and formation) of the coating is achieved. It is the way by which coating solidification is done that is the most significant distinction between the two procedures. With spray drying, coating solidification is achieved by fast evaporation of an organic solvent containing the coating material that was previously dispersed. When using spray congealing techniques, coating solidification is performed either by thermally congealing a molten coating material or by solidifying a dissolved coating by dissolving the coating - core material combination in a non-solvent. Techniques such as sorption, extraction, and evaporation are used to remove the non-solvent or solvent from the coated product once it has been applied.¹²

The drug release profile and capacity were both good. The microspheres were analysed using Fourier transform infrared spectroscopy, scanning electron microscopy, drug loading, and an in vitro bitter taste as indicators of their composition. Spray drying approach is used in the current inquiry to conceal the bitter taste of the medicine by preparing micro particles of the drug with various hydrophilic polymers such as eudragit, hydroxypropyl methylcellulose (HPMC), and polyvinylpyrrolidone (PVP). Using spray drying process, the goal of this technology is to generate flavor-masked microspheres of a very bitter medication with a strong bitter taste. Microspheres are created by the use of various polymers, and it has been discovered that they have flavour masking, drug release, and drug release capabilities.¹³

Spray drying is a common procedure in most industrial settings, and it may be used to integrate multiple processes in the formulation development process. Spray drying is a one-step process that converts a solution into a powder. It produces fine, dustless, or agglomerated powders that are generally hollow and approximately spherical in shape with a narrow size range. During the drying process, materials go through the following stages: atomization of the feed material, spray-air interaction, drying of the sprayed material, and separation of the dried material from the air stream. Spray drying is a technological process that may be completely regulated, with a variety of process factors that can modify the qualities of the finished product. The use of appropriate settings may result in the quick evaporation of solvent from sprayed droplets, leading in the formation of amorphous products.¹⁴

Microspheres are free-flowing powders that are composed of proteins or synthetic polymers and have particle sizes ranging from 1-1000 microns in size. Various techniques for the manufacture of microspheres provide a variety of options for controlling various elements of medication delivery as well as

enhancing the therapeutic efficiency of a particular medicine. There are many techniques of delivering a medicinal chemical to the target location in a controlled release manner over a prolonged period of time. One such strategy is the use of microspheres as drug carriers, also known as microparticles, in the delivery of medications. It is the most dependable method of delivering the medication to the target site with specificity, assuming the drug has been changed, and of maintaining the appropriate concentration at the site of interest throughout time. Microspheres will play a pivotal role in novel drug delivery in the future, particularly in diseased cell sorting, diagnostics, gene and genetic materials, safe, targeted, and effective in vivo delivery, and supplements as miniature replicas of diseased organs and tissues in the body, thanks to the combination of various other strategies.¹⁵

Flavors and Sweeteners

Sweeteners are frequently used in the pharmaceutical industry to mask the taste of drugs. These technologies are often used in conjunction with other flavour masking technologies to improve the overall taste experience. It is possible to combine them with bitter medications in order to enhance the flavour of the base substance. Natural sweeteners are distinguished from synthetic sweeteners by the origin of their production. Synthetic sweeteners like as sucralose, aspartame, and saccharin are becoming more prevalent in taste masking than natural sweeteners. Sucralose, aspartame, and saccharin are examples of such sweeteners. When combined with sugar alcohols such as lactitol, maltol, and sorbitol, these sweeteners help to reduce the aftertaste impression of a product. Sucralose may be used with acids (such as citric acid) to boost the effectiveness of the sweetener in disguising the flavour of foods. The initial experience of the drug ingredient is taken into consideration while selecting the appropriate flavouring agent to be added. Some tastes have a cooling impact on the palate, which helps to reduce the feeling of aftertaste. Eucalyptus oil is a common ingredient in mouthwashes and cough syrup formulas because of its soothing properties.¹⁶ The example of drugs is given in **Table 1**.

Table 1: Taste masking of drug by flavors and sweeteners.

Drugs	Taste	Taste masking agents	Dosage forms
Eucalyptus oil	Bitter	Fenchone, Borneol	Mouth washes
Ibuprofen	Bitter	Saccharin sodium, Sucrose, Sorbitol solution	Syrup, suspension
Thymol, Triclosan	Bitter	Citrus flavor, limonene	Oral rinses
Zinc acetate dehydrate	Bitter	Saccharin sodium	Lozenges

pH Modifiers

For liquid dosage forms such as suspension, pH Modifying agents are capable of establishing an optimal pH microenvironment in aqueous media, which may allow in-situ precipitation of the bitter medicinal ingredient in saliva, hence lowering the overall taste sensation in the mouth.¹⁷

Coating with inert material

When it comes to flavour masking technology, coating is a frequent and effective means of achieving the desired results. Lipids, polymers, and sugars are the three main types of coating material used. For flavour masking of bitter medications, these materials may be employed alone or in combination, as a single layer or multiple layer coatings, and can be applied in a single or multiple layers. Hydrophobic polymers, rather than hydrophilic polymers, have become more preferred for coating bitter medications in order to accomplish flavour masking. Sweeteners may also be used to conceal the harsh taste of a coating solution that contains bitter flavour masking agents. Multilayer coating has been performed in order to overcome coating flaws that would otherwise result in a reduction in taste masking efficacy, particularly for medications that are aggressively bitter. Polymers are among the many different kinds of coating materials available, and they are commonly utilised for coating.

Polymers are further subdivided into three categories: water soluble, water insoluble, and mixes of the two. Acidic chemicals such as citric acid and malic acid are utilised to create an acidic microenvironment in the upper intestine, which helps to increase the release of drugs from drug particles coated with reverse enteric polymers in the upper intestine. Tartaric acid and other water-soluble organic acids and their salts, such as acetic acid, may be employed in conjunction with hydrophilic polymers to provide flavour masking. As a result of these acids promoting salivation, the production of a thick, viscous, and mouldable particle paste is made possible, increasing the likelihood of the medicine being swallowed. By using a multilayer coating with the inclusion of a first spacing layer, it is possible to eliminate coating flaws and medication excipient incompatibilities, hence boosting the flavour masking efficacy.¹⁸

Ion Exchange Resins

A synthetic inert organic polymer composed of a hydrocarbon network to which ionizable groups have been bonded, ion exchange resins are capable of exchanging labile ions present in the solution with which they come in contact with their labile ions. Styrene and divinylbenzene copolymers are the most often used polymeric networks, and they are the most common kind of polymeric network (DVB). Other polymers, such as those derived from acrylic and methacrylic acids that have been cross-linked with divinyl benzene and contain the

required functional groups, have also been employed as ion exchange drug carriers in addition to these.

Ion exchange resin is a high-density polymer having cationic and anionic functional groups that may be used to exchange ions. In return for the surrounding medium's mobile ions of equivalent charge, they may swap their own. For many years, synthetic ion exchange resins have been employed in the pharmaceutical industry to conceal the taste of medications. Weak ionic bonds are formed between the drug and the resin substrate, resulting in the formation of insoluble absorbates or resinate, which are resistant to dissociation under normal pH circumstances. As a result, the drug's disagreeable taste and odour are effectively concealed.¹⁹

Ion exchange resin can be classified into four major groups

a) Strong Acid Cation Exchange Resin

This resin (Sulphonated styrene divinylbenzene copolymer product) has a pH range of 0 to 14 and may be used to mask the taste of basic medications. It is effective over the whole pH range.

b) Weak Acid Cation Exchange Resin

These resins are effective at pH values greater than six.

c) Strong Base Anion Exchange Resin

These resins have a pH range of 0 to 14, and they may be used to disguise the taste of acidic medications in pharmaceutical formulations.

d) Weak Base Anion Exchange Resin

These resins will perform better when the pH is lower than seven.

Microencapsulation

It is critical to recognise that only the soluble fraction of the medication is capable of causing a taste sensation. Furthermore, it is plausible, if not probable, that covering the active drug with a carefully designed polymer film might lower its solubility in saliva, therefore masking the taste of the active medication in the mouth. Coating the drug particles formed a physical barrier between the drug and the taste buds, allowing the taste of the active to be concealed and the medication to be more effectively administered. Microcapsules are composed of a polymeric skin or wall that surrounds and protects a core. It is a procedure in which extremely small droplets or particles of liquid or solid substance are wrapped or coated with a thin film or polymeric material in order to protect them.²⁰ The advantage of microencapsulation such as:

- The desired quick or regulated drug release may be obtained while disguising the taste of the medication.
- Bitter liquids may be covered with a solid coating to make them solid particles.

- The bitter particles that have been coated may be used in a broad range of dosage formulations and product applications.

The goal of microencapsulation may be accomplished by any of the following techniques:

- Air suspension coating.
- Co-acervation phase separation.
- Spray drying and spray congealing.
- Solvent evaporation.
- Multiorifice-centrifugal process.
- Pan coating.
- Interfacial polymerization.

The first four strategies of microencapsulation have been described in the literature for the goal of disguising the flavour of foods. Air suspension coating may be characterised as a technique in which an upward moving, expanded fluidized bed is present in a central region of the coating chamber and a downward moving, more condensed fluidized bed is present on the perimeter of the column. There are three varieties of air suspension coaters available: top spray coater, wurster bottom spray coater, and tangential spray coater. Top spray coater is the most common form of air suspension coater.

Inclusion Complexes

It is a "host-guest" relationship in which the host is a complexing agent and the guest is the active moiety. The inclusion complex is capable of masking bitter taste either by decreasing its oral solubility or by decreasing the availability of the drug to taste buds, depending on the complexity of the relationship. Van der Waals forces are primarily responsible for the formation of inclusion complexes. Because of its sweet taste, β -cyclodextrins is a frequently utilised complexing agent for taste masking of pharmaceuticals. It is also non-toxic in nature.²¹

Prodrugs Approach

Prodrugs are therapeutic substances that are initially inactive but, after being subjected to biotransformation, release an active metabolite that is responsible for the therapeutic effectiveness. The adsorption response of the taste receptor on the substrate, or the mechanism of taste, is influenced by the molecule geometry of the substrate. As a result, each modification made to the molecular geometry results in a decrease in the adsorption rate constant. As a result, the use of prodrugs may be used to hide the flavour of foods. In addition, changes in water solubility, an increase in lipophilicity, greater absorption, fewer adverse effects and changes in membrane permeability are all benefits of using prodrugs.²²

Granulation

Taste-masked oral solid or liquid dosage forms may be prepared by using dry, wet, or melt granulation processes to

process a mixture of bitter medicaments, sugar substitutes (including artificial sweeteners), hydrophobic polymers (including lipids), or waxes. Granulation is a typical processing step used in the manufacturing of tablet dosage forms, particularly in the pharmaceutical industry. Because certain saliva-insoluble polymers may also serve as a binding agent, granules made from these polymers have reduced solubility in saliva and, as a result, the flavour of the product may be masking. Pharmaceutical granules that are flavor-masked and may be manufactured as dry syrup, solution, chewable tablet, or dispersible tablet, among other forms.²³

Adsorption

Adsorbents are often employed in conjunction with other types of flavour masking technology. As a consequence of the medication being adsorbed or entrapped in the matrix of the porous component, the bitter active may be released at a slower rate as it travels through the oral cavity, resulting in the masking of the bitter taste. In terms of bitter tasting pharmaceuticals, the adsorbate may be thought of as the less saliva soluble variants of these medications. In the process of adsorption, a solution of the medication is prepared and mixed with an insoluble powder that will absorb the medication. After removing the solvent, the resulting powder is dried and then used in the creation of the final dosage form. For the manufacture of adsorbates of bitter medicines, a variety of substrates such as veegum, bentonite, silica gel, and silicates may be utilised, among others.²⁴

Taste Suppressants and Potentiators

Lipoproteins are bitter taste blockers that are universally effective. Researchers discovered that lipoproteins made of phosphatidic acid and lactoglobulin inhibited the taste nerve responses to bitter compounds while having no effect on reactions to sugars, amino acids, salts, or acid in an animal model. Potentiators are substances that boost the perception of the flavour of sweets while masking the unpleasant aftertaste that follows. In order to reduce the unpleasant taste of a medication, cooling and warming chemicals expose taste receptors to intense sensations, which override the bitter taste and cause the brain to become confused. To accomplish flavour masking, a mixture of cooling and warming chemicals was shown to be an effective option.²⁵

Multiple Emulsions

The use of several emulsions to hide the taste of medications is a unique method. Multiple emulsions of the w/o/w or o/w/o type are vesicular systems in which active substances may be entrapped in the internal phase of the system. By passing through the 'membrane phase', the entrapped compounds may be moved from the internal to the exterior phases of their respective phases. This phase is responsible for controlling the discharge of the medication from the system. When it

comes to taste masking, several chloroquine emulsions are used in both w/o/w and o/w/o formulations.²⁶

Solid dispersion system

Historically, solid dispersion has been defined as the dispersion of one or more active substances in an inert carrier or matrix at a solid state, which has been created by the melting (fusion) solvent technique or the melting solvent method. Provision, polyethylene glycols of different molecular weights, urea, manifold, and ethyl cellulose are some of the carriers utilised in solid dispersion systems. Providence is a polyethylene glycol of varied molecular weights. Various approaches for preparation of solid dispersion are described below:

- i) Melting method: The medication or drug combination and a carrier are melted together in this process, which uses heat to accomplish this. When heated in an ice bath, the melting fluid cools and solidifies quickly as it is vigorously stirred. Crushing and pulverising are used to create the final solid bulk.
- ii) Solvent method: A common solvent is used to dissolve the active medication and carrier, which is then evaporated and the solid dispersion is recovered using this technique.
- iii) Melting solvent method: This approach incorporates medication solutions into molten polyethylene glycol at 70°C without removing the solvent.²⁷

Viscosity Enhancers

Suspending coated particles or microcapsules may not be effective enough to enable flavour masking of particularly bitter medicaments in liquid oral suspensions. Usage of viscosity enhancers in these instances would slow the migration of dissolved medicines from the surface of the solid particle to the suspending liquid. Additionally, they may also the interaction between the bitter medicament and the taste receptors, therefore boosting the total flavour masking efficiency. Hypromellose was utilised as a viscosity modifier in flavour disguised azelastine solution consisting of sucralose as the sweetening ingredient. Viscosity enhancers such as xanthan gum, microcrystalline cellulose, and sodium carboxymethylcellulose have been used in suspending vehicle to increase the flavour masking efficacy.²⁸

Liposomes

When disguising the unpleasant taste of a medicinal substance, the entrapment technique of choice is to entrap them in Liposomes. When it comes to drug delivery, liposomes are carrier molecules made of fatty acids that are most typically spherical in shape and have many layers of fatty acids. The medication or biological agent is transported inside the liposome molecule. In the mouth, oils, surfactants, polyalcohols, and lipids are useful in decreasing the contact time between the bitter medicament and the taste receptors,

hence increasing the overall effectiveness of the flavour masking agent in the mouth.²⁹

Effervescent Agents

In the oral administration of medications, effervescent agents have been found to be beneficial and advantageous. They have also been used as flavour masking agents for dosage forms that have not been dissolved in water prior to administration. A bitter medicament chewing gum formulation has been developed to deliver the medication to the mouth cavity for local administration or buccal absorption, depending on the application. Chewing gum is composed of a chewing base, an orally administrable medicament, a taste masking generator of carbon dioxide (and, optionally, a taste bud desensitising composition, such as benzocaine), and other non-active ingredients such as sweeteners, flavouring components, and fillers, among other things. Recently, effervescent tablets of fentanyl and prochlorperazine have been designed to deliver these medications to the oral cavity for absorption via the buccal, sublingual, and gingival mucosa, among other routes. The medicine is combined with an effervescent ingredient to aid in the absorption of the medication in the oral cavity while also masking the bitter taste of the medication. An additional pH-adjusting chemical was also incorporated in the fentanyl formulation to aid in the enhancement of absorption even more effectively.³⁰

APPLICATION OF TASTE MASKING

In recent years, a number of different formulations have been investigated for the creation of taste-masked oral pharmaceuticals. An especially large amount of effort has been put into the development of oral fast-disintegrating tablets, dry syrups, and liquid products that can inhibit bitter taste, which can be used in oral dosage forms for a wide variety of drugs that are administered to infants or elderly patients, in particular. For the purpose of developing more desired and appetising taste masked formulations, it may be necessary to combine taste changing using flavours, such as sweeteners, with taste masking via physical means. To present, the psychophysical assessment of pharmaceutical preparations by a taste panel is the most extensively used approach for determining the taste qualities of pharmaceutical preparations. Conventional chemical analyses, performed on the basis of release studies, have, on the other hand, been proved to be beneficial as auxiliary approaches.

New in-vitro taste evaluation equipment and procedures have been developed in recent years to aid in the screening and quality control of foods and beverages. BMTSSs, such as multichannel taste sensors or electronic tongues with global selectivity, have been warmly received by both medicinal research and industry. Taste-masking approaches that have

been proven effective in the formulation of APIs in syrups and soft-chew dosage forms can be applied to APIs in the thin film oral dosage form at taste-masking nanotechnology can be used to mask unpleasant tastes in pharmaceuticals and nutraceutical preparations, resulting in significant improvements in consumer acceptance, patient compliance, and user satisfaction.³¹

CONCLUSION

The application of medications must be done with care so that it does not interfere with the bioavailability of the drug. One may significantly increase product preference by using these strategies and doing a thorough study of the flavour masking impact on the product. Furthermore, the creation of taste masking methods requires a high level of technical expertise as well as a large amount of testing. Several tactics, including sensory, barrier, chemical, and complexity, have been used in an attempt to disguise the disagreeable taste of a formulation formulation. It is well acknowledged that palatability is a significant aspect in patient compliance, especially in youngsters, in whom the acceptance of a medication and, therefore, the ease with which it may be administered can be considerably influenced by taste.

CONFLICT OF INTEREST

No conflict of interest is declared.

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