

TASTE MASKING TECHNOLOGIES

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ABSTRACT

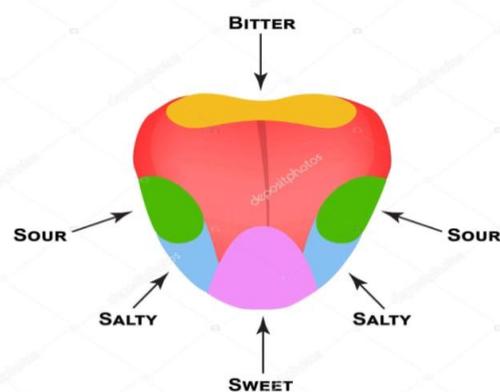
Taste is an valuable factor in establishment of dosage form. Unpleasant taste of dosage form is one of several important formulation problem that are encountered with certain drugs. According to year 2003 survey of pediatrician by association of pediatrics unpleasant taste was the biggest barrier for completing treatment in paediatrics. Test masking of abnoxious drugs has gained the important as the most of them are administered orally. By development of taste masking technology of dosage form characteristics is improve and good patient complies is achieved. The main objective of this review is.

INTRODUCTION

Taste is one of the most vital parameter governing patient compliance. Undesirable test is one of the several important method issue that are encountered with certain drugs. Oral administration of bitter drugs with an acceptable degree of palatability is key issue for health care providers, especially for paediatric patient. Due to disadvantage of medicine patient getting hussle in administration. so formulation with pleasant test would improve better patient compliance and therapeutic value for the patient. therefore test masking technology is used in formulation of pharmaceutical dosage forms. test masking is defined as perceived reduction of an undesirable taste that would otherwise exist. taste masking drug delivery research gaining is gaining importance for improving the quality of the treatment for pediatrics and geriatrics. There are various method like coating inclusion, inclusion complexes, microencapsulation, granulation, adsorption, product approach, addition of flavour and sweeteners, ion exchange resins are used for masking the taste of abnoxious drug. Taste masking by formation of inclusion complexes with cyclodextrins, test masking by making multiple emulsion, taste masking with gelatin, gelatinized starch liposomes, lecithin, surfactant salts or polymeric membrane. Avatab, microcaps, liquitard, kleptose, formulplex and formalcoat are the new taste masking technologies. One method is not suitable for taste masking all the abnoxious drugs. Evaluation of taste masking by electronic tongue recent innovation. The tate masked drug delivery research is gaining important for improving the quality of treatment of patient.

Types of taste and mechanism of taste-Taste is one of the five senses and is the ability to detect the flavour of substances such as food, certain minerals, and poisons, etc. It determines the selection of food, its palatability and stimulation of reflexes for secretion of saliva, gastric juices and pancreatic juices.^[1] The sensation of taste can be categorized into:

- Sweet (sugars, glycerol)
- Saltish (sodium)
- Sour (acidic substances)
- Bitter (quinine, nicotine)



Humans receive tastes through sensory organs, taste buds(gustatory calyculi) concentrated on the upper surface of the tongue.

Taste buds- Taste buds are the structures present primarily on the surface of tongue which contains chemosensory receptors known as taste buds.^[2] Taste

buds themselves consist of columnar cells arranged circumferentially to form a single "taste pore" between them and microvilli extending from the columnar cells arranged around this pore.

TASTE MASKING TECHNIQUES

Taste masking of medicine is mainly important in oral dosage forms, to enhance administration of the unpleasant drugs. There was some other purpose for masking the taste of medicine such as, to avoid the contamination of drug with other substances, environment, to avoid the incompatibility of the medicine, to avoid the loss of API, etc. There are various types of taste masking technologies:

1. Coating
2. Granulation
3. Sweeteners
4. Microencapsulation
5. Solid dispersion
6. Ion exchange resins
7. Prodrug Approach.

1) Coating- coating is one of the commonly used and effective method used in taste masking technologies. it is classified based on the type of coating material, coating solvent system and the number of coating layers.^[3] The lipid, polymer and sugars are used as coating material. these material can either be used alone or in combination, as a single or multilayer coat to achieve the test masking by aqueous or organic base coating process. Hydrophobic polymer have been popularly used for coating of bitter drugs than hydrophilic polymer to achieve taste masking. Lipids, oils, surfactant, polyalcohol effectively increase the viscosity in the mouth and coat the test buds, and therefore they are potentially test masking agent. Multilayer coating has been alone to overcome the coating imperfection in the coating solution of better test masking.^[4] Sugar or sweetness can be also involved in the coating solution of better taste masking. polymer are widely used for coating. Any non toxic polymer that is insoluble at pH 7.4 and soluble at acidic pH would be acceptable alternative for test masking. Water soluble polymer such as hydroxyl ethyl cellulose, acetate, etc. water insoluble polymer such as ethyl cellulose, polyvinyl acetate, etc. are used there are various type of polymer used for the taste masking technologies. Acidic compounds like citric acid and malic acid are used for creating acidic micro environment to promote the release of drug in upper intestine from the drugs particles coated with revers enteric polymer.^[5] Coating with hydrophilic vehicles is the simplest and most feasible option to achieve taste masking. The coating act as physical barrier to the drug particles, there by minimising interaction between the drug and taste buds specialised technique ie. micro emulsion technology has been used for test masking powder, chewable tablet and liquid suspensions.

2) Granulation- test masking of bitter taste drug can be masked by granulation process. granulation is commonly

used process in tablet production. In granulation process those polymer are insoluble in saliva thus the bitter test of drug can be masked. The test masked granules can also be formulated as chewable tablet and rapidly disintegrating tablets.^[6] The method comprises coating the drug core with separate layers of aqueous dispersion of the copolymer. granules of the invention could be used in the preparation of chewable tablet which has good palatability and bioavailability.^[7]

3) sweeteners and flavours- sweetness and addition of flavours are commonly used in combination with other taste masking technologies. this technique is foremost and the simplest approach for taste masking especially in the case of pediatric formulations, chewable tablet and liquid formulations.^[8] Sweeteners can be mixee with bitter taste medicaments to improve taste of core material which is prepared for further coating or may be added to the coating liquid. Taste masked lamivudine (antiretroviral drug) was prepared by using lemon, orange and coffee flavour.^[9] The unpleasant taste of certain formulation like mouth washes and cough drops containing medicinal and bitter tasting substances such as eucalyptus oil can be masked by the adding fenchone, bernoel or isoborneol.^[10] Sweeteners have been commonly used for the taste masking of pharmaceuticals. artificial sweetner such as sucralose, aspartme and saccharin have been used in combination with sugars, alcohol such as lactilol, maltilol and sorbitol to decrease the after taste perception of artificial sweeteners.

4) Microencapsulation- microencapsulation is a valuable technique applicable to protect material from volatilizing oxidation as well as their unpleasant taste.^[11] Microencapsulation process are commonly based on the principle of solvent extraction or evaporation. However modification of other technique such as phase separation and spray congealing is another method of microencapsulation. Microencapsulation is process in which the active moiety is coated with the polymeric material or film. microencapsulation can be an advantageous taste masking strategy for suspension due to the low particle size distribution of microencapsules that can be remain suspended for longer time.^[12] The technique can be efficiently use for applying level.

5) Solid Dispersion- Solid dispersion means the dispersion of one or more active ingredient in an inert solid carrier. solid dispersion of drug with the help of polymer sugar or other suitable agent is very useful for taste masking. Specific interaction between poorly soluble drugs and hydrophilic polymer can be increase solubility of drugs. Like wise specific interaction between the drug and the hydrophobic polymer might decreases the solubility of a drug.^[13] Cabrera (2005) developed the solid dispersion of quinolone and naphthryldone carboxylic acid is an insol8matrix to mask the taste of active ingredient. Solid dispersion was prepared from the solution of quinolone and the natural hydrophobic polymer shellac by solvent evaporation.^[14]

Hydrophobic polymer and long chain fatty acids have been used to achieve taste masking by solid dispersion. Natural polymer such as shellac and zein and enteric polymer like derivative of acrylic acid polymers and phthalate are good choices to develop the taste masked solid dispersion.

6) Ion Exchange Resins- Ion exchange resins are synthetic organic polymer inert in nature, consists of hydrocarbon chain to which insoluble groups are attached and they ability to exchange their labile iron present in the solution with which they are in contact.^[15] after ingestion the resinate exchange drug with the counter ion in gastrointestinal tract and the drug is eluted to be absorbed.^[16] Ion exchange resins like umberlite was used to formulate taste masked fast dissolving orally consumable films of dextromethorphan. Bitter testing deugs can be absorb onto ion exchange resins this effectively removing them from solution during the transit through the mouth at salivary pH 6.7, remains in intact form masking the drug unavailable for taste sensation. Various studies have revealed ion exchange resins are equally suitable for drug delivery technology.^[17]

7) Prodrug Approach- Chemically modified inert drug precursor which upon biotransformation liberties pharmacologically active parent compound. the simplest technique involves use of flavour in enhancer. Molecular geometry of the substance is important for taste receptor atoption reaction i.e. mechanism of taste. Hence if any alteration is done in molecular geometry. it lower the adsorption rate constant. Thus taste masking can be achieve through prodrug approach.^[18] Prodrugs include change in aqueous solubility increase lipophilicity, improve absorption, less side effect and change in membrane permeability, etc.

CONCLUSION

Taste masking of drugs has been challenge to the scientist. There are number of technology available which effectively mask the objectionable test of drugs. Selection of technology depends upon the bitterness of drugs and their compatibility with the taste masking agent. Test masking of bitter drugs has significantly improved the quality of treatment provided to suffering patients especially children. The development of taste masking methodology requires great technical skills and the need of massive experimentation.

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