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Research Article

Development of Taste Masking Strategies of Few Selected Bitter Drugs

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A B S T R A C T

Taste is an important factor in the development of dosage form. Many orally administered drugs elicite bitter taste. Palatability is an extremely important factor in ensuring the likelihood that the recipient will take medicine. Previously the attitude of "Worse the taste of medicine, better the cure" was observed, but now-a-days several approaches of masking the bitter taste have been developed. It includes adding sugars, flavors, sweeteners, use of lipoproteins, numbing taste buds, coating drug, microencapsulation, multiple emulsion, viscosity modifier, vesicles and liposomes, prodrug and salt formation, inclusion and molecular complexes, solid dispersion, application of Ion Exchange Resins (IERs).Taste masking becomes a prerequisite for bitter drugs to improve the patient compliance especially in the pediatric and geriatric population. Formulating or dispersible, melt in mouth, buccal tablet and other formulations which comes in contact with taste buds taste is one of critical factor to be consider. Masking the bitter taste of drugs is a potential tool for the improvement of patient compliance which intern decides the commercial success of the product.

Keyword: - Palatability, Orodispersible, Microencapsulation.

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INTRODUCTION

Flavors of drugs, food or drink is detected by sensation of taste. Palatability and patient compliance is a key parameter to be considered while formulation of oral dosage form [1]. Oral administration is the most accepted routes among multiple drug administration route due to its advantage such as easy, administered by self and painless which increases patient acceptance. The drug of poor palatable should focus mainly on enhancing the palatability [2]. Recent years have seen a rise in the need of acceptable palatability for bitter medications when administered orally, especially for pediatrics and geriatric patients. The combination of taste, smell, and, to a lesser extent, other sensory experiences is known as palatability [3].

There are many medications that contain bitter tasting active ingredients. The harshness of over-the-counter medications, such as cough and syrups, discourages patient adherence. One of the many significant formulation issues that some medications have unpleasant taste. The pharmacist is currently faced with the issue of unpleasant and bitter taste of medications [4]. ODT (Oral Disintegrating tablet) systems were created in the late 1970s to provide pediatric and geriatric patients who had trouble swallowing traditional oral solid dose forms with an alternative to tablets and capsules. The terms orodispersible tablets, mouth dissolving tablets, fast melt tablets, rapid dissolving tablets, and quick dissolving tablets are all used to refer to oral disintegrating tablets [5].The most popular techniques for taste masking include a variety of chemical and physical techniques that prevent the medication produced by taste receptor interaction. Use of taste enhancer is the simplest technique. Where these approaches fall short, more sophisticated approaches are used. The use of polymer coating, inclusion complex reaction, anesthetic drug complex, ion exchange resins, numersous emulsion, and solubility limiting approaches are only a few of the ways that have been identified for masking tastes [6]. The current review aims to provide a concise overview of both conventional and modern taste masking dosage form technologies, as well as different approaches to measuring the effectiveness of taste masking. To combat the drug's poor taste, two methods arefrequently used. The first involves lowering medication solubility in saliva, where it is important to strike a balance between lowered solubility and bioavailability. Altering the drug's

capacity to interact with taste receptors is an alternative strategy [7].

The fact that chemicals with various structural characteristics can produce a single bitter sensation indicates that various mechanisms are involved in the perception and transduction of bitterness. Some of these systems might be used to perceive both sweet and bitter tastes. Compounds that are bitter can become extraordinarily sweet or vice versa with minor modifications in their chemical structure. For instance, D-tryptophan tastes sweet while L-tryptophan is bitter. The interaction between bitter and sweet occurs at the neuronal level and can enhance or decrease one another's flavors in a solution. Individual differences in the ability to detect some bitter tastes are significant [8].

MATERIAL AND METHODS

Preparation of dicyclomine chloral suspension

Calculatedtherequiredquantityofeachingredientforthetotalamounttobe prepared.Accuratelyweightandmeasuredeachingredient.Requiredquantityofsucrosewasaddedto30mlwater.Inamortartookthe requiredquantityof Xanthumgum,tothis30mlwaterwasadded in a thin stream with trituration and kept a side for 10 min.TothisXanthumgum,theabovesucrosesolutionwasaddedfollowedbytheaddition of tween80 and methyparaben.Tothisglycerinwasaddedandmixwellfollowedbyadditionofflavor.FinallyDicyclomineHClmicrocapsuleswere addedandmixwelltopreparea suspension.

Evaluation of dicyclomine chloral suspension
Sedimentation

Sedimentationrateandvolumecanbecalculatedusingbelowformula

$$Vs = \frac{H_u}{H_o}$$

Particle Size Distribution

Usingopticalmicroscopecarriedoutparticlesizedistributionstudies.

Stability studies

Theselectedformulationswerepackedinwidemouthbottle.They werethenstored at 2.8±2 0C and 37±2^{0}C and 40±2^{0}C for 3 months humidity in chamber &environmental chamber and evaluated for their physical appearance and drug content as specified intervals of time. Even though stability is assured for 3 months, further studiesat different temperature and humidity conditions are needed to establish its self- life.

Rheology

The time needed for every suspension specimen to move through a 10 ml pipette wasdetermined and the evident thickness. The thickness (in balance) of the suspensions was mulled over utilizing BROOFIELD synchro electric viscometer.

Zeta potential

The time required for each suspension example to travel through a 10 ml pipette wasdetermined and the clear thickness.

Drug-Resin Complex

5% slurry of pitch was readied with DM water and permitted to swell for 45 min.A concentrated arrangement of medication was arranged independently. pH of the medication arrangement was acclimated to 7.5 to 8.0 by expansion of NaoH arrangement. The medication arrangement was included gradually and drop savvy to pitch slurry under consistent and moderate mixingcondition The blending was proceeded for 6 Hrs. to structuredrug–resinate complex. The medication resinate complex was kept overnight undisturbed. Siphon the supernatant and use it in the following group to structure sap slurry. Medication resinate complex framed was recuperated and utilized for further definition advancement. The different parameters, for example, D: R proportion, mixing time, blending pace, rate of expansion were changed to improve the detailing of medication resinate perplexing.

Characterization

Taste evaluation

Preliminary taste evaluation was performed by 3 human volunteers and final taste evaluation was performed by 10 human volunteers after development of finalformulation.

Free druga nalysis

The formulations were analyzed for free drug concentration. Supernatant thus obtained was analyzed titrimetrically using 0.004M SLS.

In-vitro release studies

In vitro discharge studies were done in two distinctive media. At first the discharge was mulled over in phosphate cradle of pH 6.8 for 5 moments lastly in 0.1N HCL for 90 min. suspension of medication resinate complexwas scattered in 25 ml of disintegration media in a 50ml measuring glass, specimens were withdrawn intermittentlyand examined titrimetrically as portrayedlong ago in the section.

SEM dissection

The shape and surface of medication gum complex were investigated by utilizingfiltering electron magnifying lens (SEM) with a 5 kv quickening voltage at 100x, 500x, and 1000x amplification.

Molecule size

Molecule size was dictated by Malvern Master Sizer.

DSC dissection

The DSC is exceptionally valuable examination in the framing of medication resinate complex. Warm investigation of examples was done by differential filtering calorimeter. The specimens (10 mg) set in aluminum dish and afterward fixed. The thermograms were acquired at an examining rate of 100c/moment over a temperature extend 40 to 3000c. In

the present examination, DSC thermogram of immaculate medication, thermogram of unadulterated tar Indion 204,physical mixture of medication and pitch Indion 204 in same proportion as in the definition and thermogram of medication resinate complex were taken.

RESULTS

Table 1: Optimization of D:R ratio and stirring speed

Batch no.	Drug: Resin Ra (w/w)	Stirring Time	Stirring Speed (rp	Rate Of addition (ml/min)	Taste	Free Drug (%)	Drug loading effic (%)
1	1:1	6	Moderate	1.5	Bitter	68.00	32.00
2	1:1.5	6	Moderate	1.5	Bitter	28.00	72.00
3	1:2	6	Moderate	1.5	V.LessBitter	12.18	87.82
4	1:2.5	6	Moderate	1.5	V.LessBitter	12.60	87.40
5	1:2	6	Slow	1.5	LessBitter	14.85	85.15
6	1:2	6	Moderate	1.5	V.LessBitter	12.50	87.50
7	1:2	6	Fast	1.5	LessBitter	15.55	84.45
8	1:2	6	Moderate	1.5	V.LessBitter	12.20	87.80

Table 2: Drug-resin ratio

Batch no.	Drug: Resin (w/w)	Stirring Time	Stirring Speed (r	Rate Of addition (ml/min)	Taste	Free Drug (%)	Drug loading effici
1	1:2	1	Moderate	1.5	bitter	54.90	43.10
2	1:2	2	Moderate	1.5	bitter	39.79	59.21
3	1:2	4	Moderate	1.5	Lessbitter	29.60	70.40
4	1:2	6	Moderate	1.5	Lessbitter	12.50	87.50
5	1:2	8	Moderate	1.5	Lessbitter	12.30	87.70
6	1:2	6	Moderate	2	Lessbitter	15.10	84.90
7	1:2	6	Moderate	1	Lessbitter	11.40	90.60
8	1:2	6	Moderate	0.5	Tasteless	6.00	94.00
9	1:2	6	Moderate	0.25	Tasteless	4.00	96.00

In vitro drug release study from drug-resin complex

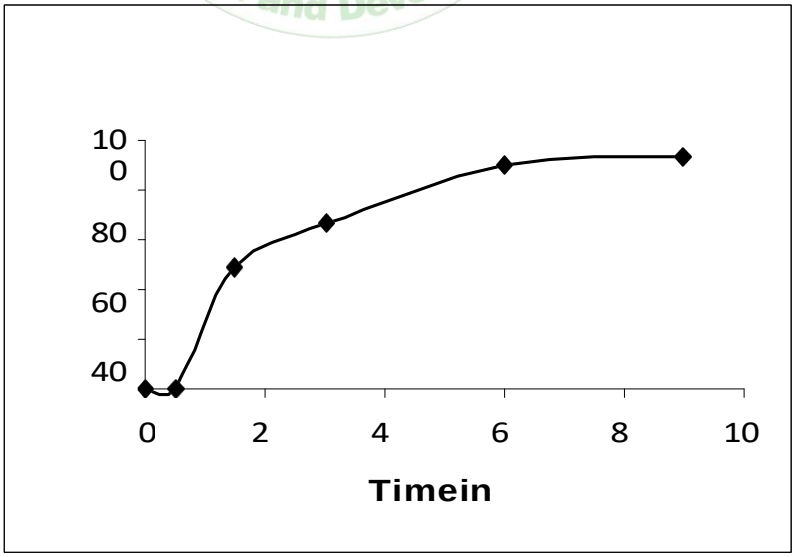

Figure 1: *Drug Release Study* in 0.1NHCl

Particle size

Particle size of the drug-resin complex was determined by Malvern Master sizer.

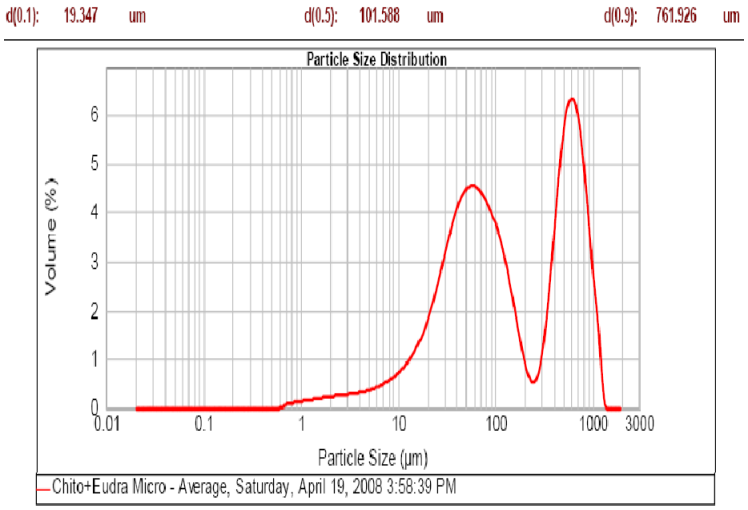

Figure 2: Particle size distribution of drug resin complex

SEM (scanning electron micros copy) analysis

The shape and surface of drug-resin complex were observed at100x, 500x, and 1000x magnification, which shows irregular shape and rough texture of drug-resin complexThe size of drug-resin complex was found to be 20-400µm.

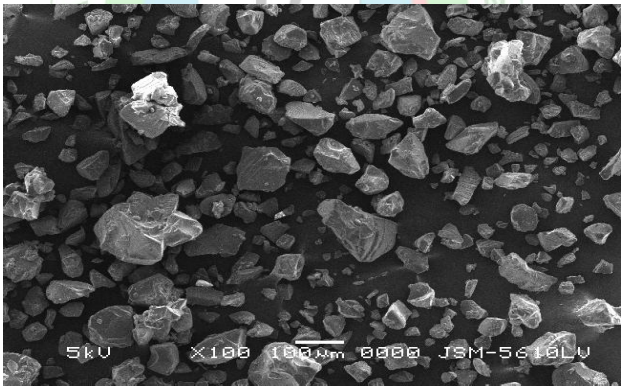

Figure 3: Drug Resin Complex At 100X

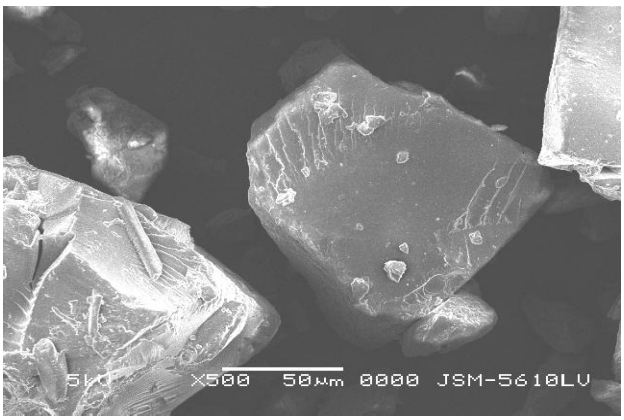

Figure 4: SEM of drug resin complex at 500X

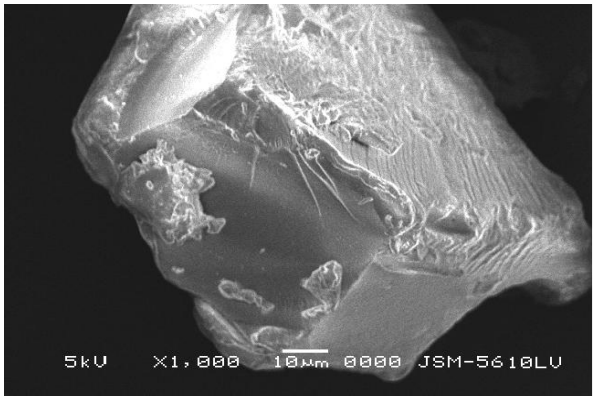

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Figure 5: Drug Resin Complex at 1000X

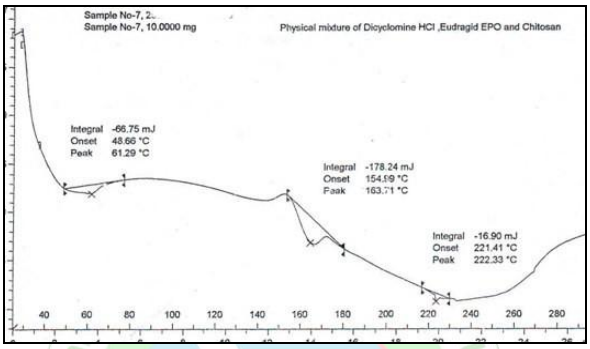

Figure 6: DSCofpure drug

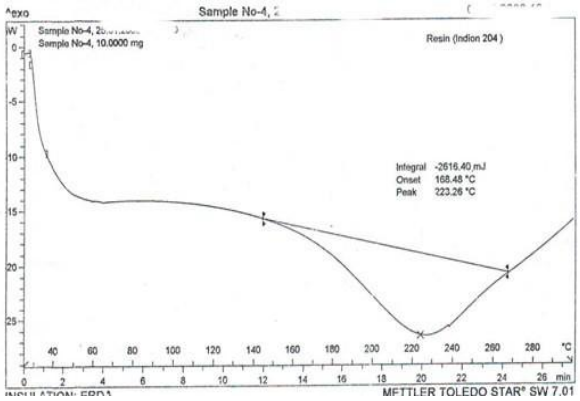

Figure 7*:* DSC of pure resin

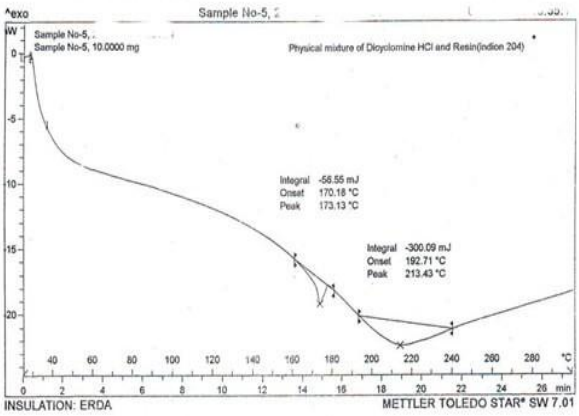

Figure 8: DSC of physical mixture of drug and resin

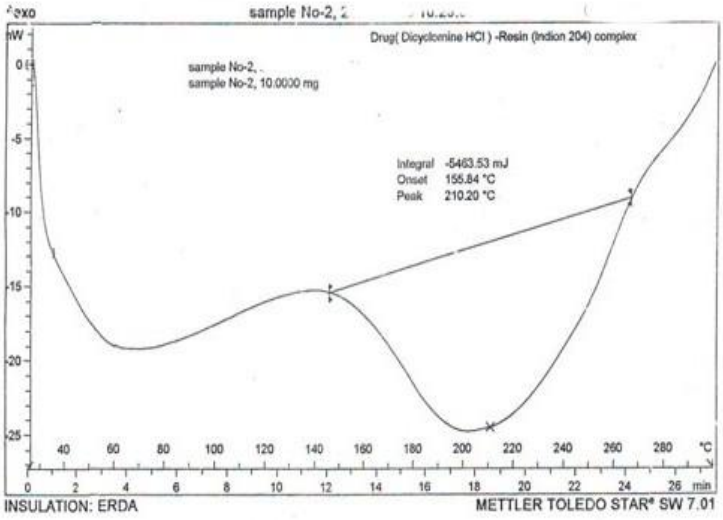

Figure 9: DSC of drug-resin complex

SUMMARY AND CONCLUSION

Indion gum 204 may be utilized for taste veiling of DH. The bland medication tar complex was acquired at Drug: gum degree 1:2, Stirring time 6Hrs, Rate of expansion (medication arrangement) to tar slurry 0.25ml/min and at moderate mixing rate. The medication gum complex did not discharge drug at ph of salivation in 5 min. anyhow discharged the medication in 90 moment at the pH of stomach. The upgraded plan was seen according to our unique configuration and consequently taken for advancement of last definition.

REFERENCES

1. SharmaS.,2010,TasteMaskingTechnologies:areview.IntJ.Pham .andPharma. Sci, 2(2): 6-13.
2. SwarbrikJ.,EncyclopediaofPharma.Tech..NewYork:MarcelDe ker,2002; 2053 – 2056
3. European Commission report on dietary food additive intake in the EU, October 2001; ref. COM (2001) 542 final (Annex V, table 2)
4. HillE.andFrostR,Sweetenercontentofcommonpediatricoralliqui d medications. American J. of Hos. Pharm. 1988; 45:135-42
5. DawsoneL.andNahataC.,Guidelinesforcompoundingoralmedic ationsfor pediatric patients. J. of Ph. Tech. 1991; (10) 168-175.
6. EncyclopediaofPharma.Tech.,3rdEdition,Flavoursandflavormo difiers– Thomas L.Reiland, John M.Lipari Pg 1763-1772
7. AncientScienceofLife,Vol.VIII,Nos.1.July1988,Pages38-40.
8. FuriaE.,Fenaroli'sHandbookofFlavourIngredients;Bellanca,N., Ed.;CRC Press: Cleveland, OH, 1971