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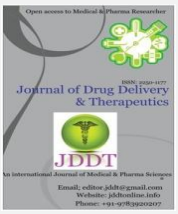

Open Access Research Article

FORMULATION AND OPTIMIZATION OF FAST DISSOLVING TABLETS OF PROMETHAZINE THEOCLATE USING 3^2 FACTORIAL DESIGNS

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ABSTRACT

The fast dissolving tablets of Promethazine Theoclate were prepared by sublimation technique**,** using 3^2 full factorial design. This research work aimed to study and to develop a unique drug delivery system for immediate release of drugs which can dissolve readily when placed in the oral cavity. The different subliming agents (Camphor, Urea and Menthol) in varying concentration (5-15% w/w) were used to develop the tablets. Total 12 formulations were prepared and evaluated for pre-compression and post compression characteristics. The optimization of the batches was carried out using 3^2 full factorial design and results of polynomial equation were analyzed using ANOVA and regression analysis. By the use of desirability approach final optimized formulation was prepared.

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INTRODUCTION:

Despite of tremendous innovations in drug delivery, the oral route remains the preferred route for administration of therapeutic agents because of accurate dosage, low cost therapy, self medication, non invasive method and ease of administration leading to high level of patient compliance. Pediatric patients may suffer from ingestion problems as a result of underdeveloped muscular and nervous control. Moreover, patients traveling with little or no access to water, limit utility of orally administered conventional tablets or capsules[1, 2].

The task of developing rapidly disintegrating tablets is accomplished by using a suitable diluents and Superdisintegrants. The Promethazine Theoclate is classified under anti-emetic drug category which undergoes extensive gastric and first pass metabolism via oral administration causing low bioavailability, thereby reducing the efficacy of controlling vomiting. Fast dissolving tablets of Promethazine Theoclate were designed for rapid and complete oral absorption for achieving a therapeutic success. Thus the objective of the work was to formulate and optimize mouth dissolving tablets of Promethazine Theoclate, having adequate mechanical strength, rapid disintegration and fast action. A3^2 full factorial design is applied for the optimization of the fast dissolving tablets.

MATERIALS AND METHODS:

Promethazine Theoclate was obtained from Cipla (Baddi, India), Menthol was obtained from S.D. Fine (Mumbai, India). Camphor and urea were obtained from LobaChem Pvt. Ltd., (Mumbai, India).

Preparation of Promethazine Theoclate Tablets by Sublimation Technique [2, 3, 4]

For preparation of fast dissolving tablets subliming agents (camphor, urea and menthol) were incorporated in varying concentration (5-15% w/w). All ingredients were co-grounded in glass pestle mortar. The mixed blends of excipients were compressed using a single punch machine to produce flat faced tablets weighing 100 mg. Tablets were subjected for drying for 6 h under vacuum (30 kpa) at 50º for sublimation to make tablets porous.

Evaluation

Precompression characterization: Bulk Density, Tapped Density, Compressibility index, Angle of repose and Hausners Ratio.

Post compression characterization

Friability, Wetting Time, *In Vitro*Dispersion time and Disintegration time

Table 1: Formulation by varying Subliming Agents

Ingredients	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10 *	F11 #	F12 $
PMT	6	6	6	6	6	6	6	6	6	6	6	6
Camphor	5	10	15							5	10	15
Menthol				5	10	15						
Urea							5	10	15			
Crospovidone										2	2	2
Avicel PH102	45	40	35	45	40	35	45	40	35	43	38	33
Dextrose	20	20	20	20	20	20	20	20	20	20	20	20
Lactose monohydrate	20	20	20	20	20	20	20	20	20	20	20	20
Talc	2	2	2	2	2	2	2	2	2	2	2	2
Magnesium stearate	2	2	2	2	2	2	2	2	2	2	2	2

Preparation of Factorial Design Batches

The raw materials were passed through a no. 100 screen prior to mixing. Promethazine Theoclate, Crospovidone, Camphor, urea, Avicel and lactose were mixed using a glass mortar and pestle. The blends were lubricated with 2% w/w Talc and 2% w/w Magnesium Stearate. The blends ready for compression were converted into tablets using a single-punch tablet machine. The composition of the factorial design batches is shown in Table 2 respectively.

RESULTS AND DISCUSSION:

The fast dissolving tablets of Promethazine Theoclate were successfully prepared by sublimation technology. Total twelve formulations were prepared and optimized using 3^2 full factorial design; that after the ANOVA was applied and the formulations showed the significant model. Using the desirability approach the final optimized formulation was prepared with the targeted results.

Table 2: Optimized Formulation (PMT)

Formulation	OPT
Promethazine Theoclate	6
Camphor	10.62
Crospovidone	2.59
Lacotse Monohydrate	20
Avicel PH 102	36.79
Dextrose	20
Talc	2.00
Magnesium Stearate	2.00
Evaluation	
Weight (mg)	98.014±2.225
Hardness (kg/ cm^2)	3.8±0.135
Friability (%)	0.480±0.028
Disintegration time (s)	28±2.01
Wetting time (s)	22±1.98
Drug Content (%)	97.35±2.325

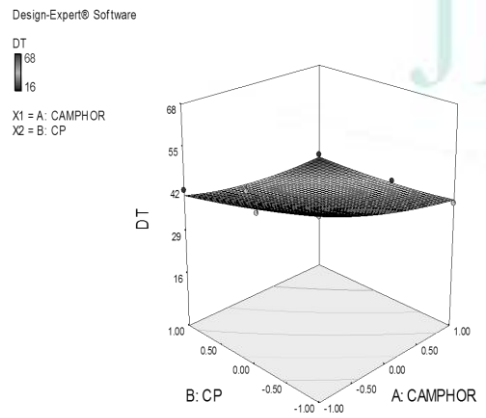

Figure 1. Response Surface for Disintegration Time

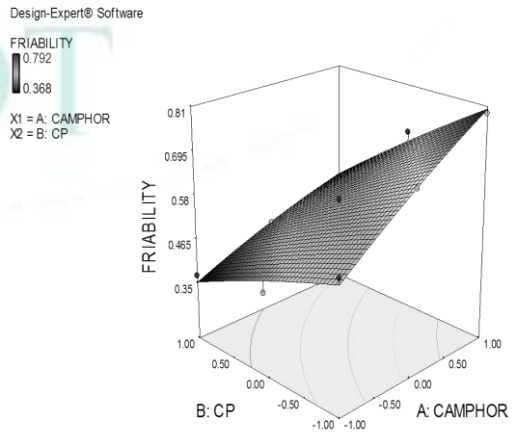

Figure 2. Response Surface for Friability

CONCLUSION:

The results of a 3^2 full factorial design revealed that the amount of Camphor and Crospovidonesignificantly affect the dependent variables, disintegration time, andpercentage friability. It is thus concluded that by adopting a systematic formulationapproach, an optimum point can be reached in the shortest time with minimum efforts.

REFERENCES:

1. Garg A, Gupta M, Mouth dissolving tablets: a review. Journal of Drug Delivery and Therapeutics, 2013; 3(2):207-214. doi:10.22270/jddt.v3i2.458
2. Garg A, Gupta M, Taste masking and formulation development & evaluation of mouth dissolving tablets of levocetrizine dihydrochloride. Journal of Drug Delivery and Therapeutics, 2013; 3(3):123-130. doi:10.22270/jddt.v3i3.514
3. Mishra DN, Vijaya KSG, Rapidly disintegrating oral tablets of meloxicam, Indian Drugs, 2006, 43, 117-121.
4. Zhao N, Augsburger LL, Functionally compression of 3 classes of superdisintegrants in promoting aspirin tablet disintegration and dissolution, AAPS PharmSciTech, 2005, 6, 634-640.
5. Khan S, Kataria P, Nakhat P, Yeole P, Taste masking of ondansetron hydrochloride by polymer carrier system and formulation of rapid-disintegrating tablets, AAPS PharmSciTech, 2007,8, E1-E7.
6. Sreenivas SA, Gadad AP, Dandagi PM, Mastiholimath VS, Patil MB, Formulation and evaluation of ondansetron hydrochloride directly compressed mouth disintegrating tablets, Indian Drugs, 2006, 43, 35-38.