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Formulation Design and Evaluation of Anti-inflammatory Fast Dissolving Tablet

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ABSTRACT

ORIGINAL RESEARCH ARTICLE

For many years, the oral medication delivery system has been widely raised due to its increased use as the most effective route of administration among all the drug delivery methods that have been investigated. Fast Dissolving Tablets in many forms and quantities that are not limited. Because of the long-held notion that drug taken orally is still absorbed through daily food consumption, the oral route's for its success can also be largely attributable to its direct delivery. The main focus is to develop and characterize fast mouth dissolving tablet of Meloxicam which disintegrates in the oral cavity.

INTRODUCTION

Recent advances in novel drug delivery (NDDS) aims to enhance safety and efficacy of drug molecule by formulating a convenient dosage form for ease of administration and to achieve better patient compliance. The tablet is the most widely used dosage form because of its convenience in terms of self-administration; accurate dosage and pain avoidance. But there are certain problems with conventional tablets dosage forms like difficulty to swallow. Oral routes of drug administration have broad acceptance up to 50-60% of the total dosage forms. Solid dosage forms are popular because of the comfort in administration, accurate dosage, self- medication, pain avoidance and most importantly the patient compliance. [1] Fast dissolving drug delivery system first developed in the 1970s as a substitute to conventional dosage forms for the geriatric and pediatric patients. These tablets are created or designed to dissolve or disintegrate rapidly in the saliva generally less than 60 seconds. A fast-disintegrating drug delivery system, in most cases, is a tablet that dissolves or disintegrates in the oral cavity without the need of water or chewing. Most fast-disintegrating delivery system films must include substances to mask the taste of the active ingredient. This masked active ingredient is then swallowed by the patient's saliva along with the soluble and insoluble excipients. Recent advances in novel drug delivery system aims to enhance safety and efficacy of drug molecule by formulating a convenient dosage form for administration and to achieve patient compliance. Most of the time inconvenience of administration results in high incidence of noncompliance and ineffective drug therapy. [2-3] In this study, the development of fast dissolving tablet of Meloxicam. The main focus is to develop and characterize fast mouth dissolving tablet of Meloxicam which disintegrates in the oral cavity in a matter of seconds without need of water. This will help in the easy swallowing, thereby increasing the bioavailability.

EXPERIMENTAL WORK

Identification of Meloxicam

In the preparation of fast dissolving tablet, drug and excipients many interact as there are in close content which each other, which could lead to the instability of drug. Preformulation studies

regarding the drug and excipients interaction are therefore varying critical in selecting appropriate excipients .The pure drug and the drugs with excipients were scanned separately.

Physiochemical characteristics

Melting point: The melting point of pure drug of Meloxicam was determined.

Solubility: Solubility drug was checked by dissolving them different solvent.

Formulation of Tablets by Direct compression method

Five different batches of tablets prepared by direct compression method. The term direct compression method is used to define the process by which tablet are compressed directly from the power blends of ingredient and suitable excipients, which will flow uniformly in the die cavity and from a film compact. Power of drug were mixed with super disintegrated, MCC as diluents aspartame as, talc as gliding & magnesium stearate as lubricant. All ingredients were passed through mesh#60then compress tablet at an average weight of 15mg/tablet. [4-5]

Table 1 Composition of fast dissolving tablet of Meloxicam

Ingredients (mg)	Formulation codes				
	MLX1	MLX2	MLX3	MLX4	MLX5
Meloxicam	15	15	15	15	15
Crosspovidone	55	50	55	50	55
Sodium starch glycolate	50	55	60	65	70
Microcrystalline cellulose	90	80	80	90	80
Lactose	30	25	20	15	15
Talc	2.0	2.0	2.5	2.0	2.5
Mg. Stearate	2.5	2.5	2.5	2.5	2.5

Evaluation Parameters [6-8]

Bulk density

Both loose bulk density(LBD) and tapped bulk density (TBD) were determined .The accurate weighed amount sample taken in 50ml measuring cylinder measured the volume of parking and tapped 50 time on plane surface and tapped volume of packing recorded

Angle of repose

The frictional forces in loose powder or granules can be measured by the angle of response. This is the maximum angle possible between the surface of a pile of powder or granules and the horizontal plan.

Thickness uniformity

The aim of the present study was to check the uniformity of thickness of the formulation tablet. The thickness of the tablet was measured at 3diffenert point using a digital caliper and average thickness of three reading was calculated.

Hardness test

Hardness indicates the ability of tablet to withstand mechanical shocks while handling the hardness of the tablet was determined using Monsanto hardness tester it is expressed in kg/cm^2. The mean and SD value were also calculated.

Friability test

Friability test is performed to assess the effect of friction and shocks, which may offer cause tablet to chip, cap or break. Roche Friabilator was used for the purpose. Pre weight sample of ten tablet were placed in the friabilator, which was then operated for 100 revolutions.

Friability (%) = (Initialweight – Final weight / Initial weight)×100

RESULTS AND DISCUSSION

The Fast Dissolving Tablets have potential advantages over conventional dosage forms, with their improved patient compliance; convenience bioavailability and rapid onset of action had drawn the attention of many manufacturers over a decade. compression tablets includes co increase in the solubility due to the reduction in the effective particle size of the drug following increase in the wetting of drug particle Dissolving

Tablet formulation obtained by some of these technologies has sufficient strength quick disintegration / dissolution in the mouth without water In conclusion, MLX2 shows best results in terms of selected evaluation parameters.

Table 2 Evaluation parameters

Formulation code	MLX1	MLX2	MLX3	MLX4	MLX5
Bulk Density (gm/cm³)	0.80	0.78	0.65	0.62	0.65
Tapped Density (gm/cm³)	0.86	0.85	0.72	0.64	0.72
Angle of Repose (θ˚)	25.31	24.40	26.32	23.28	25.14
Compressibility Index%	11.83	12.14	10.34	13.25	12.26

Table 3- Post compression parameter of different formulations

Formulation code	MLX1	MLX2	MLX3	MLX4	MLX5
Thickness(mm)(n=3)	2.6±0.03	2.7±0.01	27.±0.02	2.6±0.03	2.7±0.01
Hardness(n=3)(kg/cm³	3.4±0.25	3.8±0.27	3.5±0.26	3.7±0.25	3.8±0.24
Friability (%)(n=10)	0.52	0.42	0.42	0.43	0.44

CONCLUSION

Formulation development method is simple, rapid, accurate, precise, economical, specific and reproducible for the qualitative and quantitative determine of Meloxicam with good resolution in short time and high sensitivity. It was concluded that developed method offers advantage such as rapidity and sample preparation step, improved sensitivity make it specific and reliable for its intended use. This method can be applied so analysis of pharmaceutical dosage forms.

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