Design, Preparation and Evaluation of Taste-Masked Dexketoprofen of Orally Disintegrating Tablet By Using QbD Approach

, Yagmur Pirincci Tok[a], Burcu Mesut[a,*] Yıldız Özsoy[a],
[a] Pharmaceutical Technology Department, Faculty of Pharmacy, Istanbul University, Istanbul, Turkey
*E-mail: bmesut@istanbul.edu.tr

Introduction

Dexketoprofen is an (S) + enantiomer of bitter taste[1] ketoprofen that is member of arylpropionic acid groups of NSAID. Ketoprofen is one of the racemic drugs owing to its chiral center and exists together equilly with S(+) and R(-) enantiomers. However, only the (S)- enantiomer shows COX-inhibitory activity by this way offers analgesic and antiinflammatory activity over several cases such as rheumatoid arthritis, osteoarthritis, and mild to moderate pain from a variety of causes.With using of only the pure S - enantiomer dexketoprofen, the patient's xenobiotic exposure, the metabolic and renal load may be decreased thereby the benefit: risk ratio may be increased [2].

Orally disintegrating tablets (ODTs) disintegrate fast when encountered with the saliva in mouth. In recent years, ODTs are getting importance and popularity owing to their numerous advantages such as; avoiding hepatic metabolism via pregastric absorption, better stability, ease of administration, dosage, and enhanced patient compliance for diffuculty in swallowing.[3]

Materials & Methods

Bitter-taste active pharmacological ingredients (APIs) should involve taste masking approach [4]. For this purpose, the bitter taste dexketoprofen particles were coated pH-dependent methacrylates polymer in which one of the methods of taste-masking as a taste-masking agent.

Table 1. Independent variable

Independent variables, factor	Levels		
	Low (-1)	Midle(0)	High(1)
X1: Prosolv® ODT G2	150	200	250
X2: Emdex®	100	150	200
X3: Aroma	0,02%	0,13%	0,24%
X4: Tablet pressing force	250	500	750

- The experimental design was enforced with four-factor three-level Box-Behnken method within the framework of response surface modeling (RSM).

The independent factors were high functionality excipient/ excipient matrix/ready-to use matrix excipient (Prosolv® ODT G2) (X1), dextrates (Emdex®) (X2), aroma (X3), and tablet pressing force (X4) and were assessed on four dependent factors such as dissolution rate, disintegration time, tablet hardness, and friability.

This study is designed as 2 series using taste-masking agent both of concentration low and high separately thus is comprised of 54 particular formulations.

Results & Discussions

When tablet pressing force is applied as 250 PSI, the tablets disintegrate below 1 minute and friability value's is under 1%.

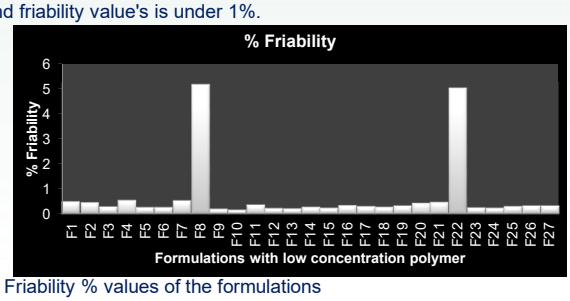


Figure 1. Friability % values of the formulations

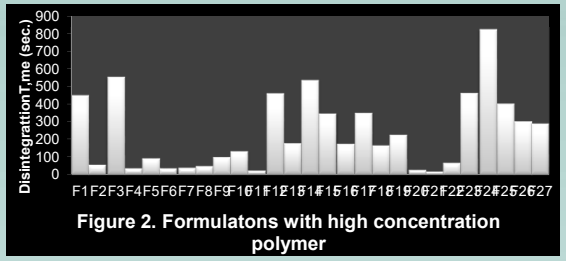


Figure 2. Formulatons with high concentration polymer

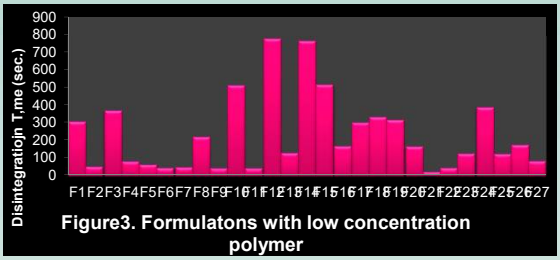
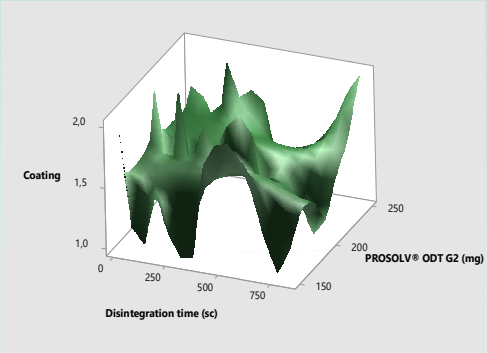


Figure3. Formulatons with low concentration polymer



- Disintegration time increases as the coating thickness increases.

Figure 4. Coating and Prosolv amount effect on Disintegration time 3D plot graphic

Conclusion

It was observed engrossingly that amount of aroma and thickness of coating had an impact on disintegration time. However it was concluded that QbD study helped in optimizing material and process variables impacting the dissolution rate, disintegration time, tablet hardness and friability of Dexketoprofen orally disintegrating tablet (ODT) finished product.

References

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[3] Guhmann M, Preis M, Gerber F, Ilinger N, Breitkreutz J, Weitschies W. Design, development and in-vitro evaluation of diclofenac taste-masked orodispersible tablet formulations.(2014) ***Drug Dev Ind Pharm***.; 41(4): 540-551.

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