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Effect of Particle size on Dissolution of Tablet Dosage Form

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ABSTRACT:

In current research a simple experimental principle for relationship between compression force and disintegration time has been tried to established. A simple formulation with directly compressible ingredient was used for this purpose. Ferrous sulphate tablets were prepared using directly compressible binder-microcrystalline cellulose. While making tablets, variation were made in applying force for compression. Resulting different batches were evaluated for disintegration time testing. The result clearly proved the said principle.

KEY WORDS: Compression force, direct compression, disintegration time, ferrous sulphate tablets

INTRODUCTION:

Tablet is a compressed solid dosage form containing active drug substance(s), with or without excipient(s). Tablets are usually solid, flat or biconvex dishes, unit dosage form, prepared by compressing a drugs or a mixture of drugs, with or without diluents.

TABLET COMPRESSION: After the preparation of granules (in case of wet granulation) or sized slugs (in case of dry granulation) or mixing of ingredients (in case of direct compression), they are compressed to get final product. Therefore, compression is one of the most important steps in tablet manufacturing process.

COMPRESSION FORCES:

Compression forces are applied during the compression of powders/ granules to get the final product. Pressure in the range of 300 to 3000kg/cm2 is usual for tablet presses. Tablet parameters can be varied for different types of tablet presses as they maintain various compression forces[1].

The force exerted on the powder/ granule in the dies is, therefore, should very carefully be controlled to ensure that each tablet is perfectly formed within the specification.

In general, the greater the pressure applied, the harder the tablets. Some tablets, which are intended to dissolve slowly, are intentionally made hard by using high compression forces. Other tablets, such as those for immediate drug release, are made soft by ss using low compression forces[2].

TABLET DISINTEGRATION TIME:

Tablet disintegration is the first step for a drug to become bio available. The tablet must first disintegrate and discharge the drug to the body fluids. The drug in the disintegrated tablets must be dissolved in the fluid to be absorbed into the blood stream[3].

METHODOLOGY:

All ingredients were accurately weighed. All the ingredients were transferred in to mortar, mixed well until a homogeneous blend was formed; then passed that powder blend through sieve no #60 to obtain uniform blend. Formula for the same has been provided in table number 1.

Using blend tablets were prepared by adjusting thickness knob in tablet punching machine. Deferent set of tablets were prepared using same blend but at four possible thickness adjustment.

Table 1 Formulation for ditect compression

Formulation code	1 Tablet (mg)	50 Tablet(mg)
Ferrous sulphate	200	10,000
Starch	30	1500
Microcrystalline cellulose	250	7500
Talc	(1%) 4.8	240
Aerosil	(0.5%) 2.4	120
Magnesium stearate	(1%) 4.8	240
Ferric oxide	q.s.	q.s.

Using variation in thickness our goal of applying different compression force was achieved. Separately prepared tablet having different thickness were evaluated based on disintegration test as per Indian Pharmacopeia[3]. Results are depicted in result section.

RESULT AND DISCUSSION:

Pre-formulation evaluation parameters:

Angle of repose, Carr's index, Haussner's ratio were performed. Results for Angle of repose, Carr's index, Haussner's ratio are depicted in table number 2. Excellent angle of repose, Fair carr's index and fair hausner's ratio were obtained.

Table 2 results of pre-formulation parameter

PARAMETERS	LIMITS	OBSERVATION
Angle of repose	25-30	26.56
carr's index	16-20	18.75
Hausner's ratio	1.19-1.25	1.25

Post-formulation evaluation parameters:

Disintegration test was performed as per Indian Pharmacopeia for tablets having achieved different thickness due to different compression force. Lesser thickness if more compression and vice versa. Thickness of all four batches and corresponding time to disintegrate are depicted in table 3.

Table 3 Thickness and corresponding D.T.

Disintegration time of	Thickness	Time for disintegration (min), n=3
Batch1	0.5mm	2:47±0.160
Batch 2	1.0mm	2:17±0.349
Batch 3	1.5mm	1:17±0.284
Batch 4	2.0mm	1:00±0.361

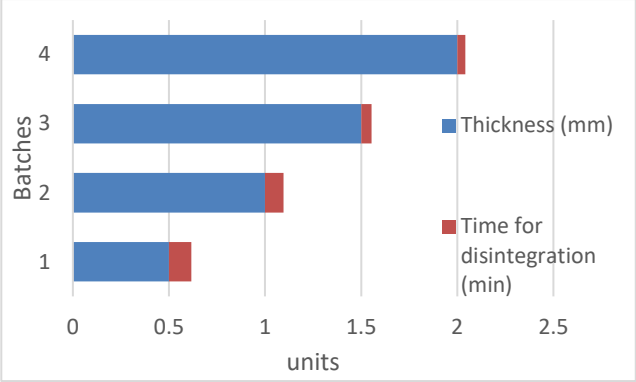

Figure 1 Thickness vs disintegration time

From table 3 and figure 1 it is very much clear in preparation of ferrous sulphate tablets using direct compression force; as compression increases, time to disintegrate tablets will also increase. Thus here by it is concluded that compression force has direct relationship on tablet disintegration.

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REFERENCES:

1. SHIPAR M. A. H., WADHWA A., VARUGHESE C., KAUR N., THAYAPARAN N. Effect of compression force on tablet hardness and disintegration time. MT13-3. Toronto Institute of Pharmaceutical Technology, 2013 – 2014
2. Hill PM. Effect of compression force and corn starch on tablet disintegration time. Journal of pharmaceutical sciences. 1976 Nov;65(11):1694-7
3. Indian Pharmacopoeia. Ministry of health and family welfare. Government of India. 1996; 2:350.