

## EFFECT OF SLUGGING PRESSURE ON THE PROPERTIES OF GRANULES AND TABLETS PREPARED FROM POTASSIUM PHENETHICILLIN

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Slugging is one of the oldest and most widely used processes for tableting high dose moisture sensitive drugs. Although both wet granulation and direct compression are well researched, the slugging process has received little or no attention. The role of pre-compression and subsequent size reduction, to improve compaction of poorly compressible drugs, is not yet clearly understood.

The object of this investigation was to examine the effect of certain processing factors on the properties of granules and tablets produced by slugging a high dose, moisture sensitive penicillin: potassium phenethicillin (Broxil). The slugging pressure was optimised by making slugs at various pressures, using both single and double slugging systems. The slugs were then reduced to granules using an Apex comminuting mill and the effect of both hammers and knives forward on granule and tablet properties was examined.

The following granule properties were studied: bulk and tapped density, friability, particle size distribution and true density. The granules were tableted at four pressures, each tablet containing 125mg of phenethicillin and the following tablet properties were studied: weight variation, porosity, disintegration time, dissolution time, crushing strength and friability. The surface area and scanning electron micrographs of some selected granules and tablets were also examined. The reproducibility of results using two batches of potassium phenethicillin was also compared.

The results showed that granules obtained from slugs made at lower pressure had better compressibility than those obtained from slugs made at higher pressure. The effect for example of slugging pressure on the crushing strength/pressure profiles of tablets in a single slugged system, is shown in Figure 1.

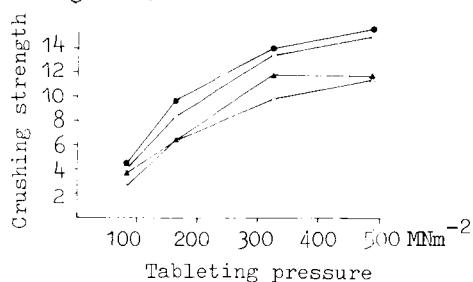


Fig. 1; Effect of tableting pressures on the crushing strengths of potassium phenethicillin tablets prepared from a formulation, single slugged at four pressures (Apex milled, hammers forward)

Key for slugging pressures (MNm<sup>-2</sup>)  
 ● 49 ○ 98 ▲ 147 △ 196

A similar relationship was observed for double slugged granules. The granules obtained from slugs compacted at lower pressure were more porous and friable than those obtained from slugs compacted at higher pressures. It is suggested that the former yielded to a greater degree on tableting, producing stronger particle to particle bonds, which resulted in tablets of higher crushing strengths. The study demonstrated the importance of optimising slugging conditions for producing tablets of desirable properties.

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