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A Short Note on Preparation Methods Involved in Tablet Dosage Form

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INTRODUCTION

Tablets are one of the most commonly used dosage forms in modern medicine. They provide a convenient and effective way to administer medications, offering accurate dosing and ease of handling. The preparation of tablet formulations requires a series of carefully orchestrated steps to ensure the accurate delivery of active pharmaceutical ingredients and the production of high-quality tablets. In this article, we will explore the essential preparation methods involved in the manufacturing of tablet dosage forms.

Before tablet production begins, preformulation studies are conducted to evaluate the physicochemical properties of the API. This involves analyzing its solubility, stability, particle size, and compatibility with excipients [1]. These studies provide crucial information that guides the formulation process and ensures the stability and efficacy of the final tablet product.

DESCRIPTION

Granulation is a key step in tablet manufacturing that involves the formation of granules from the API and excipients. There are 2 primary methods of granulation. Wet Granulation-In this method, the API and excipients are mixed and wetted with a binder solution to form a damp mass. The mass is then passed through a granulator to break down aggregates and create granules of a desired size [2]. Wet granulation enhances powder flow, improves compressibility, and ensures uniform drug distribution.

Dry Granulation, also known as slugging, involves compacting the API and excipients into large tablets or slugs. The slugs are then crushed and screened to obtain granules. This method is preferred when the API is sensitive to moisture or heat, or when the use of solvents is not desirable. After granulation, the obtained granules are blended with additional excipients, including diluents, binders, lubricants, and disintegrants. The blending process ensures uniform distribution of the API and excipients, providing consistent drug content in each tablet [3]. The blended mixture is typically passed through a sieve to break down any lumps and achieve homogeneity.

Compression is the process of converting the granulated and blended mixture into tablet form. It involves filling the powder mixture into a tablet press, which applies high pressure to compact the material and form tablets of a desired size, shape, and hardness. Different types of tablet presses, including single punch and rotary tablet presses, are utilized based on the production scale and requirements. Throughout the tablet manufacturing process, rigorous quality control measures are implemented to ensure the production of safe and effective tablets. Quality control involves various tests and inspections, such as checking the weight, thickness, hardness, friability, and disintegration time of tablets [4]. Dissolution testing is also performed to evaluate the release of the API from the tablet and assess its bioavailability.

CONCLUSION

The preparation methods involved in tablet dosage form manufacturing are a complex and systematic process that requires attention to detail, adherence to Good Manufacturing Practices (GMP), and continuous quality control. From granulation to blending, compression, and coating, each step contributes to the development of tablets with accurate dosing, optimal drug release, and acceptable physical characteristics. By employing these preparation methods, pharmaceutical manufacturers can produce high-quality tablets that ensure patient compliance, therapeutic efficacy, and overall safety in medication administration.

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CONFLICT OF INTEREST

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