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Formulation and Evaluation of NSAIDs Drugs

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Abstract: *The present study focuses on the **formulation and evaluation of paracetamol tablets** using the **wet granulation method**. Paracetamol, also known as acetaminophen, is one of the most commonly used over-the-counter drugs for its analgesic and antipyretic properties. Its widespread use necessitates the development of a stable and effective oral dosage form that ensures therapeutic efficacy and patient safety. The formulation process involved the use of excipients such as starch, lactose, polyvinylpyrrolidone (PVP K30), talc, and magnesium stearate. The tablets were prepared using the wet granulation technique, which improves flow properties and compressibility of the powder blend, ultimately leading to better tablet quality. The results demonstrated that all evaluated parameters were within acceptable limits. The disintegration time was within 5 minutes, hardness ranged between 4–6 kg/cm², friability was below 1%, and drug content was within the range of 95–105%. The in-vitro drug release studies showed more than 85% drug release within 30 minutes, indicating effective drug availability.*

Keywords: paracetamol tablets

I. INTRODUCTION

The development of oral solid dosage forms remains a cornerstone in modern pharmaceutical technology. Among them, tablets are the most commonly used and widely accepted form due to their ease of administration, precise dosing, stability, portability, and cost-effectiveness. Tablet formulation involves a thorough understanding of pharmaceutical excipients, processing techniques, and quality assurance measures to produce a safe and efficacious product.

Paracetamol, also known as acetaminophen, is one of the most widely used over-the-counter (OTC) analgesic and antipyretic agents. It is used for the relief of fever, headache, muscle aches, arthritis, backache, toothaches, and colds. It has a good safety profile when used at therapeutic doses but is hepatotoxic in overdose conditions. Due to its widespread use, it is essential to formulate paracetamol tablets with consistent quality to ensure therapeutic efficacy and patient safety.

The selection of appropriate excipients such as binders, disintegrants, diluents, and lubricants is critical in ensuring the stability and performance of the final product. The physical and chemical evaluation of both granules and tablets is essential to ensure they meet pharmacopeial quality standards, including parameters like hardness, friability, disintegration time, drug content uniformity, and in-vitro dissolution.

This thesis is designed to systematically investigate the formulation of paracetamol tablets using wet granulation and evaluate them based on key quality parameters. The results will offer insights into the formulation factors affecting tablet quality and serve as a basis for scaling up the manufacturing process in the pharmaceutical industry.

II. LITERATURE REVIEW

Paracetamol, also known as acetaminophen, is a widely used over-the-counter medication. It is used to treat fever and mild to moderate pain. Paracetamol is typically considered safe when taken at recommended doses. However, it is hepatotoxic in overdose situations. Pharmaceutical tablet formulation is a complex process that requires consideration of drug-excipient compatibility, granulation, compression characteristics, and release profile. Paracetamol, also known as acetaminophen, is a widely used over-the-counter medication. It is used to treat fever and mild to moderate pain. Paracetamol is typically considered safe when taken at recommended doses. However, it is hepatotoxic in overdose situations. Pharmaceutical tablet formulation is a complex process that requires consideration of drug-excipient compatibility, granulation, compression characteristics, and release profile. Paracetamol, also known as acetaminophen,

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III. DRUG PROFILE

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IV. AIM AND OBJECTIVES

AIM: TO FORMULATION AND EVALUATION OF NSAID DRUGS (PARACETEMOL)

OBJECTIVES:

- To develop a stable and effective tablet formulation of paracetamol
- Selecting appropriate excipients (binders, disintegrants, diluents, and lubricants)
- Ensuring compatibility of drug and excipients
- To prepare granules of paracetamol using the wet granulation method
- Formulating granules with improved flow and compressibility characteristics
- To compress the granules into tablets using a rotary tablet press
- Optimizing machine settings to maintain uniformity in tablet size, weight, and hardness
- To evaluate the pre-compression parameters of granules, such as:
- Bulk density and tapped density
- Angle of repose
- Carr's Index and Hausner's ratio
- To perform post-compression evaluation of the formulated tablets, including:
- Weight variation
- Thickness and diameter
- Hardness and friability

V. MATERIALS AND METHODS

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PREFORMULATION STUDIES

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FORMULATION DEVELOPMENT

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EVALUATION PARAMETERS

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VI. RESULTS AND DISCUSSION

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