

The logo of Galgotias University is a circular emblem with three overlapping, curved bands in shades of yellow, blue, and red, creating a sense of motion or a stylized 'G'.

# **Manufacturing of Tablets**

## **Lecture 4**

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## DISCLAIMER

All the content material provided here is only for teaching purpose

The logo of Galgotias University is a stylized, circular emblem. It features a central blue swoosh that curves upwards and to the right, surrounded by concentric, overlapping bands of yellow and orange. The entire logo is set against a light, circular background.

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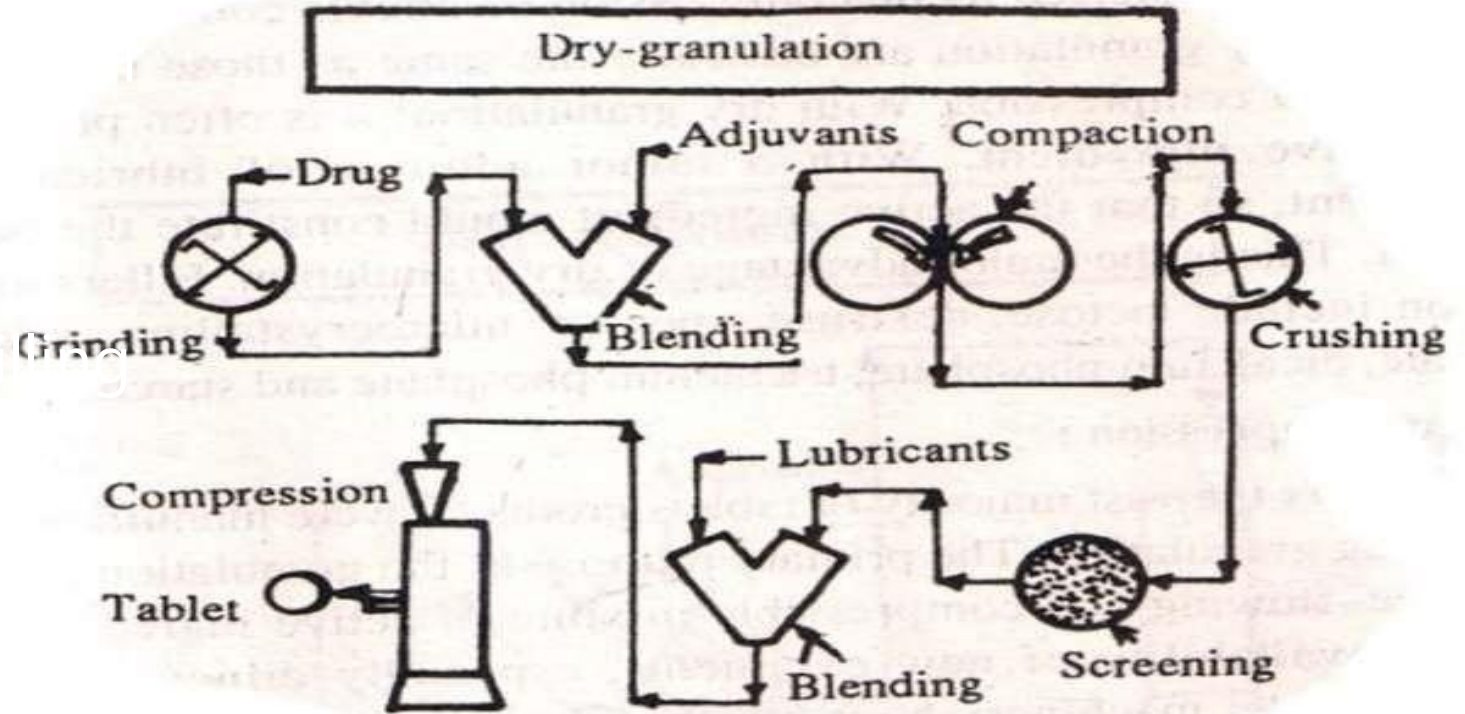
# Manufacturing of Tablets

Dry granulation method

wet granulation method

Direct compression

# Dry granulation

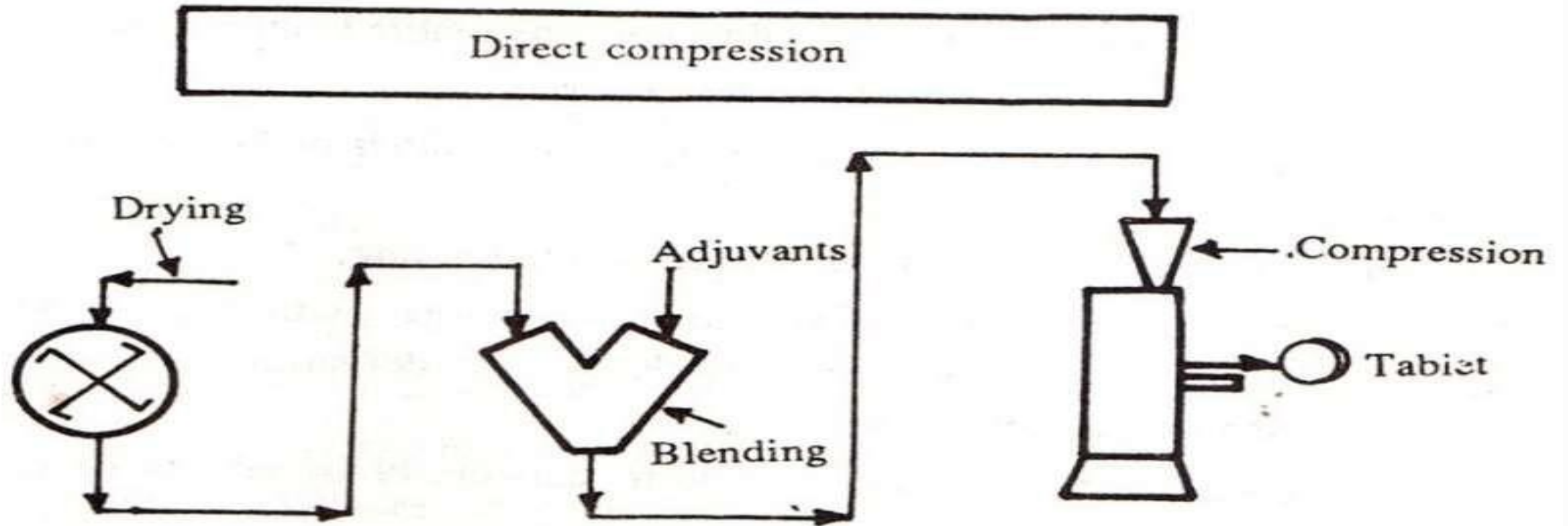


## Direct compression

- These excipients include fillers, such as:
  - ✓ spray-dried lactose
  - ✓ microcrystals of alpha-monohydrate lactose
  - ✓ sucrose–invert sugar–corn starch mixtures
  - ✓ microcrystalline cellulose
  - ✓ crystalline maltose
  - ✓ dicalcium phosphate

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# Process Parameters



- Some granular chemicals, like potassium chloride, possess free-flowing and cohesive properties that enable them to be compressed directly in a tablet machine without any need of granulation.
- For chemicals lacking this quality, special pharmaceutical excipients may be used to impart the necessary qualities for the production of tablets by direct compression.

### Important Steps

1. Milling of drugs and excipients
2. Mixing of ingredients
3. Tablet compression

# Direct compression

## Advantages:

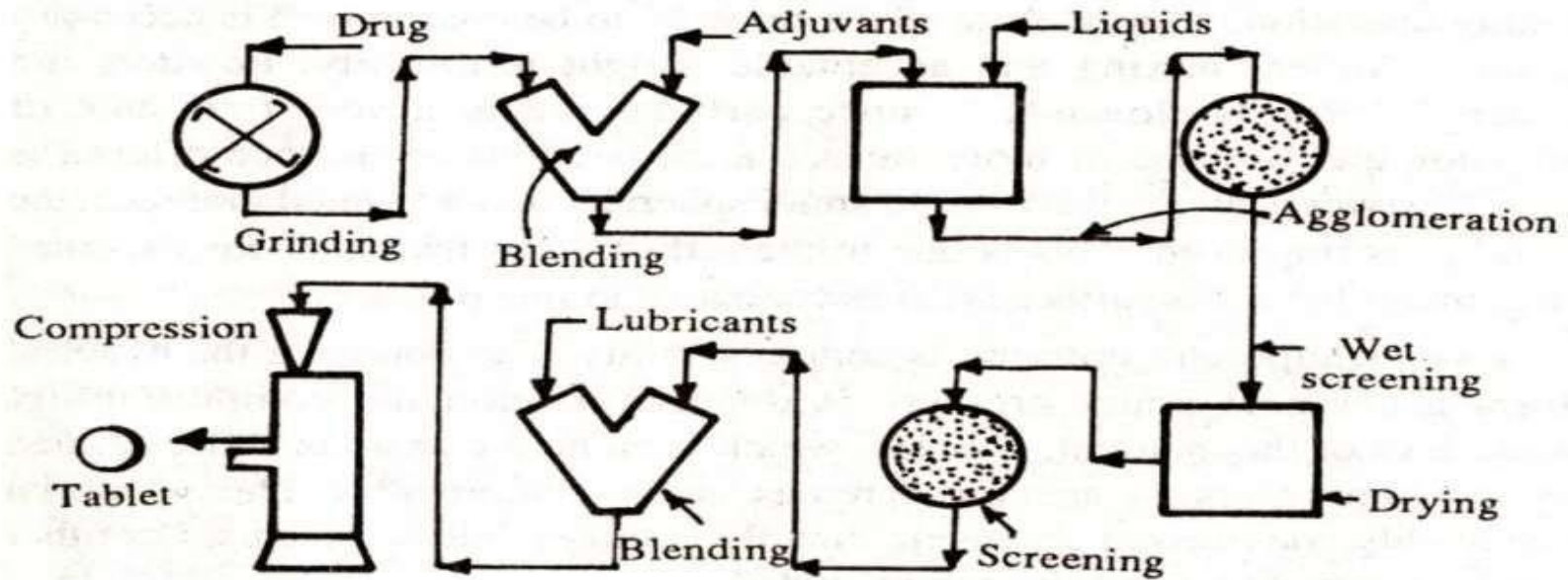
1. Low labour input
2. A dry process
3. Fewest processing steps

## Disadvantages:

1. Stratification (layers) may occur due to differences in particle size and bulk density which results poor content uniformity.
2. A large dose drug may cause problem in direct compression. It requires diluents. The tablet becomes large in size which is difficult to swallow and also costly.
3. During handling of dry materials static charge may form which may present uniform distribution of drug.
4. Direct compression diluent may interact with the drug. For example, amine drug with Lactose produce discoloration of tablet



# WET GRANULATION



# Procedure of Wet Granulation

**Step 1:** Weighing and Blending

**Step 2:** wet granulate prepared by adding the binder solution

**Step 3:** Screening the damp mass into pellets or granules (6-8 mesh)

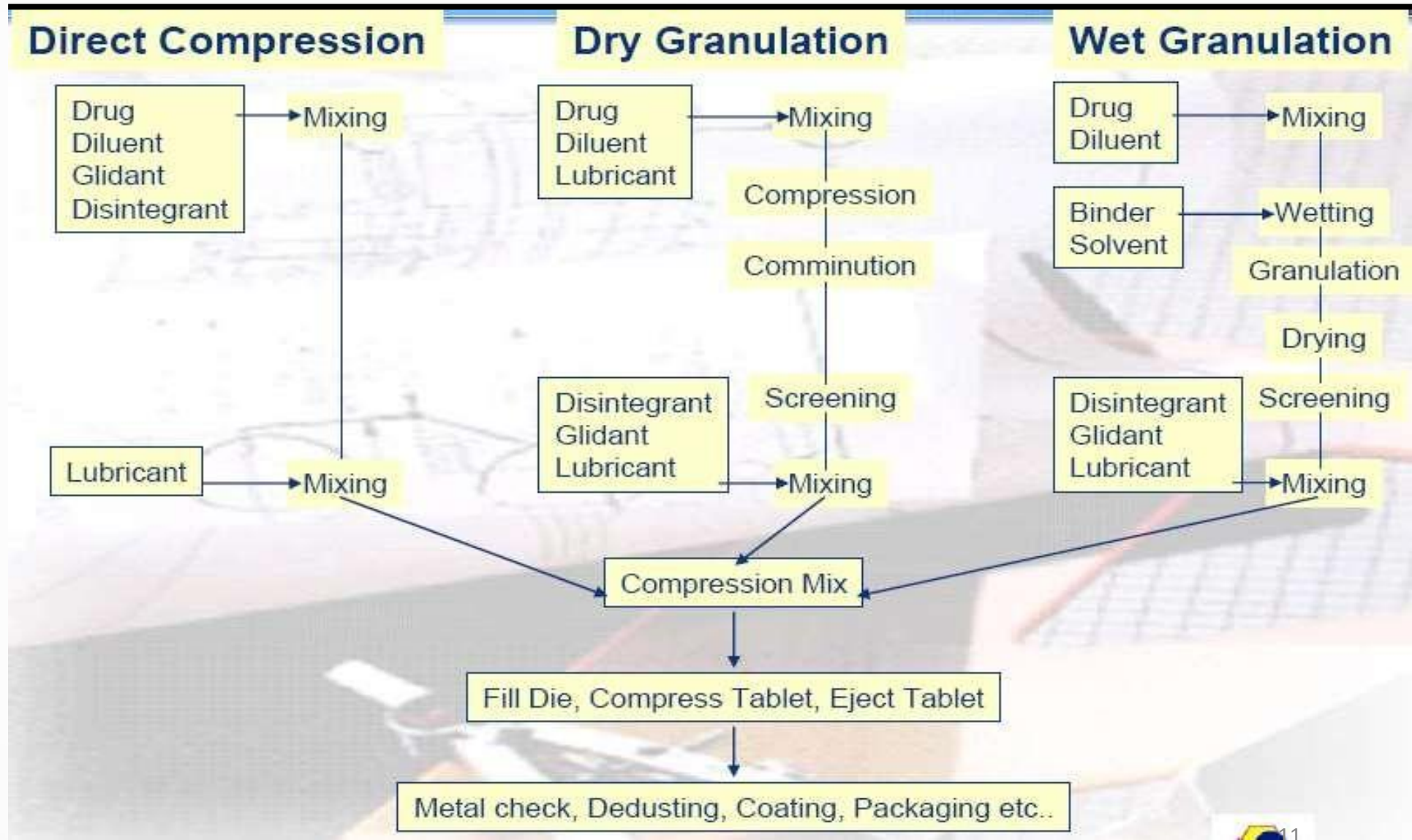
**Step 4:** Drying the granulation in thermostatically controlled ovens

**Step 5:** Dry screening:

**Step 6:** Mixing with other ingredients: A dry lubricant, antiadherent and glidant is added to the granules either by dusting over the spread-out granules or by blending with the granules. Dry binder, colorant or disintegrant may be also added in this step.

**Step 7:** Tableting: Last step in which the tablet is fed into the die cavity and then compressed.

# Tableting methods

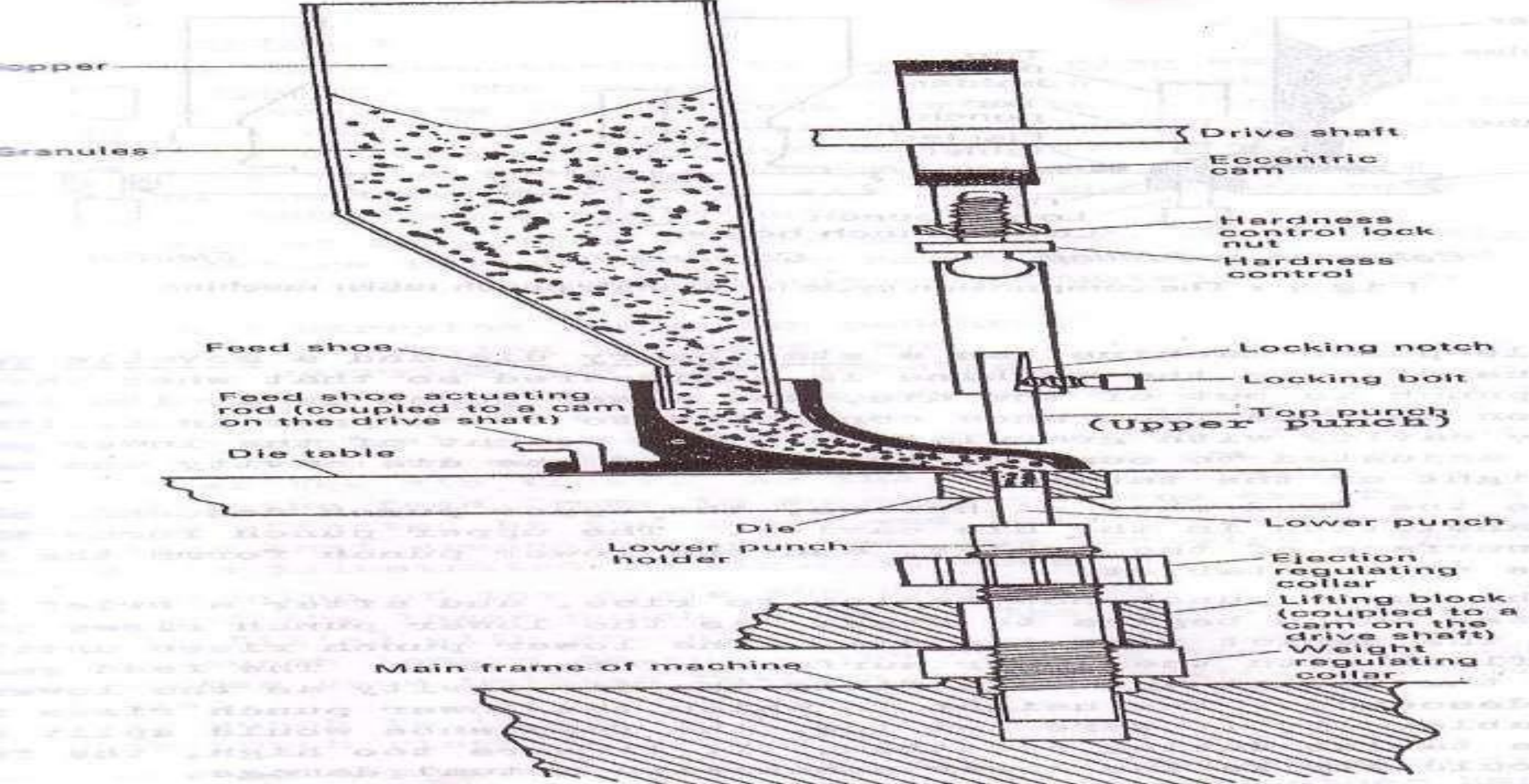


# Advantages of wet granulation

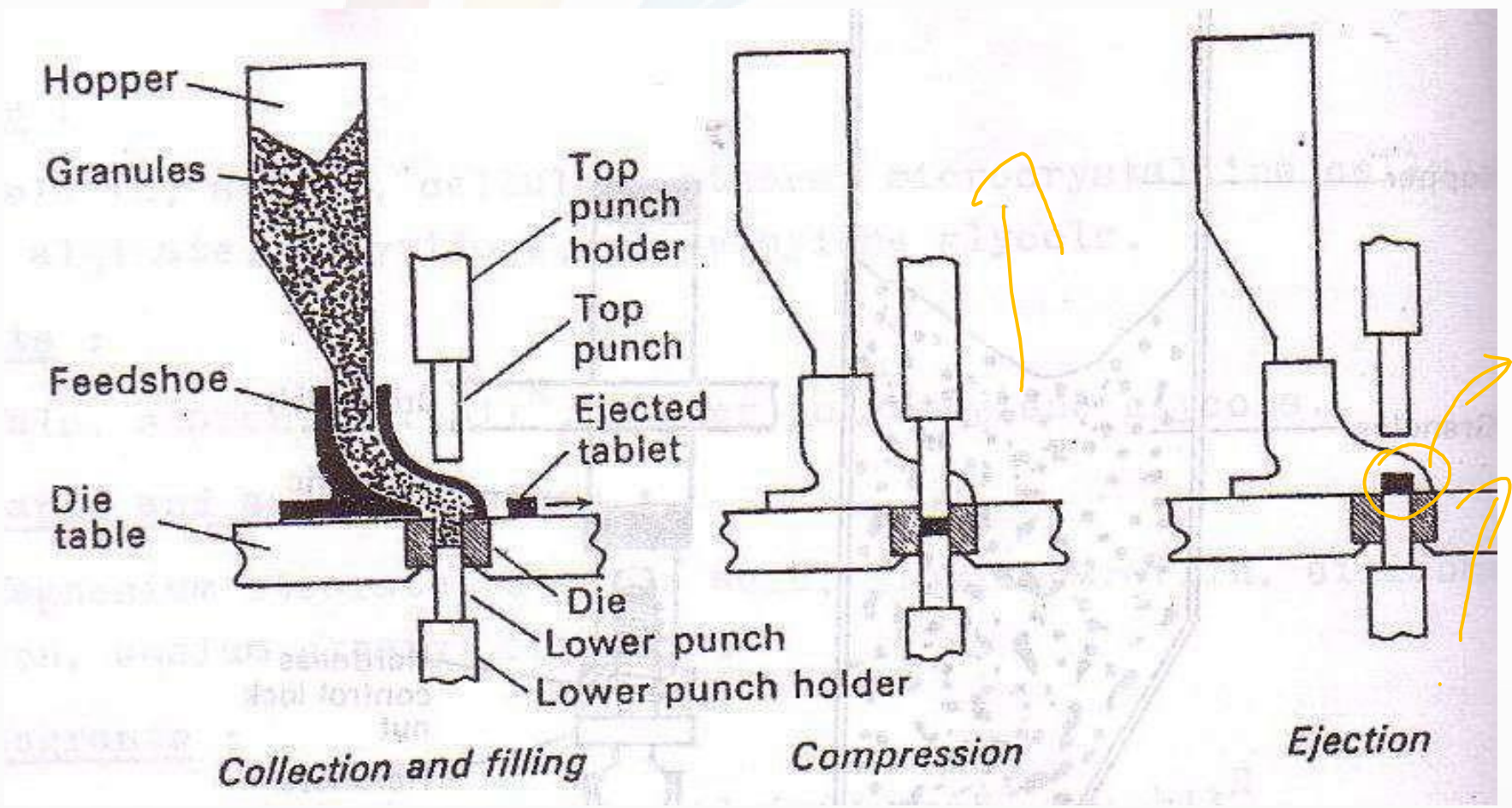
- prevent segregation of the constituents of the powder blend.
- Improved cohesiveness and compressibility.
- To improve homogeneity .
- Uniform distribution of contents and colour .
- The dissolution rate of hydrophobic drugs may be improved by wet granulation method.







# The compression cycle for a single punch tablet machine



# Tablet Formation

- **Gravitational flow of the powder from hopper via the die table into the die .**
- **The upper punch descends, enters the die, the powder is**
- **Compressed until a tablet is formed.**
- **After maximum applied force is reached, the upper punch leaves the powder.**
- **The lower punch rises until its tip reaches the level of the top of the die.**
- **The tablet is subsequently removed from the die and die table by a pushing device.**



## Tablet presses

- **Single punch.**
- **Rotary press.**
- **Multi layer rotary press.**

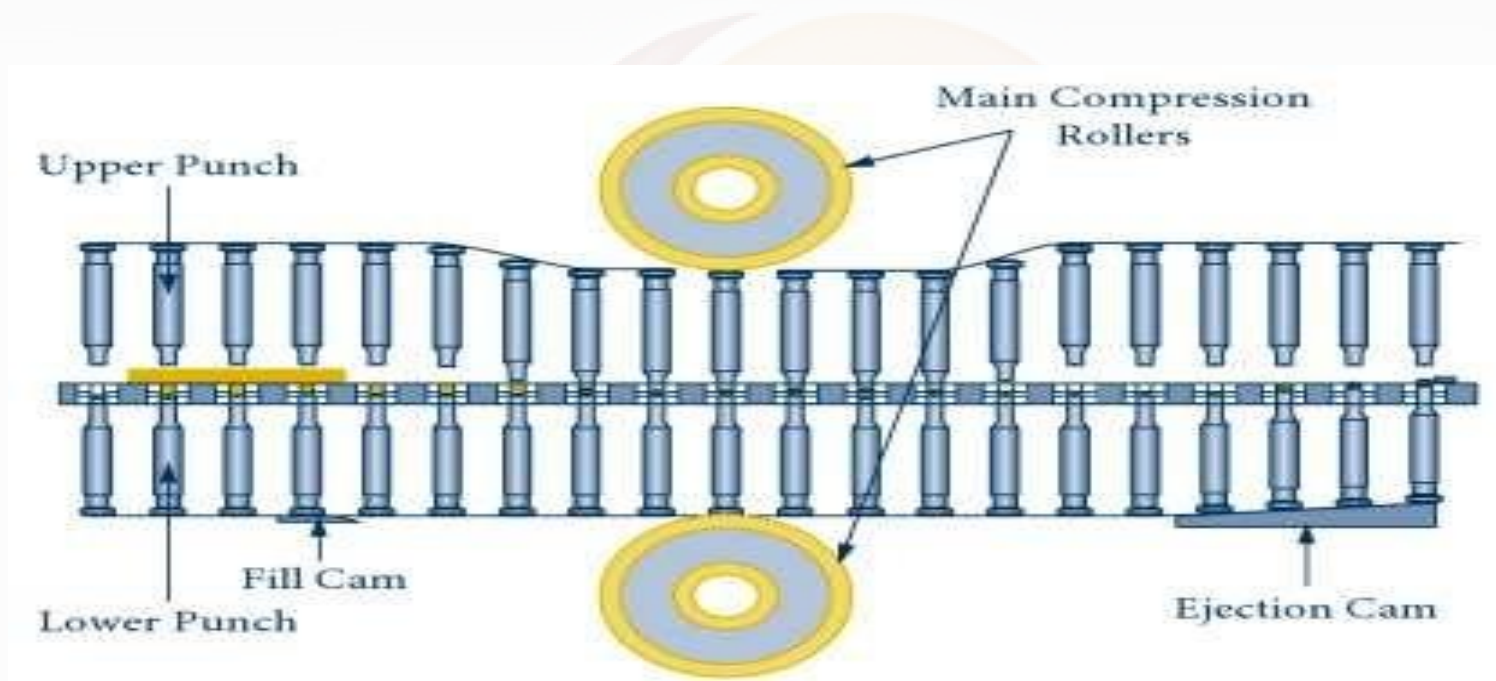


## Single Punch press

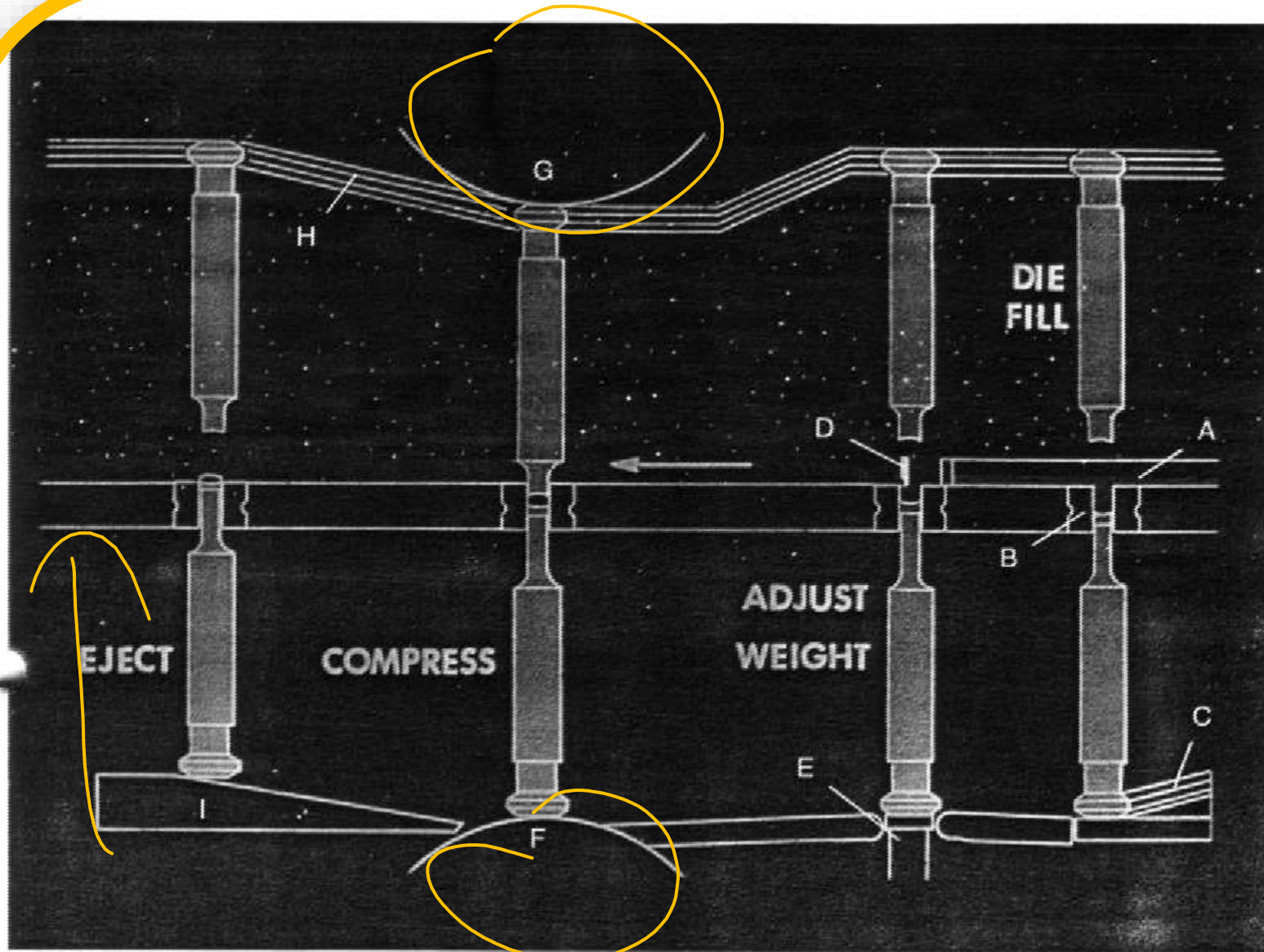
- Make one tablet At a time  
(single–station presses)
- Disadvantages: production of  
small batches of tablets

## Rotary Press( Multi station Press):

- (10 000 tablets per minute)
- Large scale production.
- It consists of a number of dies and sets of punches (from 3 up to 60).
- The dies are mounted in a circle in the die table
- both the die and the punches rotate together during operation of the machine.



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**FIG. 11-6.** The compression cycle of a rotary tablet press. (See text for explanation of lettered labels.) (Courtesy of Thomas Engineering, Hoffman Estates, IL.)

- **The powder is held in a hopper whose lower opening is located just above the die table.**
- **The powder flows on to the die table & fed into the die by a feed frame.**
- **During powder compression both punches operate by vertical movement.**
- **After tablet ejection, the tablet is knocked away as the die passes the feed frame.**

# Reference

- ▶▶ The theory and practice of industrial pharmacy fourth edition by lachman/lieberman page no 449–543