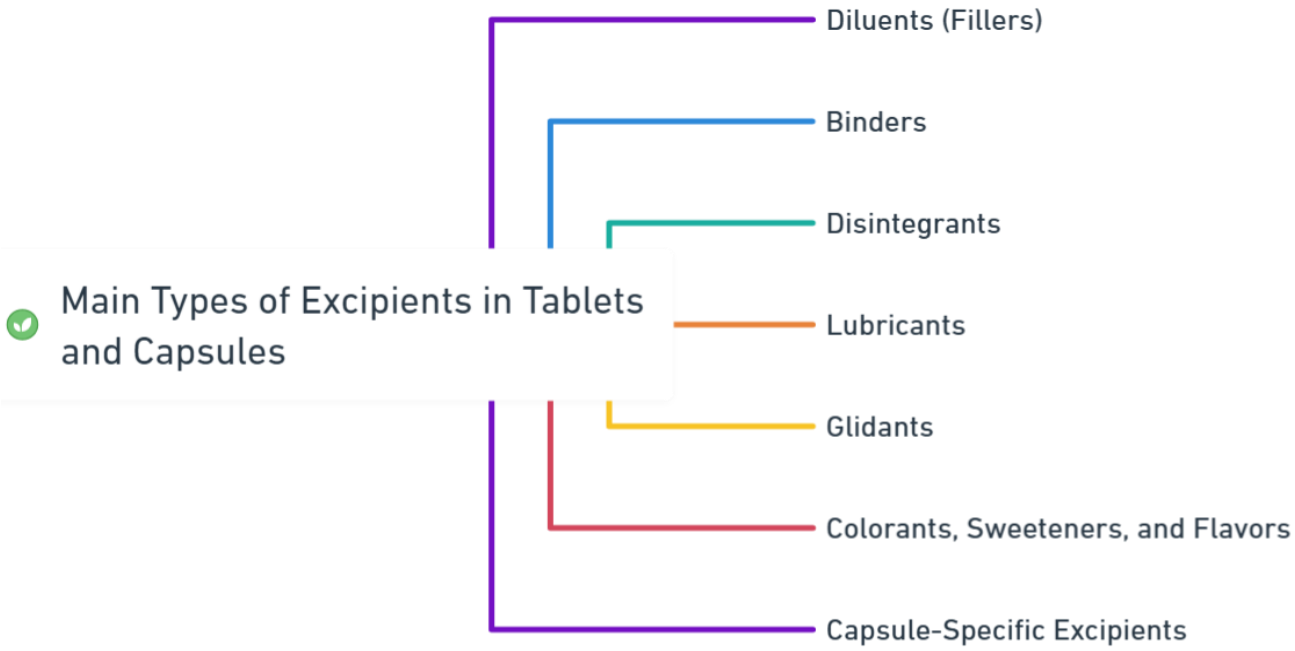
Tablet and Capsule Excipients



What are Tablet and Capsule Excipients?

- Excipients are inactive ingredients used alongside the active pharmaceutical ingredient (API) in a drug formulation.
- In tablets and capsules, excipients do not have any therapeutic effect, but they help in the manufacturing process and improve the product's quality, stability, and performance.

Main types of excipients used in tablets and capsules:



1. Diluents (Fillers):

- These are used to add bulk to the formulation.
- Why? Because sometimes the drug dose is very small (e.g., few milligrams), which is not enough to form a tablet or capsule.
- **Examples**: Lactose, Microcrystalline cellulose (MCC), Dicalcium phosphate.

2. Binders:

- Binders help to hold the ingredients of the tablet together.
- They provide mechanical strength to the tablet after compression.

- **Examples**: Starch paste, Povidone (PVP), Gelatin.

3. Disintegrants:

- These help the tablet to break apart quickly after swallowing, so the drug is released and absorbed easily.
- **Examples**: Sodium starch glycolate, Croscarmellose sodium.

4. Lubricants:

- These prevent the ingredients from sticking to the machine during tablet or capsule production.
- They also help in smooth ejection of the tablet from the die cavity.
- **Examples**: Magnesium stearate, Stearic acid.

5. Glidants:

- These improve the flowability of powders or granules, which is important for uniform filling of tablet dies or capsule bodies.
- **Examples**: Colloidal silicon dioxide, Talc.

6. Colorants, Sweeteners, and Flavors:

- Used mainly to improve appearance and taste, especially in chewable tablets or pediatric medicines.
- **Examples**: Aspartame (sweetener), Titanium dioxide (white color).

7. Capsule-Specific Excipients:

- **For hard gelatin capsules:** Powder flow and compaction properties are important.
- **For soft gelatin capsules:** Liquids or semisolids are filled, so excipients like polyethylene glycol or glycerin are used as solvents or vehicles.

Why these excipients are important:

- Ensure the tablet or capsule is **safe, effective, easy to swallow**, and **stable** during shelf life.
- Help in **mass manufacturing** with consistent quality.

Directly Compressible Vehicles

What are Directly Compressible Vehicles (DCVs)?

- These are special types of excipients that allow tablet formation by simple compression of a powder mix — without needing granulation (a wet or dry pre-processing step).

Why are they used?

- Direct compression is faster, requires fewer steps, and is cost-effective.
- So, industries prefer directly compressible vehicles for modern tablet production.

Properties Required in a Good DCV:

- Good flowability (to move easily into the tablet die cavity)
- High compressibility (to form hard tablets under pressure)
- No reactivity with drug
- Chemical and physical stability

Examples of DC vehicles:

A. Spray-dried lactose:

- Lactose is processed using a spray-drying technique to improve its compressibility and flow.

B. Anhydrous lactose:

- A form of lactose without water, has good compactibility and stability.

C. Microcrystalline cellulose (MCC):

- One of the most commonly used DC excipients.
- Provides good binding, flow, and compressibility.

D. Dicalcium phosphate dihydrate (DCP):

- It gives hard tablets and is non-hygroscopic (doesn't absorb moisture).

E. Co-processed excipients:

- These are combinations of two or more excipients processed together to improve functionality.
- **Example:** A mixture of lactose and MCC.

Advantages of using DC vehicles:

- Fast and easy manufacturing – no need for wet granulation.
- Better for moisture- or heat-sensitive drugs.
- Improved uniformity of tablet weight and content.
- Simplified formulation process.

Limitations:

- Not suitable for all drugs, especially those with poor flow or low dose.
- Might require higher cost materials.

Industrial Applications:

- Widely used in **generic drug production** to reduce costs.
- Useful in **high-speed tablet presses** where excellent flow is needed.

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