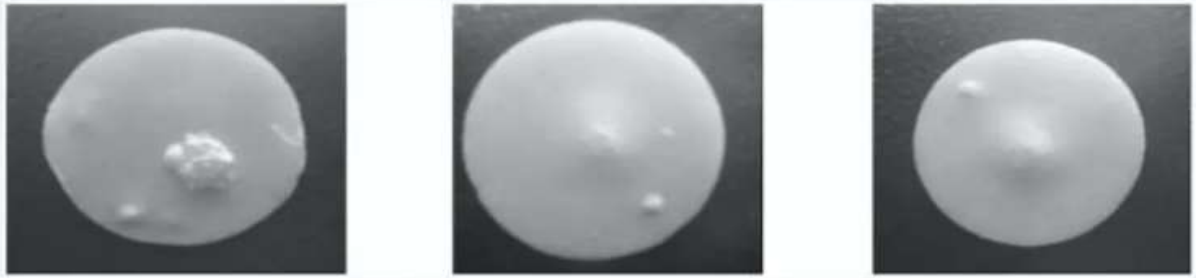
COATING DEFECTS

PROBLEMS AND REMEDIES FOR TABLET COATING

❖ BLISTERING

It is local detachment of film from the substrate forming blister.

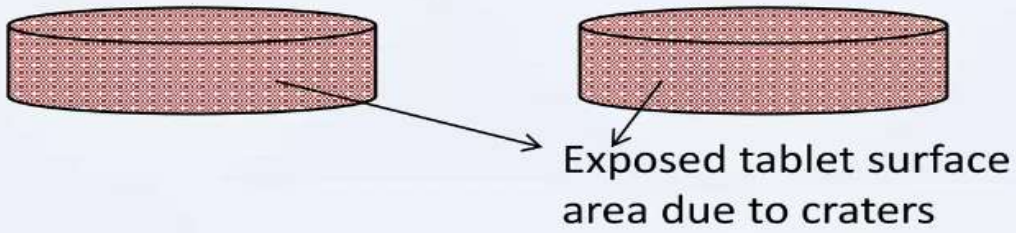
- **Reason:** Entrapment of gases in or underneath the film due to overheating either during spraying or at the end of the coating run



Causes	Remedies
▪ Effect of temperature on the strength, elasticity and adhesion of the film.	✓ Use mild drying condition.

❖ CRATERING

- It is defect of film coating whereby volcanic-like craters appears exposing the tablet surface
- **Reason:** The coating solution penetrates the surface of the tablet, often at the crown where the surface is more porous, causing localized disintegration of the core and disruption of the coating.



Causes	Remedies
▪ Inefficient drying. ▪ Higher rate of application of coating solution.	✓ Use efficient and optimum drying conditions. ✓ Increase viscosity of coating solution to decrease spray application rate.

❖ PITTING

It is defect whereby pits occur in the surface of a tablet core without any visible disruption of the film coating.

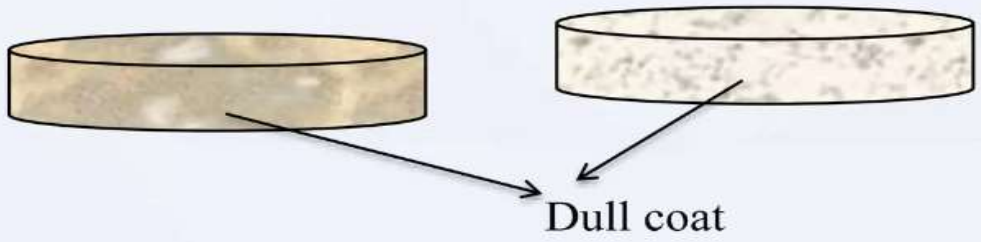
- **Reason:** Temperature of the tablet core is greater than the melting point of the materials used in the tablet formulation.

Causes	Remedies
• Inappropriate drying (inlet air) temperature.	✓ Modifying the drying (inlet air) temperature such that the temperature of the tablet core is not greater than the melting point of the batch of additives used.

❖ BLOOMING

It is defect where coating becomes dull immediately or after prolonged storage at high temperatures.

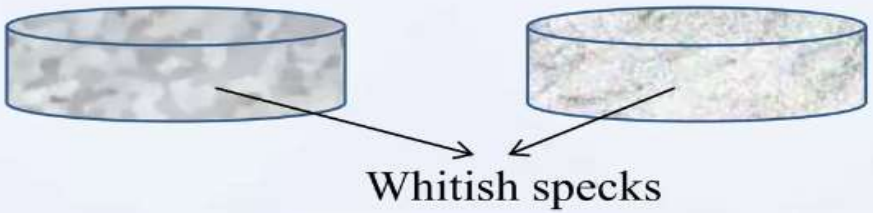
- **Reason:** It is due to collection on the surface of low molecular weight ingredients included in the coating formulation. In most circumstances the ingredient will be plasticizer.



Cause	Remedy
➢ High concentration and low molecular weight of plasticizer.	✓ Decrease plasticizer concentration and increase molecular weight of plasticizer.

❖ BLUSHING

- It is defect best described as whitish specks or haziness in the film
- **Reason**: It was thought to be due to precipitation of polymer worsened by the use of high coating temperature.



Causes	Remedies
• High coating temperature. • Use of sorbitol in formulation which causes largest fall in the thermal gelation temperature of the polymers	✓ Decrease the drying air temperature. ✓ Avoid use of sorbitol with the polymers.

❖ ORANGE PEEL/ROUGHNESS

- It is surface defect resulting in the film being rough and nonglossy. Appearance is similar to that of an orange.
- **Reason**: Inadequate spreading of the coating solution before drying

Causes	Remedies
• Rapid Drying • High solution viscosity	✓ Use mild drying conditions. ✓ Use additional solvents to decrease viscosity of solution.

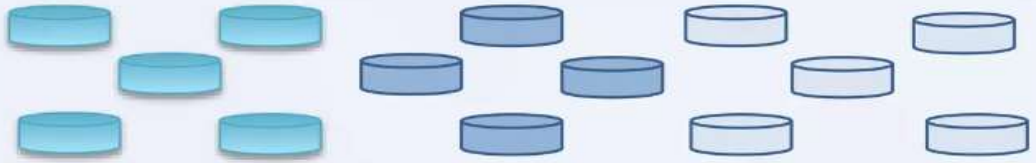
❖ STICKING AND PICKING

- Sticking involves sticking of the tablets with each other and with pan walls.
- Picking is the case of sticking involves adhering of some portion of coated layer to pan or to another tablet at the point of contact.

Causes	Remedies
• Higher rate of application of coating solution • Inefficient drying.	✓ Use optimum and efficient drying conditions. ✓ Increase the inlet air temperature. ✓ Decrease the rater of application of coating solution by increasing viscosity of coating solution.

❖ COLOUR VARIATION:

- A defect which involves variation in colour of the film.
- **Reason:** Alteration of the frequency and duration of appearance of tablets in the spray zone or the size/shape of the spray zone.



Causes	Remedies
• Improper mixing, uneven spray pattern, insufficient coating, migration of soluble dyes-plasticizers and other additives during drying.	✓ Go for geometric mixing, reformulation with different plasticizers and additives or use mild drying conditions.

❖ BRIDGING:

- Coating fills in the letter or logo on the tablet .

Causes	Remedies
• Poor logo design • Improper application of coating solution • Improper atomization pressure • High percentage of solid in coating solution • High coating viscosity	✓ Increase plasticizer contents or change plasticizer concentration ✓ Reduce viscosity of coating solution

❖ EROSION

- The coating solution gets removes from the surface of the tablets due to friction amongst themselves.

Causes	Remedies
• Over-wetted tablet surface • Inadequate drying • Lack of tablet surface strength	✓ Control drying rate & temparature

❖ TWINNING:

- This term is used when two tablets stick together.
- **Reason:** Common problem when shape of tablet is capsule shaped.

Causes	Remedies
• Coating suspension can not be evaporated.	✓ Reducing spray rate ✓ Increasing pan speed

**In some cases, it is necessary to alter the design of the tooling by very slightly changing radius.

The change is almost impossible to see (minor), but it solves the twinning problem.