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**Review Article……!!!**

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# TABLET COATING: A REVIEW

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## ABSTRACT

Tablet is pharmaceutical dosage form, containing a mixture of active substance and excipients, usually in powder or compacted into a solid, Process of tablet manufacturing is very simple and flexible hence all drug molecules can be formulated in tablet. Coating is applied to oral solid dosage form including tablets, capsules, drug crystals and multiparticulars. The excipients can include binders, glidants and lubricants to ensure efficient tableting Disintegrant to promote tablet break up in digestive tract Sweetening or flavorings agent add to increase taste , A polymer coating is applied to make the tablet resistant to the environment or to enhance the tablet appearance.

## INTRODUCTION

### History of coating technique

Panning was the original word for the process of adding a coating to tablet. In the confectionery business the common word use is panning. In past years coating perform using rotating pan (drum) on a stand. Coating solution was added while the rotation of pan distributes coating solution throughout the bed of tablet. The disadvantage of this technology was slow waiting for coating solution to dry. With the film coating a film or thin polymer membrane usually represent 1 - 3 % of total tablet weight was sprayed on using a perorated pan. To low the manner time, holes made through the pan in order to handle air warm or cold will pull by pan, as garments dryer, permit the tablets to dry. To improve drying time the ability to replace film coating solution form based to water based solution. The coating of pharmaceutical oral solid dosage form has been practiced for many centuries.

### Basics principles involved in tablet coating

The coating of tablet is use coating solution require to add in rotating pan and sprayed onto the tablets by use of air to evaporate the solution.

### Review project on tablet coating

1. In solution release pattern as little as possible and not change the appearance tract
2. Release of active substance modified with some requirements and release mechanism change in digestive
3. Color coating provide insulation.
4. All drug include in the coating to away from chemical incompatibility or provide drug release sequentially.
5. Tablet coating improve pharmaceutical elegance by using colors and printing is also possible.

### Coating process design and control

In coating method , the coating solution are spray on tablets with the help of heated air Film is formed on tablet after solution spraying thin polymer layer form on tablet. The commonly rotating pans are use in industry , uncoated tablet placed in the pan , which tilted at angle

horizontal and coating solution is introduce into pan . The liquid coating solution is evaporate by passing air over the surface of the tumbling tablets . Afluid bed coater operates by passing air through bed of tablets at velocity to support and separate the tablets as individual units , The coating solution sprayed on separated tablet '

**The following steps involved in coating process.**

A. Batch identification and recipe selection ( film or sugar coating )
B. Dispensing / loading ( accurate dosing of all required raw materials )
C. Warming
D. Spraying ( application and rolling are carried out simultaneously )
E. Drying
F. Cooling
G. Unloading

**Coating equipment**

The tablet coating system combines several components.

1) A coating pan.
2) A spraying system.
3) An air handling unit
4) A dust collector

**Coating techniques**

Generally three methods are used for tablet coating

A. Sugar coating
B. Film coating
C. Enteric coating

**A Sugar coating**: The coating layer is water soluble and quickly dissolves after swallowing Compressed; tablet content may be with colored or uncolored layer of sugar.

**Sugar coating process involves five operations:**

1. Sealing / water proofing: Moisture barrier provides the coat of tablet and surface of tablet hardness in order to minimize attritional effects. Materials used for

coating include shellac, zinc. Cellulose, hydroxyl Propyl methylcellulose etc . sugar coating are aqueous which allow water absorb into tablet core

2. Sub coating: In sugar costing actual start from sub coating process. Provides the rapid buildup necessary to round up the tablet edge. It act as the formation of smoothing and color coats on tablet Large amount of sugar coating are applied to tablet , increases the weight of tablet by 50 - 100 % .
3. Groosing / smoothing :- This process is spatially for the smoothing and filling the irregularity on the surface formed during sub coating Tablet size also increases to predetermined dimension to impart desired | color.
4. Color coating: The color coating is critical in the successful completion of a sugar coaling process; this involves the multiple application of syrup solution containing the tablet coating.
5. Polishing: To achieve a final elegance needs to polish to sugar coated tablet Polishing is done on tablet by use mixture of waxes like bees wax , cornuba wax, candelila wax or hard
6. Paraffin wax to tablets in pan, wax is applied to provide a desired luster. Use clean standard coating pan, canvas - lined coating pans. B

**FILM COATING**

**Aqueous film coating**: The thin polymer base film over the tablet as aqueous film coating. Mask the, bitter taste and odor Film coating pan protect the tablet from light , temperature and moisture, Control the release of drug and improve the appearance , Provide tablet identity : aqueous coating of solid dosage form has replaced solvent based coating for safety environment and economic reasons . Film coating is multiple processes, such as coating equipment, process conditions, composition of the core tablets, shape of tablet, coating liquid etc. Which affect the pharmaceutical quality of linal product Aqueous film coating uniform smooth and attach satisfactory to the tablet surface and maintain the chemical stability of drug.

**MECHANISM OF FILM FORMATION**

Tablet coating is occur by using liquid solution Aqueous film coating are either solutions or dispersions , depending on the water solubility of film polymer layer . Layer formation from the polymer base.

**Solution occurs through phases:** The solution applied to surface of tablet, cohesion force form a bonds between the coating polymer molecules. High cohesion the bond strength of polymer molecules must be high . Film molecules must attach to each other and form coalescence. Coalescence of polymer molecule, layer occurs by the diffusion. More water evaporates and viscosity of solution increases .Polymer chain close to each other and deposit over a previous polymer layer. Cohesion stable by attractive forces of molecules. Sufficient diffusion and coalescence after complete evaporation of the water

The polymer chain leave attach to each other form cohesive film , Pan is use for the spraying of solution on tablet surface , Mechanism of film formation is different when using aqueous polymer dispersion instead of organic polymer solutions.

The organic solvent use for coating, they sprayed on surface of tablet gets evaporate solvent The polymer chain attach to each other and form a continuous homogeneous film. Spraying the aqueous solution over tablet, water evaporate the polymer particle approach each other and under appropriate conditions (in particular temperature, presence of sufficient amount of water and other plasticizers) coalesce to form a homogeneous polymer film. It is difficult in practice to assume complete film formation during coating Generally a thermal after treatment ( occurring ) is performed in order to complete polymer particle coalescence Film formation occur when polymer molecules attach / coalesce to form a continuous film Making it more complex mechanism compared to film formation from solution . The combination of aqueous polymer dispersion deposited on the surface of the tablet into continuously initiate by water evaporation. As water evaporate, dispersed polymer particle are close together in pack form after the polymer particles come into contact with each other, they must face into order to coalesce into film.

**Application Process**: Conventional coating machine are used to sugar coat tablets, pills , cream for a variety of industries such as Pharmaceutical . Confectionery, Food and others. They are also used for rolling and heating beams and edible nuts or seeds.

The product is to be filled inside the pan . During thermation , coating material in Sprayed by spraying system according to the technological process and rational technological process

So process materials ( produety are coated due to rotating pan . The coating round pot is rotated by Variable speed

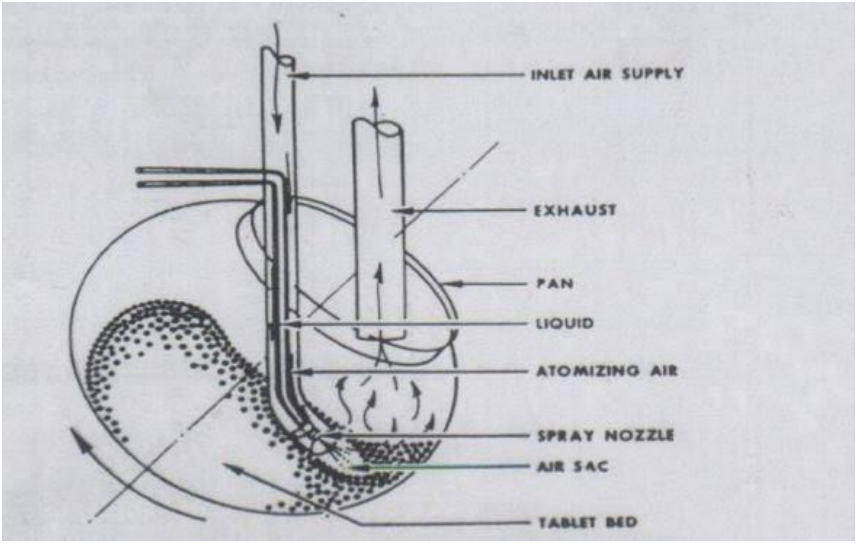


**Fig. 1: Conventional Coating Pan**

At the same time hot air is supplied through inbuilt lot air blower system which dries rapidly ( heating or cooling ) and evenly thus forming a solid and smooth surface ,

**Salient Features:**

1. Design is cGMP - Current Good ManufacturingPractices compliance.
2. All contact parts AIST 316 / 304 & non contact parts AISI 304.
3. Conventional coating system for manual film coating and sugar coating.
4. Machine is designed with fabricated structure fitted with enclosure which makes simple , cleanable outside covering and mounted on anti vibration pad.
5. Closed powerful pin drive with rediction gear box and motor by variable speed pulley.
6. Movable hot air blowing system with electric heater.
7. Easy to replace polishing pan and other size : coating pan.

**Table 1: Tablet defect with reason and remedies**

| Sr.NO | Tablet defects | Cause | Remedies |
|---|---|---|---|
| 1 | Blistering | Entrapment of gases in the film due to overheating during spraying. | Milder drying conditions are warranted in this case. |
| 2 | Chipping | Decrease in fluidizing air | Be careful not to over dry the tablets in the pre-<br>heating stage. |
| 3 | Picking | It creates overly wet bed where adjacent tablets stick together and break apart | Increase in the drying air temperature and air<br>volume |
| 4 | Twinning | Common problem | Increase the pan speed |
| 5 | Pitting | Temperature of the tablet core is greater than the melting point of the materials<br>used in the formulation | Control of temperature of tablet core |
| 6 | Color variation | Alteration of the frequency and duration of the spray zone | A best way is to reformulate with different<br>plasticizers |
| 7 | Cracking | Internal stress in the film exceeds tensile strength of the film | Use of high molecular weight polymer blends |
| 8 | Orange peeling | Inadequate spreading of the coating solution | Thinning the solution with additional solvent |
| 9 | Mottling | Degradation of the product | Prepare coating solution properly |

**CONCLUSION:**

The tablet coating is more important in early stage. Coating of pharmaceutical dosage has been concern super development efforts to make certain and enhance the nice of tablet dosage form. Electrostatic dry coating calls for special type of powder coating composition . Evaluation and fulfillment of In addition constructional enhancements in coating appear to depend on correct analytical tools and advanced method modeling and control . These technology of coating will ensure the commercialisation of these technologies in

pharmaceutical industry. Improvement regarding particle movement , heat and energy transfer , film distribution , drying efficiency and continuous processing have contributed to develop this technology . In this regard achieving optimal manufacturing efficiency and high product quality still remains a major challenge for future research .

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