

PURPOSE

The tablet coating process has introduced the concept of continuous coating technology which improves efficiency and increases productivity. High solids coating systems are used to achieve significant savings in both process time and overall energy consumption. Ideal Cures has developed a fully aqueous high solids film coating system Instacoat 4G having 35% solids capability which will help to reduce processing time, energy consumption and overall product cost.

The present study evaluates the coating uniformity and appearance of tablets coated with IDEAL CURES revolutionary product **INSTACOAT 4G™** using Thomas Engineering Inc.'s Continuous Tablet Coater (CTC)



Figure 1. Continuous Coating Pan (Thomas Engineering)



Figure 2. Interior of the Continuous Coating Pan

METHOD

MATERIALS AND METHODS

The coating system used was **INSTACOAT 4G™**, a high productivity film coating system reconstituted in water at 35% solids concentration and applied at a target weight gain of 2.5%.

Table 1. Core tablets and Coating Material Details

| A) Placebo Tablets Details | |
|--------------------------------|---|
| Placebo Tablets | 19.5 mm x 8.5 mm oblong shaped tablets having monogram dimensions (INSTACOAT Logo) on both sides. |
| B) Coating Formulation Details | |
| Product Name | INSTACOAT 4G™ |
| Colour | Red |

Table 2. Coating Reconstitution Details

| | |
|-------------------------|----------------|
| Solids Content (% w/w) | 35 |
| Solvent | Purified Water |
| Stirring Time (minutes) | 45 |

COATING EQUIPMENT/SPRAY GUNS

Trials were conducted in a 24 inch (drum diameter) fully perforated drum of Thomas Engineering Inc. based in Chicago, Illinois, USA, continuous coater (Model: Thomas Flex CTC) (Figure 1), equipped with 22 spray guns (Model: Schlick ABC Technology 940). 22 spray guns (Nozzle Diameter:1.0 mm) were divided into 2 separate Manifolds (11 Spray Guns per manifold)

COATING TRIAL DETAILS

- Tablets were fed continuously onto a weigh belt from an over bulk hopper, which delivered the tablets to the coater. After moving through the spray zone where the desired amount of coating was applied, tablets were moved into a waxing/cooling zone and then discharged. The resident load in the coater was approximately 150 kg during the continuous coating process. Once all the tablets were coated, the machine was tilted and coated tablets were unloaded into suitable containers.
- Coated tablet samples were collected from the unloading point of the continuous coater once the desired weight gain of 2.5% had been achieved. Tablets were tested for appearance, colour uniformity, disintegration time and coating defects. Colour difference of the coated tablets was checked using a reflectance spectrophotometer.
- Coated tablets obtained good tablet to tablet color uniformity in a continuous mode in less time as compared to a batch coater. This rapid achievement of color uniformity was due to the combined effect of repeated tablets exposure to the spray guns, large spray area, shallow tablet bed depth and primarily high solids (35% w/w) content capability of **INSTACOAT 4G™** suspension.

Table 3. Coating Process Parameters

| | |
|------------------------------|---------|
| Desired Weight Gain (%) | 2.5 |
| Inlet Air Temperature (°C) | 59-64 |
| Product Bed Temperature (°C) | 43-45 |
| Exhaust Temperature (°C) | 47-48 |
| Airflow (cfm) | 6700 |
| Atomizing Air Pressure (psi) | 40-43 |
| Pattern Air Pressure (psi) | 30 |
| Drum speed (rpm) | 12 |
| Spray Rate (g/min) | 548-756 |
| Weigh belt feed rate (kg/hr) | 544-635 |

RESULTS

- The coating trial of Instacoat 4G was successfully executed using a Thomas Engineering Continuous Coater.
- Results of coated tablet evaluations were found acceptable.

Table 4. Coating Trial Observations

| Parameters | Observations |
|--|--|
| (A) Coating Suspension Characteristics | |
| Appearance | Red, smooth, agglomerate free coating suspension |
| Viscosity (cP) | 210 |
| (B) Process Feasibility | |
| Ease of operation | No gun blocking observed |
| Sprayability | Easily Sprayable |
| (C) Coated Tablet Evaluation | |
| Appearance | Smooth Tablet Surface |
| Logo Clarity | Excellent Logo Clarity |
| Colour Difference (dE) | 1.5 |
| DT (seconds) | 50 |
| Coating Defects | No defects |



Figure 3 Coated Tablets

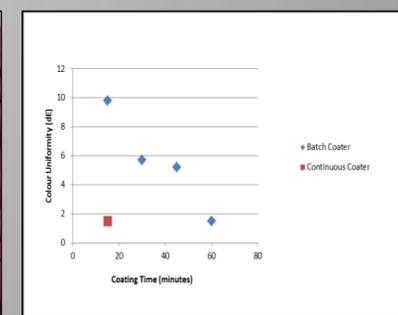


Figure 4 Colour Uniformity vs Coating Time Batch Coater vs Continuous Coater

CONCLUSION

The **Instacoat 4G™** coating formulation is ideal continuous coating technology due to its low viscosity and high solids reconstitution (35%w/w). As a result target 2.5% coating weight gain could be achieved at a high tablet throughput rates (635 Kg/hr) during the continuous mode of operation. Further optimization of the coating parameters for **Instacoat 4G™** will enable an even higher throughput rate without compromising the quality of the finished product.

FUNDING / GRANTS / ENCORE / REFERENCE or other use