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Evaluation Of Coating Performance Of INSTACOATTM 4G In The Bectochem **Perforated Pan** S. Pareek, K. Oza, S. Negi Ideal Cures Pvt. Ltd.

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PURPOSE

INSTACOAT[™] 4G, a high solids, low viscosity formulation allows coating across a broad range of process parameters in any type of a coating equipment. It significantly reduces coating process time and delivers coated tablets with good surface finish. This study evaluates coating uniformity and tablet appearance of Instacoat $4G^{TM}$ in a fully perforated Bectochem perforated pan.

OBJECTIVE

The objective was to perform a coating trial with INSTACOAT[™] 4G using Bectochem perforated pan.

METHOD

9.1 mm round biconvex tablets having monogram (IC Logo) on one side, were used for the coating trials. INSTACOAT[™] 4G, a high productivity film coating system from IDEAL CURES, was reconstituted at 35% solids concentration in water and applied at a target weight gain of 3%. The coating dispersion was evaluated for appearance and viscosity. Coating trial was conducted in Bectochem Perforated Pan (Autocoater; Model: T-043), equipped with 3 spray guns (Devilbiss) using predetermined coating parameters (Table No. 1). Coated tablet samples were collected at 15 minute intervals throughout the process which was continued until a 3% weight gain was achieved. Tablets were assessed for visual appearance, color difference, disintegration time and coating defects. Color difference of the coated tablets was measured using a reflectance spectrophotometer.

INSTACOAT™ 4G	Yellow						
Coating Pan Details							
Pan Diameter (Inch)	48						
No. of Baffles	8						
Spray Gun Details							
Gun Type	Devilbiss						
No. of Guns	3						
Nozzle Diameter (mm)	1.2						
Coating Suspension Details							
Solids Content (% w/w)	35						
Solvent	Purified Water						
Stirring Time (minutes)	45						
Coating Process Parameters							
Target Weight Gain (%)	3.0						
Batch Size (kg)	150						
Inlet Temperature (°C)	52-55						
Bed Temperature (°C)	41-43						
Gun to Bed Distance (cm)	15-17						
Atomizing Air Pressure (bar)	4						
Pan Speed (rpm)	3-12						
Pump Speed (rpm)	5-12						
Spray Rate (g/min)	120-170						

Table No. 1: Coating Process Parameters

RESULTS

The INSTACOAT[™] 4G coating trial was successfully carried out at a batch size of 150 kg using a Bectochem Perforated Pan. Coated tablets were evaluated for appearance, color difference, coating defects and disintegration time. All results were found acceptable. The appearance and color uniformity of coated tablets was good. No coating defects were observed.

Table No. 2: Coated 7

Theoretical Coating Weight Gain (%)	Actual Coating Weight Gain (%)~	Parameters Location	L1	L2	L3	L4	L5	L6
15 0.5	0.22	Colour Difference (dE)	9.922	8.800	9.800	9.700	9.750	9.800
		Coating Defects	Nil					
30 1.050	0.58	Colour Difference (dE)	5.580	6.001	6.300	6.400	6.320	5.680
		Coating Defects	Nil					
45 1.5	0.83	Colour Difference (dE)	5.237	5.200	5.400	5.321	5.335	5.380
		Coating Defects	Nil					
*60 2.1	1.012	Colour Difference (dE)	1.180	1.090	1.140	1.200	1.250	1.310
		Disintegration Time (Sec.)	45	46	45	47	45	46
		Coating Defects	Nil					
75 2.6	1.26	Colour Difference (dE)	0.829	0.900	0.858	0.867	0.872	0.880
		Disintegration Time (Sec.)	48	49	47	48	47	49
		Coating Defects	Nil					
90 3.15	1.39	Colour Difference (dE)	0.780	0.778	0.775	0.780	0.700	0.732
		Disintegration Time (Sec.)	50	51	51	50	52	52
		Coating Defects	Nil					
	1.67	Colour Difference (dE)	0.700	0.702	0.750	0.760	0.770	0.745
105 3.67		Disintegration Time (Sec.)	51	52	55	52	50	53
		Coating Defects	Nil					
	2.80	Colour Difference (dE)	0.658	0.648	0.659	0.680	0.700	0.712
120 4.2		Disintegration Time (Sec.)	60	62	61	60	62	62
		Coating Defects	Nil					
	4.75 2.95	Colour Difference (dE)	0.549	0.600	0.560	0.572	0.576	0.578
135 4.75		Disintegration Time (Sec.)	65	66	68	68	68	67
		Coating Defects	Nil					
	Coating Weight Gain (%) 0.5 1.050 1.5 2.1 2.6 3.15 3.67 4.2	Theoretical Coating Weight Gain (%)Actual Coating Weight Gain (%)0.50.221.0500.581.50.832.11.0122.61.263.151.393.671.674.22.80	Theoretical Coating Weight Gain (%)Actual Coating Weight Gain (%)ParametersWeight Gain (%)Colour Difference (dE) Coating DefectsLocation0.50.22Colour Difference (dE) Coating DefectsColour Difference (dE) Coating Defects1.0500.58Colour Difference (dE) Coating DefectsColour Difference (dE) Coating Defects1.0500.83Colour Difference (dE) Coating DefectsColour Difference (dE) Coating Defects1.50.83Colour Difference (dE) Coating DefectsColour Difference (dE) Coating Defects2.11.012Disintegration Time (Sec.) Coating DefectsDisintegration Time (Sec.) Coating Defects2.61.26Disintegration Time (Sec.) Coating DefectsDisintegration Time (Sec.) Coating Defects3.151.39Disintegration Time (Sec.) Coating DefectsDisintegration Time (Sec.) Coating Defects3.671.67Disintegration Time (Sec.) Coating DefectsDisintegration Time (Sec.) Coating Defects4.22.80Disintegration Time (Sec.) Coating DefectsDisintegration Time (Sec.) Coating Defects4.752.95Disintegration Time (Sec.)	Theoretical Coating Weight Gain (%)Actual Coating Weight Gain (%)Parameters LocationL10.50.22Colour Difference (dE)9.9220.50.22Coating Defects5.5801.0500.58Colour Difference (dE)5.5801.0500.58Colour Difference (dE)5.2371.50.83Colour Difference (dE)5.2371.50.83Colour Difference (dE)5.2372.11.012Disintegration Time (Sec.)452.11.012Disintegration Time (Sec.)452.61.26Disintegration Time (Sec.)482.61.26Disintegration Time (Sec.)503.151.39Disintegration Time (Sec.)503.671.67Disintegration Time (Sec.)513.672.80Colour Difference (dE)0.6584.22.80Disintegration Time (Sec.)604.752.95Disintegration Time (Sec.)65	$ \begin{array}{c c c c } \hline \begin{tabular}{ c c } \hline \hline \begin{tabular}{ c c } \hline \hline $	$ \begin{array}{c c c c } \hline \mbox{Theoretical Coating Weight Gain (%)} & \mbox{Actual Coating Weight Gain (%)} & \ \mbox{Location} & \ \mbox{L1} & \ \mbox{L2} & \ \mbox{L3} & \ \mbo$	Theoretical Coating Weight Gain (%)Actual Coating Weight Gain (%)Parameters LocationL1L2L3L40.50.22Colour Difference (dE)9.9228.8009.8009.7000.50.22Colour Difference (dE)9.9228.8009.8009.7001.0500.58Colour Difference (dE)5.5806.0016.3006.4001.0500.58Colour Difference (dE)5.2375.2005.4005.3211.50.83Colour Difference (dE)5.2375.2005.4005.3211.50.83Colour Difference (dE)5.2375.2005.4005.3211.50.83Colour Difference (dE)1.1801.0901.1401.2001.6Disintegration Time (Sec.)464647482.61.26Disintegration Time (Sec.)484947482.61.26Disintegration Time (Sec.)505151523.151.39Disintegration Time (Sec.)505151523.671.67Disintegration Time (Sec.)5152523.671.67Disintegration Time (Sec.)5152523.671.67Disintegration Time (Sec.)5152523.671.67Disintegration Time (Sec.)5152523.671.67Disintegration Time (Sec.)5152523.671.67Disint	Theoretical Coating Weight Gain (%)Actual Coating Meight Gain (%)Parameters LocationL1L2L3L4L50.50.22Colour Difference (dE)9.9228.8009.8009.7009.7500.50.22Colour Difference (dE)9.9228.8009.8009.7009.7501.0500.58Colour Difference (dE)5.5806.0016.3006.4006.3201.0500.58Colour Difference (dE)5.2375.2005.4005.3215.3351.50.83Colour Difference (dE)5.2375.2005.4005.3215.3352.11.012Disintegration Time (Sec.)45464547452.61.26Disintegration Time (Sec.)48494748472.61.26Disintegration Time (Sec.)48494748473.151.39Disintegration Time (Sec.)50515150523.671.67Disintegration Time (Sec.)50515150523.671.67Disintegration Time (Sec.)51525252523.671.67Disintegration Time (Sec.)51525252523.671.67Disintegration Time (Sec.)51525252523.671.67Disintegration Time (Sec.)5152555252523.671

*Tablets achieved acceptable color uniformity after 60 minutes of coating. Uncoated tablet disintegration time: 34 seconds

Table No. 3: Coating Process Evaluation

Parameters	
	(A) Process F
Ease of Operation	
Sprayability	Agglomerate
	(B) Coating D
Coating Defects	No coating defect
	(C) Tablet Ap
Smoothness	
Logo Clarity	

Fablet Characteris	tics
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Observations

Feasibility

No gun blocking observed.

e free, readily sprayable coating suspension

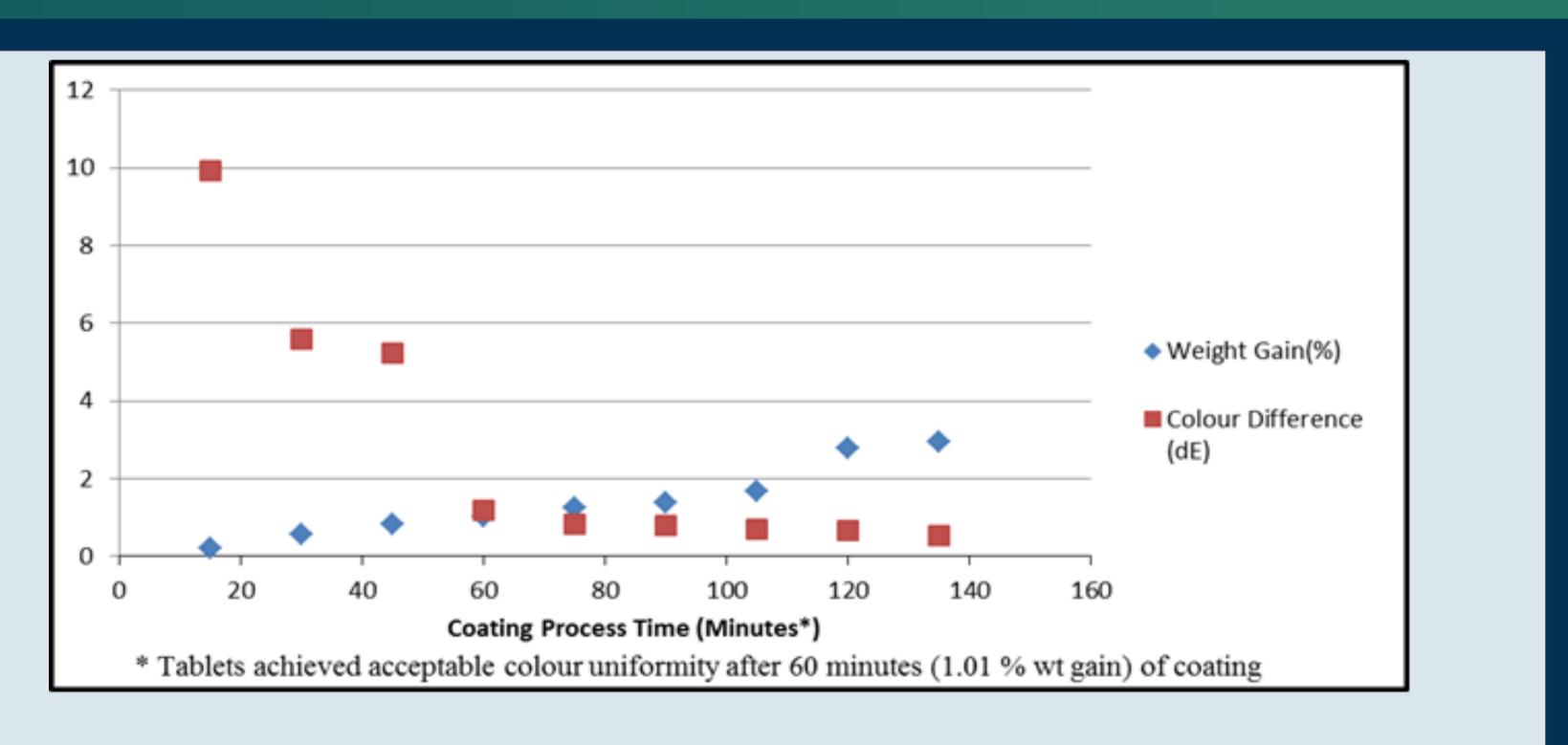
Defects

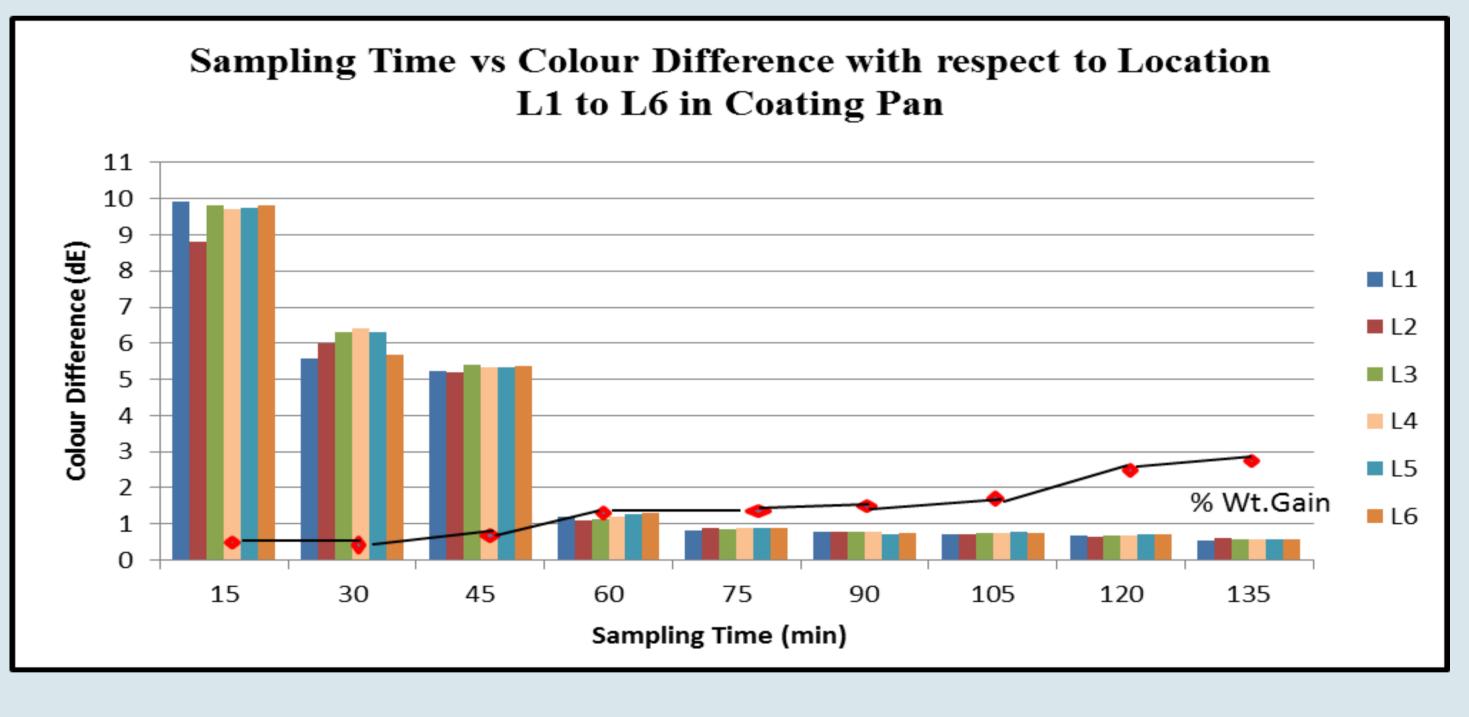
cts observed (100 tablets were checked visually)

pearance

Smooth Tablet Surface

Good





CONCLUSIONS

The INSTACOAT[™] 4G coating trial was successfully performed at a batch size of 150 Kg using a 48 inch Bectochem Autocoater Coated tablets were evaluated for appearance, color difference, coating defects and disintegration time at various intervals throughout the coating process. All results were found acceptable. INSTACOAT[™] 4G coating system was successfully applied to placebo tablets, achieving good color uniformity within a short process time.





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Figure No. 1: Coating Process time versus Color Uniformity

Figure No. 2: Sampling Time vs Color Difference

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