

A Novel Rotary Granulation Process as an Alternative to Top Spray Granulation

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INTRODUCTION

Rotary granulation has been viewed as a favorable granulation method in the industry due to the uniformity and round shape of the granulations produced. It has failed to gain wide use as a production method due to small batch sizes and limited drying capabilities that can lead to long processing times. A novel screened rotary fluid bed insert with dual airflows combines the large batch size and drying capacity of the top spray fluid bed process with the size and shape uniformity of the traditional rotor process.

METHODS

5 kg of a blend of 70% Lactose and 30% B-820 Partially pre-gelatinized corn starch were loaded into an SFC-35 screened rotor insert (Freund-Vector Corporation). 2000g of a 10% PVP K-30 solution was sprayed via a tangential spray gun. The process was repeated using a standard 12L top spray fluid bed insert in a Freund-Vector Corporation VFC-3 fluid bed. The process was then repeated with a 10 KG batch size for both inserts. The resulting granulations were compared for yield, particle size distribution, aspect ratio, sphericity, flow and density. Processing times and conditions were recorded for each process.

FORMULATION

Batch Size	% Lactose (Dry Blend)	% Starch(B820) (Dry Blend)	% Binder
5kg	70%	30%	4%
10kg	70%	30%	4%

EQUIPMENT



Freund-Vector Corporation SFC-35



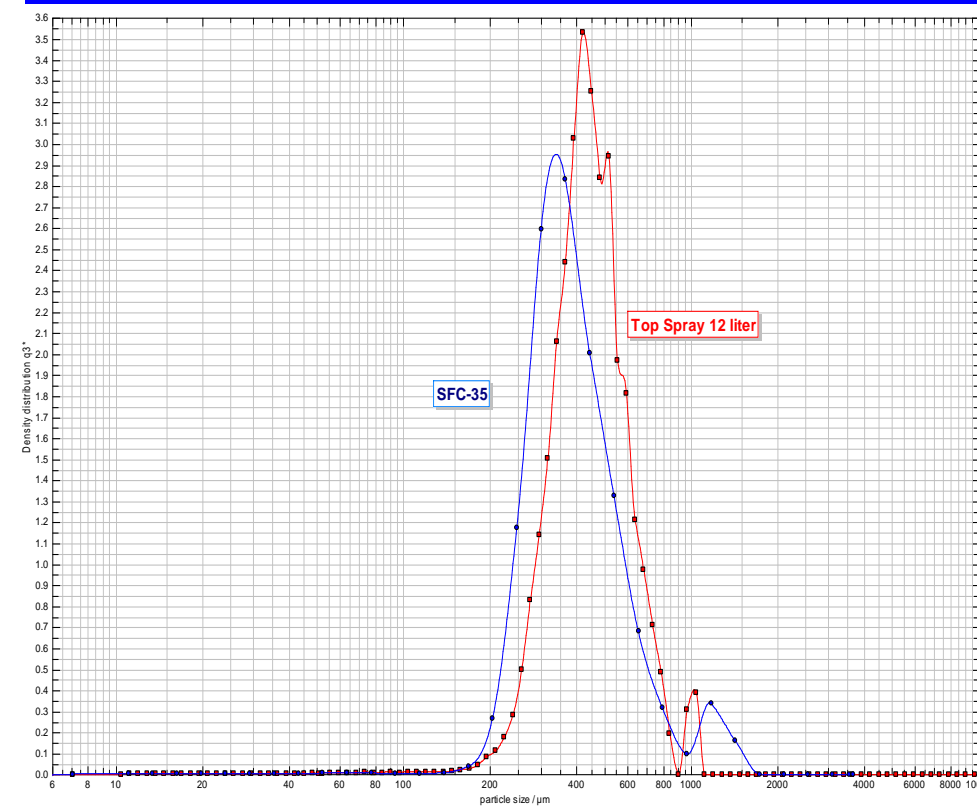
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RESULTS

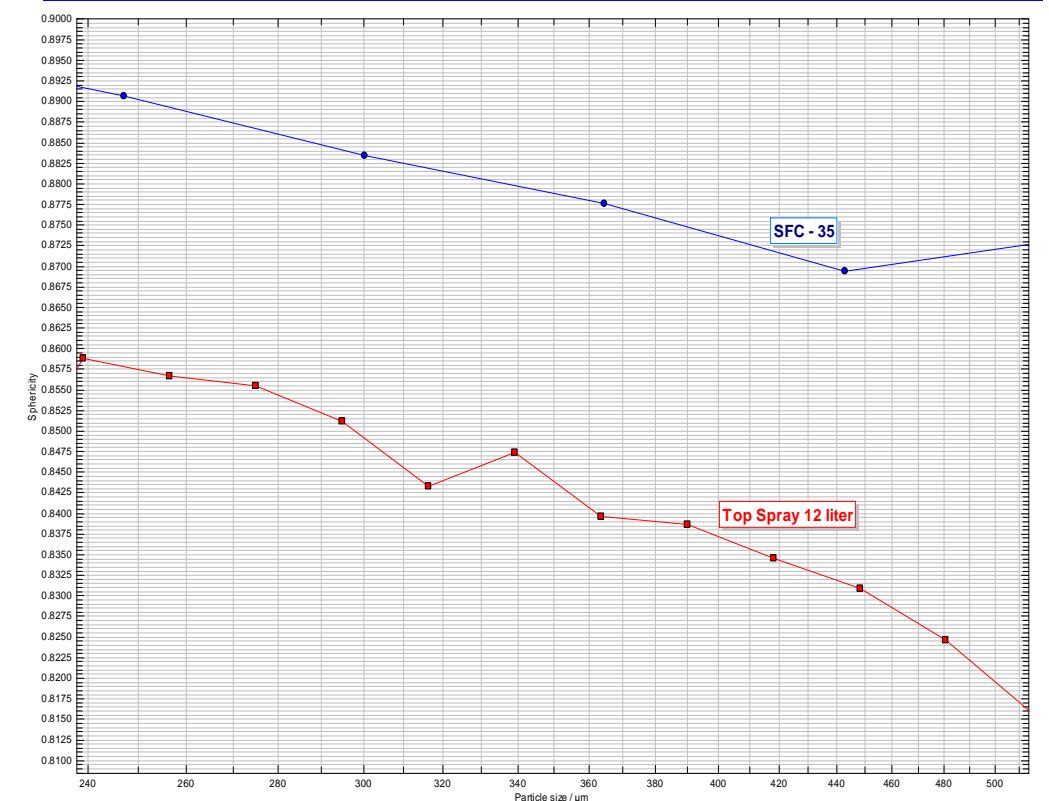
DISCUSSION

The SFC granulation resulted in a PSD with a X10 at 259.25 micron, X50 at 376.6 and X90 at 667.98 with an aspect ratio of 0.85 and a sphericity value of 0.8 with a yield of 95%. The Top spray process resulted in a PSD with a X10 at 304.2 microns, X50 at 438.49 microns and a X90 at 649.18 microns with an aspect ratio of 0.71 and a sphericity of 0.71 with a yield of 90%. The spray times, drying times and overall processing times were identical for each method.

Particle Size Distribution



Sphericity



PROCESS PARAMETERS

Equipment	Formulation	PVP Spray Rate	Process Airflow	Process Heat	Rotor Speed	Final Moisture
SFC-35	Lactose/Starch	15-45gpm	45-110cfm	50° C	400 rpm	21.08%
12 liter Top Spray	Lactose/Starch	15-45gpm	45-110cfm	50°C	N/A	20.7%

CONCLUSIONS

The SFC insert showed that it could effectively granulate large batch sizes, comparable and exceeding the capacities of a top spray fluid bed at the scale shown, while maintaining the size and shape advantages that a rotary process possesses. The addition of increased drying capacity through the screened section of the rotor provided equivalent drying capability to the top spray process.

