

**DEVELOPMENT OF PARTICLE SIZE DETERMINATION MODEL
IN HIGH SHEAR MIXING WET GRANULATION**

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in this thesis.

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ABSTRACT

DEVELOPMENT OF PARTICLE GROWTH MODEL
IN HIGH SHEAR MIXING WET GRANULATION

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Rapid growth rate in high shear mixing wet granulation demands better understanding of its growth kinetics in order to monitor and modify the process. This research aims to report the significance of several process variables in correlation with particle growth. Growth kinetic model was expected to be found and provide implications to granulation technology. Initial particle size, impeller speed and chopper speed was set at two levels of treatment in a binary mixture of lactose and water. The mean size of granules obtained was analyzed through laser diffraction and grid counting method. It was observed that smaller initial size produced larger granules (42.438 μm into 277.514 μm –5.5038 mm vs. 83.712 μm into 152.513 μm –4.5187 mm). Impeller speed showed different trends in correlation with energy threshold for growth (e.g. 220 rpm into 382.487 μm and 110 rpm into 446.035 μm vs. 220 rpm into 348.222 μm and 110 rpm into 152.513 μm). Higher chopper speed was effective in reducing size (e.g. 1500 rpm into 4.4861 mm vs. 750 rpm into 5.4225 mm). Particle growth was steady for granules below 2 mm, while granules above 2 mm showed relatively unsteady growth. Granule growth was extremely fast and granulation is not governed by chemical properties.

Keywords: Granulation, High shear, Growth, Binary mixture, End point



DEDICATION

To the One, who creates.
To the heart who didn't have the chance.
To the lives who didn't take the path.
To the spirits, who don't think they can.



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