**Modeling of Adhesion and Granulation Endpoint of Food and Pharmaceutical Powders Based on Material Properties and Operating Conditions**

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This study is aimed at investigating the effects of relative humidity and temperature on adhesion and granulation of powder particles, and developing a model to predict the wet granulation optimal endpoint based on the powder's rheological properties. The particles under study were á-monohydrate lactose, PVP and MCC. The granulation of powders depends on the ability of the particle to deform, and in order to characterize the deformability the glass transition temperature was determined using a Dynamic Mechanical Thermal Analysis (DMTA) and also analyzed. In addition to that, the rheological properties were characterized by measuring the compression and relaxation behavior. It was found that the pressure required for deformation increased as the sample moisture content decreased. The master curve describing the compression behavior for any temperature and moisture content was created. Master curve was also created to characterize the elastic modulus of the sample. Using the calculated viscoelastic and compression model parameters the radius of the contact area was calculated for a range of moisture contents and temperatures. When granulating at lower pressures, more water or binder is needed to achieve the end point. Material properties such as particle surface morphology, contact area deformation and force applied will also be taken into account to aid in developing a model to predict adhesiveness and cohesiveness of powder particles based on the powder's rheological properties and operating conditions. Force measurements are carried out with an Atomic Force Microscope, in which the cantilever tip end is brought into contact with the surface of the particle. In order to validate the model, force measurements will be compared to those obtained theoretically and to values obtained experimentally from the granulation.