

17th Annual Congress on

Pharmaceuticals & Drug Delivery Systems

September 20-22, 2018 Prague, Czech Republic

Evaluation of the residence time during dry, wet and hot melt granulation

Gavin M Walker and Ahmad B Albadarin
University of Limerick, Ireland

Twin screw extrusion offers a promising method to continuously process and transform physicochemical properties of pharmaceuticals and excipients and produce tailored products given its accurate control of process parameters. Certainly, one of the strengths of continuous manufacturing is the consistency in maintaining a certain product quality. In order to maintain such consistency, it is necessary to process feed materials for an optimized controllable time, also known as the residence time. The residence time is a parameter characterizing the duration for a single particle to partake in the extrusion process. As a result, the residence time and its associated distribution are parameters highly affecting the quality of output products. Additionally, if an existing process is desired to be scaled up or a process transfer scheduled to an extruder with different geometries, evaluation and comparison of residence times of both processes will be useful given its relative ease of measurement. As the residence time is a result of mass flow and mixing patterns within the extruder, it is highly dependent on process variables, such as feeder flowrate, extruder screw design and configuration and material properties. The purpose of the present study is to, study the effects of the feeder input mass flowrate on the residence time distribution and to investigate the effects of material properties on the residence time by investigating different materials under the same processing conditions during wet granulation and hot melt extrusion (HME). Based on experimental data obtained from residence time distribution curves for wet and dry granulation, at steady state it appears that the feeder flowrate plays significant role in the residence time distribution obtained but the degree of influence is strongly dependent on the rotation speed of the extruder and the material properties. Positive changes in peak height and negative changes in residence times are observed with an increase in feeder flowrate.

Gavin.Walker@ul.ie

Notes: