National Institute of Technology Rourkela

Progress Seminar

Seminar Title : Hydrodynamic Behaviour of Cellets in a Spouted Bed and its Applications for Coating in Pharmaceutical Industry

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Venue : chemical engg. Dept., Old Seminar hall

Date & Time : 29 Sep 2022 (11.0am)

Abstract : The protection of pharmaceutical drugs by coating with suitable powder polymers plays a crucial role in the pharmaceutical industry. High level film uniformity is the major advantages of fluidized bed process over drum coating. The major aim of the present work is to study the hydrodynamic characteristics of a spouted bed where the Cellets^{TM} (Ph.Eur./USP) is adopted as the bed material which acts as a core material. Experiments are carried out with three different static bed heights of shallow depth ($3D_i < H_0$ &ge $2D_i$) using two different particle sizes. The spouted bed employed with D_i/D_0 of 5 has given the experimental information on external spouting (U_{es}) clearly by mapping the pressure drop, and fountain height against the superficial gas velocity (U_g) is represented with the image contours, which show the intrinsic behaviour. All the 1000 μm and 700 μm particles have been found to exhibit symmetric and asymmetric spouting. U_{es} is found to be 0.297, 0.339, 0.38, 0.38, 0.42 & 0.46 cm/s at H_0/d_p of 110, 120, 140, 142.85,171.43 & 200 respectively, where the coating has to be conducted above U_{es}.

Enteric coating acts a barrier to prevent the gastric acids in the stomach from dissolving or degrading drugs after swallow. Hydroxy propyl methyl cellulose acetate succinate (HPMCAS) soluble in medium of a pH &ge 6 was used as a commercial cellulosic enteric coating agent. For aqueous coating, proper dispersion of HPMCAS is necessary, whereas the existing pharmaceutical industrial grade of HPMCAS is granule grade > 1mm which is difficult to dissolve. Neutralizers are used to dissolve the HPMCAS which can produce transparent solution, thereafter it was casted into films for further studies. The influence of neutralizer on chemical and mechanical properties of the corresponding HPMCAS films were thoroughly investigated. Among all the neutralizer Ammonia Bicarbonate (ABC) will be an ideal neutralizer for producing HPMCAS enteric films.

Keywords: Spouted bed, Enteric coating, Cellets, HPMCAS