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Extrusion Technology in Pharmaceutical

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Extrusion is a well-known processing technology that has been developed over the last century and spans many diverse industrial fields. The extrusion technology is used in the processing of foods and the manufacturing of plastics. Today this technology has found its place in the array of pharmaceutical manufacturing operations. This technology use to increase the dissolution rates for poorly water soluble drugs, to modify drug release and transdermal passage of the drug.

Melt extrusion processing for pharmaceuticals is used in the manufacture of solid dispersions and controlled release products.

The preparation of the molecular dispersion of an active ingredient in a hydrophilic polymer is a powerful way for decomposing the crystalline structure of the drug and improving its solubility.

My student academic work aimed the preparation of solid solution of the poor water soluble spironolactone through twin-screw extrusion [1] process. The binary adducts of the drug and hydroxypropyl- β -cyclodextrin were prepared by solvent co-evaporation. DSC, Raman and FTIR studies indicate the absence of crystallinity of spironolactone due to the interaction.

The formed interaction in extrudates was investigated by Raman-, FTIR-spectrometry and XRPD. The influence of the screw rate on the inclusion complex was evaluated and an optimal rotation speed was found at which the fine dispersion of spironolactone can be obtained in the matrix moreover the residence time is quite long for the interaction.

Mamoru F., Dave A. Miller, Nicholas A Peppas and James W. McGinity. Influence of sulfobutyl ether β -cyclodextrin (Captisol®) on the dissolution properties of a poorly soluble drug from extrudates prepared by hot-melt extrusion. International Journal of Pharmaceutics 350 (2008) 188–196.