Extrusion of Pharmaceutical Polymer Formulations

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Polymeric materials are widely used in pharmaceutical applications, for example as excipients (non active ingredients) in tablets or capsules. Increasingly, extrusion or hot melt extrusion as it is referred to in pharmaceutical fields is being used to create polymer-drug blends or composites. The Active Pharmaceutical Ingredient (API) can be incorporated as a particulate dispersion or a molecular solution, depending upon the thermal and solubility properties of the constituents. By careful choice of polymers and other excipients such as plasticisers and binders it is possible to tailor the release properties of the drugs to suit specific applications, from rapid release within minutes to sustained release of up to several months for some surgical implants. Selection of extrusion conditions such as screw configuration, temperature, throughput and screw speed has a significant effect on the properties of the compound. Twin screw extrusion of pharmaceutical polymer compounds is reported here using a pharmaceutical grade 16mm diameter stainless steel extruder for a range of polymers and APIs. In particular, the effect of extrusion parameters and the application of in-process monitoring techniques will be discussed.