Abstract

The solid-state properties of powdered drugs and additives have great implications on the formulation, processing and performance of solid dosage forms. Therefore, the introductory part of the thesis included a discussion on the different methods used to manipulate physico-mechanical characteristics of pharmaceutical solids to solve problems related to inadequate material properties. These include: methods based on the use of additives, methods based on powder processing, and methods involving particulate engineering. The latter class of methods is gaining a growing interest as the use of materials with the desired properties would reduce the number of formulation components and individual unit operations to a minimum, thus rendering processing simpler and more economic. Methods based on modifying solid-state properties involve mainly controlled crystallization as well as alternative crystallization techniques. Also, the different techniques used to characterize the molecular, particulate and bulk properties of solids were discussed. Molecular properties (those defined as material characteristics that could be measured for individual molecules) include the chemical structure of the compound. Particulate properties (those pertaining to individual solid particles) include crystal habit, crystal size, and degree of crystallinity, polymorphism, pseudopolymorphism and thermal properties. Bulk properties (those associated with an assembly of associated species) include wettability, solubility, dissolution

rate, porosity, surface area, density, flowability and compressibility. A ”Surface Solvent Treatment” technique based on interactions at solid-liquid interface to modify inadequate properties of solid pharmaceuticals is the subject of this thesis. The technique involves suspending the powdered material in a preselected solvent with stirring for a predetermined time at a suitable solid / solvent ratio under controlled conditions. At the end of the treatment period, the treated powder is filtered under vacuum, dried and sieved into different particle size fractions. Promising results have been obtained earlier when the technique was applied to the modification of some physicomechanical properties of paracetamol and sulphadiazine. Therefore, the work in this thesis was divided into two parts:

Part I: Investigation and optimization of surface solvent treatment technique using metronidazole.

Part II: Modification of the physicomechanical properties of Ofloxacin using surface solvent treatment technique.