

EDITORIAL

Introductory Remarks Regarding The Rutgers University Symposium of March 18, 1991 entitled The Physics of Tablet Compaction

The Symposium sponsored by Berlex Laboratories on The Physics of Tablet Compaction which was held in March of 1991 at Rutgers University began with a plan to hold an in-house symposium on this subject at Berlex for its staff and invited guests. In the planning of the Symposium, as often happens the concept grew in scope and size until it became clear that a new venue was necessary. With the Establishment of the Pharmaceutical Compaction Research Laboratory and Information Center at The College of Pharmacy of Rutgers University, with which Berlex is affiliated as a consortial member, there was an appropriate organization to share in the planning of such program. This joint planning was recognized to be a key element for the organizing of a program which was felt would be of fundamental interest to so many members of the community of pharmaceutical scientists.

In organizing the Symposium certain objectives were clear from the outset. The Symposium was to include pharmaceutical scientists of note and accomplishment in the field as speakers. The presentations were to emphasize fundamental concepts as well as to provide some brief descriptions of the latest work in their respective fields. The program outline was to cover as much of the basics as could be scheduled in a one-day meeting. The Symposium was to be available to both industrial scientists working in pharmaceutical product development and to academic scientists conducting their own research programs in these areas. The program was to be useful to both groups in their

respective endeavors. The papers based on the talk were together to form a set which, when published, would constitute a useful, up-to-date reference work. The speakers at the Symposium, their presentations and the papers which follow, we believe have met these objectives very well. We hope that the Symposium attendees as well as interested readers will agree.

The Symposium began with a general review of the sequence of events which occur among the particles of powder in a die during the process of compaction. This presentation covered the various forces operating during the compaction process and their distribution through the powder as well as discussing the mechanisms of compaction. In addition it considered the effects of physical properties of the particles on the various stages of the compaction process. We thank Dr. Paul Wray of Ortho Pharmaceuticals for bringing the attendees to a common understanding of the events of the compaction process with this excellent talk.

A famous principle in science is that without quantification one's knowledge is of a meager kind. In the second talk Dr. Metin Celik of The Rutgers University College of Pharmacy presented a survey of the development and applications of the various mathematical models and treatments which have been employed to describe and analyze compaction data. In his Overview of Compaction Data Analysis Techniques Dr. Celik summarized the physical bases for the use of certain approaches such as the Heckel equation, the meaning and application of force-displacement curves and the significance of the energy of compaction. In this lively presentation Dr. Celik provided the attendees with the fundamental tools to conduct investigations in this area.

Dr. William Morehead of the McNeil Consumer Products Company was the third symposium presenter with his discussion entitled, Viscoelastic Behavior of Pharmaceutical Materials During Compaction. Dr. Morehead succeeded in creating an understanding in

this fascinating but difficult area of the ability to develop models for mechanical events during compaction. This is accomplished by the appropriate mathematical combinations of the separate viscous and elastic components of the properties of pharmaceutical materials. We are grateful to Dr. Morehead for his ability to add this important, and for many, new way of thinking about the compaction process to our concept base in such a rigorous and yet comprehensible way.

Professor Peter York of the University of Bradford was our Symposium's fourth noted speaker. Dr. York discussed the concepts around crystal properties and the possible opportunities for the "engineering" of the crystals of drug substance to improve their performance in the formation of a compacted dosage form. Dr. York's lucid and absorbing presentation reviewed the fundamental mechanical characteristics of crystals in the context of their relevance to the compaction process. Dr. York then proceeded to discuss ways in which crystals of drug substances might be produced to control such properties in order to optimize compaction behavior. We express our gratitude to Professor York for contributing this quite special insight into an approach to optimizing the "compactibility" of pharmaceutical formulations.

In the last presentation of the day we were treated to a view of the application of important new physical and mathematical concepts to the compaction process. Our final speaker of the day, who is well-known to a great many in the international community of pharmaceutical scientists, was Professor Hans Leuenberger of the University of Basel. Dr. Leuenberger reviewed some of the rudiments of fractal geometry and how, in combination with percolation theory, these sophisticated tools can be used to characterize and comprehend phenomena at the various stages of a powder compaction process. Professor Leuenberger discussed percolation thresholds, critical points in the properties of the compact, and the insight that can be gained from them about the spatial distributions of vacancies and interparticulate bonds that evolve as the compaction

proceeds. He was even able to show us how insight gained from this information could be applied to understanding the release characteristics of drug from a slow-release matrix dosage form. We express our special thanks to Professor Leuenberger for concluding our day of inquiry into the compaction process with these elegant mathematical descriptions of pharmaceutical compaction.

Together with thanking the speakers for their excellent and informative presentations we want to extend thanks also to those who worked behind the scenes to make the arrangements that supported such an event, Pat Kaufman, Jean Whitmore and Don Wernick of Rutgers University. We thank Berlex Laboratories, Inc. for providing the financial support which made his program possible. Finally we express our thanks to Professor Christopher Rhodes and to Marcel Dekker, Inc. for providing the opportunity to have the symposium published in *Drug Development and Industrial Pharmacy*, thereby making this important information available to pharmaceutical scientists around the world.

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