
The 7th KONA Award

The 7th KONA Award sponsored by Hosokawa Powder Technology Foundation and given to the scientists or groups who have achieved excellence in the researches related to the basic powder technology, was presented to Professor Yoshiaki Kawashima of Gifu College of Pharmacy and to Prof. Isao Sekiguchi of Chuo University by Masuo Hosokawa, President of the Foundation on January 19, 1998 at the R&D Center of Hosokawa Micron Corporation in Hirakata.

Prof. Kawashima's achievement consisted mainly of developing an original design method for the production of agglomerates with various medical functions (quick solubility, slow release characteristics, fluidity, tableting characteristics, consistency of content), by agglomeration processing in a liquid.

Firstly, various characteristics can be given to the primary and secondary properties of various medicines obtained by spray-drying under controlled drying temperature and spraying conditions. This showed that micro-capsules can be made in various shapes as well as methods for regulating the slow release characteristics, etc., of medicines.

Secondly, Prof. Kawashima made kinetic studies on the wet spherical agglomeration method by model experiments using calcium carbonate powder and computer simulations to clarify the agglomeration mechanism. On the basis of this basic study, the functional characteristics of produced agglomerates were researched in regards to various liquid systems and systems in which the various medicines would be used, and ways were developed for their application as coatings for medicines and for the DDS method.

Thirdly, spherical crystallization was developed as a further extension of the wet agglomeration method mentioned in the 2nd paragraph above, and a composite processing method of simultaneous crystallization and agglomeration was developed for the first time.

This method was further expanded to reaction systems, and it was shown that reaction and agglomeration could be achieved simultaneously.

The above three methods enabled simultaneous control over the primary characteristics of particulates and secondary characteristics of particulates after agglomeration, and have been widely accepted as a process proposal by which various high function medicines can be easily made. In this way, Prof. Kawashima's achievements have resulted in the development of many new conceptions and application aspects, and consequently have established a new method for designing particulates of superior functioning for medicines.

In contrast to the agglomeration in liquids by Prof. Kawashima, Prof. Sekiguchi's research mainly concerned agglomeration in a gaseous phase. This operation has been widely performed since ancient times, but it is an unstationary phenomenon in which an extremely great number of factors are involved and for which theoretical analysis is extremely difficult to make. In view of the technical importance of this operation, Prof. Sekiguchi proceeded with research in this field.

Basic research was conducted on a number of typical agglomeration methods and outstanding results were obtained, including a particle size distribution rule. Also, the various and diverse agglomeration methods and agglomeration apparatuses used in the respective industries were classified by their principle of operation, characteristics of materials and demands placed on products. This helped systematize the overall agglomeration technology. Furthermore, he introduced a large number of technical books and handbooks covering many technical fields, giving substantial guidance to technicians and researchers in related industries.

