

Recent techniques for particle size analysis of food powder

■ RANJEET SINGH

SUMMARY : Particle size information is a measure for the quality of processed food products. In this paper, an attempt has been made to review various techniques and methods used for particle size analysis of food powders. Various methods for particle size measurement *viz.*, based on separation, counting and ensemble methods are being used. Each measurement techniques produce a different answer because it is measuring a different dimension of particle. We have discussed some of the relative features, advantage and disadvantages of different methods employed for particle size analysis.

KEY WORDS : Particle size analysis, Sieve analysis, Sedimentation, Electro-zone sensing, Microscopy laser diffraction

How to cite this paper : Singh, Ranjeet (2012). Recent techniques for particle size analysis of food powder. *Internat. J. Proc. & Post Harvest Technol.*, 3 (2) : 315-319.

Research chronicle : Received : 13.07.2012; **Accepted :** 20.10.2012

The importance of information on particle size analysis in food industry and allied sector has grown up sharply during the last decade. An understanding of the characteristics of masses of particle solid is necessary in designing processes and equipments for processing. Processed products-can be characterized by a range of parameters, such as composition, particle size, shape, and surface area. To optimize processing and meet the needs of a processed end product, its most significant characteristics must be specified and tightly controlled. By controlling the distribution of the desired particle attributes, produce better flow characteristics or packing density will be controled and enhance the properties of the final product. The ability to accurately analyze and control particle size will help to design the dissolution rate of a drug and the hydration rate and texture of food product. It also predicts material-handling properties such as flowability, filter blockage, and dusting tendency, and, in doing so, to better design the process equipment.

Earlier, the standard screens were used to measure the size of particles in the range between about 3 and 0.0015 inches (76 mm and 38 mm). Each screen is identified in meshes per inch. The characteristics of one common series, Tyler standard screen are based on the opening of the 200-mesh screen

(McCabe *et al.*, 1993). In making an analysis, the sample is placed on the top screen and the stack shaken for 20 min. The particles retained on each screen are removed and weighed, and the mass of the individual screen increments is converted to mass fraction or mass percentages of the total sample. The approach is more appropriate for granules compared to powders. Particle size estimation of powders by sieve analysis method has an inbuilt problem of sticking sample particles on the sieve, thereby not permitting the small particle to pass through the sieve opening. However, the approach continued in the absence of better system. But these methods are not much accurate and could not deal with particle size distribution over a wide range of particle size. Although the effect of particles interacting with light was described early in last century, the idea of measuring particle size with physics principle could be realized only after reliable laser based system developed provided the source of monochromatic light and the microcomputers are powerful enough to calculate the particle size distribution. In parallel, the instrument based on laser diffraction (LD) was developed and had become the standard technique for particle size analysis in food and allied industry (Leschonski *et al.*, 1984).

The first instrument by mean of laser diffraction for particle size analysis (PSA) of powders covered a measuring ranges from coarser than 1 micron unto 200 microns. In the mid-eighties a different attitude towards the particle size analysis entered the global market with capable dry dispenser

AUTHOR FOR CORRESPONDENCE

RANJEET SINGH, Agro-Produce Processing Division, Central Institute of Agricultural Engineering, Nabi Bagh, BHOPAL (M.P.)INDIA
Email : razi100@rediffmail.com