a large surface area, flow easily, and spread uniformly. The large surface area will aid in absorbing perspiration and give a cooling sensation to the skin.

Insufflated Powders

Insufflated powders are finely divided powders that are intended to be applied in a body cavity, such as the ears, nose, vagina, tooth socket, or throat. When using an insufflator, or "puffer," the patient simply "puffs" the desired quantity of powder onto the affected area or into the cavity. This device is particularly appropriate for anti-infectives. Also, a moisture-activated adherent, such as Polyox, can be incorporated into the powder. Polyox is an ethylene oxide polymer with a high molecular weight that forms a viscous, mucoadhesive gel when in contact with moisture. The gel serves to provide a depot for long-term drug delivery spanning several hours.

Physicochemical Considerations

Before their use in the preparation of pharmaceutical products, solid materials first are characterized to determine their chemical and physical features, including morphology, purity, solubility, flowability, stability, particle size, uniformity, and compatibility with any other formulation components (1). Drug and other materials commonly require chemical or pharmaceutical processing to imbue the features desired to enable both the efficient production of a finished dosage form and the optimum therapeutic efficacy. This usually includes the adjustment and control of a powder's particle size.

Particle Size and Analysis

The particles of pharmaceutical powders and granules may range from being extremely coarse, about 10 mm (1 cm) in diameter, to extremely fine, approaching colloidal dimensions of 1 µm or less. In order to characterize the particle size of a given powder, the *United States Pharmacopeia* (USP) uses these descriptive terms: very coarse, coarse, moderately coarse, fine, and very fine, which are related to the proportion of powder that is capable of passing through the openings of standard sieves of varying fineness in a specified period while being shaken, generally in a mechanical sieve shaker (2). Table 6.1 presents the standard sieve numbers and the openings in each, expressed in millimeters and in microns. Sieves for such pharmaceutical testing and measurement are generally made of wire cloth woven from brass, bronze, or other suitable wire. They are not coated or plated.

Powders of vegetable and animal origin drugs are officially defined as follows (2):

- Very coarse (No. 8): All particles pass through a No. 8 sieve, and not more than 20% pass through a No. 60 sieve.
- Coarse (No. 20): All particles pass through a No. 20 sieve, and not more than 40% pass through a No. 60 sieve.
- Moderately coarse (No. 40): All particles pass through a No. 40 sieve, and not more than 40% pass through a No. 80 sieve.

Table 6.1 OPENING OF STANDARD SIEVES

SIEVE NUMBER	SIEVE OPENING
2.0	9.50 mm
3.5	5.60 mm
4.0	4.75 mm
8.0	2.36 mm
10.0	2.00 mm
20.0	850.00 µm
30.0	600.00 µm
40.0	425.00 µm
50.0	300.00 µm
60.0	250.00 µm
70.0	212.00 µm
80.0	180.00 µm
100.0	150.00 µm
120.0	125.00 µm
200.0	75.00 µm
230.0	63.00 µm
270.0	53.00 µm
325.0	45.00 µm
400.0	38.00 µm

Source: USP 31–NF 26.