



FIGURE 6.1 A FitzMill comminutor, model VFS-D6A-PCS, used for particle reduction, with attached containment system for protection of environment and prevention of product contamination. (Courtesy of the Fitzpatrick Company.)

equipment, a FitzMill comminuting machine with a product containment system. Through the grinding action of rapidly moving blades in the comminuting chamber, particles are reduced in size and passed through a screen of desired dimension to the collection container. The collection and containment system protects the environment from chemical dust, reduces product loss, and prevents product contamination.

Levigation is commonly used in small-scale preparation of ointments and suspensions to reduce the particle size and grittiness of the added powders. A mortar and pestle or an ointment tile may be used. A paste is formed by combining the powder and a small amount of liquid (the *levigating agent*) in which the powder is insoluble. The paste is then triturated, reducing the particle size. The levigated paste may then be added to the ointment base and the mixture made uniform and smooth by rubbing them together with a spatula on the ointment tile. A figure

8 track is commonly used to incorporate the materials. Mineral oil and glycerin are commonly used levigating agents.

Blending Powders

When two or more powdered substances are to be combined to form a uniform mixture, it is best to reduce the particle size of each powder individually before weighing and blending. Depending on the nature of the ingredients, the amount of powder, and the equipment, powders may be blended by spatulation, trituration, sifting, and tumbling.

Spatulation is blending small amounts of powders by movement of a spatula through them on a sheet of paper or an ointment tile. It is not suitable for large quantities of powders or for powders containing potent substances, because homogeneous blending is not as certain as other methods. Very little compression or compacting of the powder results from spatulation, which is especially suited to mixing solid substances that form *eutectic mixtures* (or liquefy) when in close and prolonged contact with one another (Table 6.2). To diminish contact, a powder prepared from such substances is commonly mixed in the presence of an inert diluent, such as light magnesium oxide or magnesium carbonate, to separate the troublesome agents physically.

Trituration may be employed both to comminute and to mix powders. If simple admixture is desired without the special need for comminution, the glass mortar is usually preferred. When a small amount of a potent substance is to be mixed with a large amount of diluent, the *geometric dilution* method is used to ensure the uniform distribution of the potent drug. This method is especially indicated when the potent substance and other ingredients are the same color and a visible sign of mixing is lacking. By this method, the potent drug is placed with an approximately equal volume of the diluent in a mortar and is mixed thoroughly by trituration. Then, a second portion of diluent equal in volume to the mixture is added and the trituration repeated. This process is continued by adding an equal volume of diluent to the powder