

Urethral suppositories may be prepared from a glycerinated gelatin base of a formula somewhat different from the one indicated earlier. For urethral suppositories, the gelatin constitutes about 60% of the weight of the formula, the glycerin about 20%, and the medicated aqueous portion about 20%. Urethral suppositories of glycerinated gelatin are much more easily inserted than those with a cocoa butter base owing to the brittleness of cocoa butter and its rapid softening at body temperature.

Various combinations of these polyethylene glycols may be combined by fusion, using two or more of the various types to achieve a suppository base of the desired consistency and characteristics. Polyethylene glycols are polymers of ethylene oxide and water prepared to various chain lengths, molecular weights, and physical states. They are available in a number of molecular weight ranges, the most commonly used being polyethylene glycol 300, 400, 600, 1,000, 1,500, 1,540, 3,350, 4,000, 6,000, and 8,000. The numeric designations refer to the average molecular weight of each of the polymers. Polyethylene glycols having average molecular weights of 300, 400, and 600 are clear, colorless liquids. Those having average molecular weights of greater than 1,000 are waxlike white solids whose hardness increases with an increase in the molecular weight. Melting ranges, for example, polyethylene glycols, are PEG 300 (−15°C to 18°C), PEG 1000 (37°C to 40°C), PEG 3350 (54°C to 58°C), and PEG 8000 (60°C to 63°C).

Pharmacists have been called on in recent years to prepare progesterone vaginal suppositories extemporaneously. These suppositories, used in premenstrual syndrome, are commonly molded with either a polyethylene glycol base or a fatty acid base. Formulas for these suppositories are presented later in this chapter.

Polyethylene glycol suppositories do not melt at body temperature but rather dissolve slowly in the body's fluids. Therefore, the base need not be formulated to melt at body temperature. Thus, it is possible, in fact routine, to prepare suppositories from polyethylene glycol mixtures having melting points

considerably higher than body temperature. This property permits a slower release of the medication from the base once the suppository has been inserted and permits convenient storage of these suppositories without need for refrigeration and without danger of their softening excessively in warm weather. Further, their solid nature permits slow insertion without fear that they will melt in the fingertips (as cocoa butter suppositories sometimes do). Because they do not melt at body temperature but mix with mucous secretions upon dissolution, polyethylene glycol-based suppositories do not leak from the orifice, as do many cocoa butter-based suppositories. Polyethylene glycol suppositories that do not contain at least 20% water should be dipped in water just before use to avoid irritation of the mucous membranes after insertion. This procedure prevents moisture being drawn from the tissues after insertion and the stinging sensation.

Poloxamers (Pluronic) are water-soluble, block copolymers with a wide range of uses. Pluronic L44, L62, L64, and F68 are potential suppository bases. The poloxamers have practically no odor or taste. An example of an aspirin suppository using a poloxamer base uses the following formula:

– Pluronic F68	6.00 g
– Pluronic L44	7.00 mL
– Aspirin	1.02 g

To prepare, the poloxamers were placed in a beaker on a water bath and heated until melted. The aspirin was added and the mixture stirred until uniform. The solution is placed in a mold and allowed to cool, and the suppositories are removed. The authors summarized that the Pluronic base aspirin suppository should be further tested in clinical situations (8).

FORMULATION VARIABLES

Formulation variables that are generally considered include (a) the nature and form of the active principle (esters, salts, complexes, etc.), (b) the physical state, particle dimensions, and the specific surface of the product, (c)