cator) in contact with a tube filled with a drug-containing ointment. The diffusion of the drug (as evidenced by a color change in the agar) was monitored, and the results were plotted as diffusion distance versus time. This method was later used by Billups and Sager (23) to measure the antiseptic properties of various ointments. In these experiments, diffusion of drugs from ointments into bacterially inoculated agar was assessed by the measurement of the length of a resulting zone of inhibition.

The method that has been used most frequently to assess the release of a drug from a vehicle involves the release of the drug from the vehicle directly into a stirred solvent. Most often the receptor solvent is present in a volume that allows sink conditions to be approximated throughout the course of an experiment. In this configuration, the vehicle slab is in direct contact with the receptor phase and, therefore, a solvent is chosen that does not dissolve the vehicle. This system was introduced by Poulsen et al. (24) to study the release of fluocinolone acetonide and its acetate ester from various propylene glycol–water gels into isopropyl myristate. With use of similar experimental designs, this group of researchers have systematically investigated the release of other topical steroids from various gelled solvent systems (25,26). Rank-order correlation between in vivo physiological responses and in vitro release for these drugs was shown. The choice of isopropyl myristate as a receptor phase has been given additional credibility through experiments by Scheuplein (27), who showed that topical corticosteroids are transported through the skin by way of a lipoidal pathway. Other investigators have utilized systems in which the vehicle is in direct contact with an aqueous receptor phase (28,29). In an interesting modification of Poulsen's method, Busse et al. (30) devised a three-layer system that consisted of a vehicle phase, an alcohol–water phase, and a chloroform phase. The alcohol–water phase was intended to represent the skin, and the chloroform phase acted as a sink. The release of betamethasone 17-valerate from two different ointment systems was studied with this experimental configuration.

When performing studies involving release from a topical formulation into a solvent receptor phase, it is preferable to reduce the probability that cross-contamination of the two phases will occur. Jurist (31) introduced a system for the study of the release of water-soluble materials from ointment bases. He described a dialysis cell method for measuring the ion-exchange capacity of a resin incorporated into an ointment base. The method involves the measurement of ion exchange through a semipermeable membrane. Mutimer et al. utilized this system for measuring the drug-release characteristics of several ointment bases (32). In their study, an ion-exchange resin was incorporated into each base, whereupon the formulation's ability to release drugs was judged by its ability to deliver hydrogen ions to an alkaline solution.