NOTES ON THE SUSPENSION OF SOLIDS IN LIQUIDS.*

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Pharmaceutical practice occasionally requires the suspension of powders in an oily or fatty vehicle. When such powders are of greater specific gravity than the vehicle and the latter is liquid, semiliquid or not solid at all temperatures at which it is apt to be stored, separation by settling usually occurs. Such separation may prove very annoying, especially in soft ointments and oily suspensions intended for hypodermic use. This separation, however, may be avoided, if the presence of water in the mixture is not objectionable, by the emulsification of the vehicle which makes a practically permanent suspension possible. In other words, the suspension of water in oil or oil in water acts as an effective barrier to the settling out of a finely divided solid even though the latter be quite heavy. Let me explain further by taking a practical example under consideration.

Mercuric salicylate is frequently prescribed for hypodermic or intramuscular injection in oil suspension. If powdered mercuric salicylate is triturated with almond oil so that each mil of the mixture will contain 0.13 gramme of the drug, settling becomes evident immediately on standing. In an hour about one-third of the powder will be deposited, while practically all of it will be deposited in twenty-four hours.

If the same mixture is made, except replacing a portion of the oil with anhydrous lanolin and water representing 20 and 5 percent of the finished volume respectively, no settling of the powder is noticeable, even on standing several weeks. On prolonged standing, a trace of clear oil will usually separate at the top but this is easily re-incorporated by shaking.

For the purpose of comparing the relative stability of the above described suspension, 10 mils of each were placed in a small graduated cylinder and kept under observation for a time. The result is shown in the following table:

Observation taken.	Mercuric salicylate in almond oil.	Mercuric salicylate in almond oil, containing 20% lanolin and 5% of water.
30 minutes	0.15 mil mercuric salicylate deposited on bottom	....
1 hour	0.25 mil mercuric salicylate deposited on bottom	....
3 hours	0.45 mil mercuric salicylate deposited on bottom	....
5 hours	0.55 mil mercuric salicylate deposited on bottom	....
6 hours	0.58 mil mercuric salicylate deposited on bottom	0.2 mil oil on top
7 hours	0.60 mil mercuric salicylate deposited on bottom	0.25 mil oil on top
24 hours	0.78 mil mercuric salicylate deposited on bottom	0.3 mil oil on top
2 days	0.75 mil mercuric salicylate deposited on bottom	0.6 mil oil on top
3 days	0.75 mil mercuric salicylate deposited on bottom	0.8 mil oil on top

At the end of 3 days there was practically no mercury salicylate left in suspension in the oil and it required vigorous shaking for about five minutes to reincorporate the powder which had settled out. No precipitation of mercury salicylate is visible in the mixture containing lanolin and water, even on standing several months, and the small amount of oil separating at the top is easily reincorporated by shaking. Further, the emulsion could be so adjusted that no oil will separate from it.

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