

THE EFFECT OF CHANGES OF HYDROGEN-ION CONCENTRATION
UPON COMPOUND TINCTURE OF GENTIAN.*

BY JOHN C. KRANTZ, JR., AND FRANK J. SLAMA.

It is well known that the three drugs entering into the manufacture of Compound Tincture of Gentian, when percolated with a hydro-alcoholic menstruum deposit a precipitate upon standing. Crips¹ has shown the precipitate to be composed of starch, gentian sugar and albuminous material. Hulick² observed that the presence of ten to twelve per cent of glycerin by volume prevented the deposition of this substance to a great degree. Although the menstruum employed by the Pharmacopœia contains ten per cent by volume of glycerin, the official product undergoes a considerable amount of precipitation after standing a short period of time. It occurred to the authors, that probably the amount of precipitation was a function of the hydrogen-ion concentration of the tincture, and possibly by controlling this important factor, the precipitation might be obviated or at least materially reduced.

METHOD OF STUDY.

Several tinctures were prepared from the same sample of ground drugs, taking care to employ uniform periods of time for maceration and the same volumes of menstrua in each case. The tinctures were prepared with the official menstrua adding various quantities of acids and sodium hydroxide. The acids hydrochloric, sulphuric and acetic were employed in the menstrua in dilutions from normal to ten thousandth normal, the hydrogen-ion concentration in each case was determined electrometrically. Likewise in other samples sodium hydroxide was added in concentrations from normal to ten thousandth normal and the p_H of these menstrua was determined. Several samples were prepared with distilled water, along with the alcohol and glycerin, without the addition of any acid or alkali, this, the official menstruum showed a p_H of 5.2. Fifty cubic centimeter samples of the tinctures were prepared and an average amount of deposit obtained in four samples with each different type of menstruum was determined over a period of three weeks, after which in all cases precipitation had ceased.

RESULTS.

The samples prepared with the different acid menstrua having a p_H from 0.8 to 4.5 showed an appreciable amount of precipitation after standing, the volumes of precipitate varied from 0.25 to 2 cc., the higher the hydrogen-ion concentration the greater was the degree of precipitation; the effect of the acid anions seemed negligible. The specimens prepared without the addition of acid showed less precipitation than any of those to which the acids had been added. Those prepared with sodium hydroxide varied in p_H from 6.8 to 13.2. Those containing a high hydroxyl-ion concentration were quite darker in color than the other samples and as in the case of those of a high hydrogen-ion concentration, underwent a considerable amount of precipitation. Those samples, the p_H of which ranged close to

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¹ *Pharm. J. Trans.* (Dec. 1883).

² *Proc. N. J. Pharm. Assoc.*, p. 87 (1909).

the neutrality point, *i. e.*, a p_H of 7 underwent the least amount of precipitation. This p_H may be obtained by adding a few drops of diluted alkali solution $N/1000$ to 500 cc. of official menstruum. It must be remembered, however, that the quantity of alkali required is dependent upon the actual acidity of the alcohol glycerin, and water and the p_H must be determined for each operation.

CONCLUSION.

The minimum amount of deposit in Compound Tincture of Gentian is formed when the p_H of the menstruum is adjusted near the neutral point.

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SOME PRESCRIPTION PROBLEMS.*

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The intention of the prescriber and a full knowledge of the properties of the ingredients of a prescription are, we believe, major factors to be kept in mind in solving most prescription problems. Many of the problems of the compounder are caused by the prescriber's lack of knowledge of the physical and chemical properties of the ingredients of his own prescription and, also, by his carelessness in writing the prescription. Problems resulting from such causes are difficult to consider as types, each requiring practically an individual solution. Examples of such problems are illegibility, extreme dosages, ambiguous dosage, misspelled titles, chemically incorrect vehicles, etc. We all know the diplomacy as well as the skill required in intelligently caring for these. It is not with this type of problems that we are about to deal. For this paper we have selected four type prescriptions, each seemingly simple and yet offering difficulties to the compounder. We selected these problems from many that have been presented to us during the past year because the solution of each seemed so evident but in practice did not yield the expected result.

For our first case we are going to consider the old and common prescription:

℞	
Tr. Benzoin	4
Glycerin	6
Aq. Rosae q.s.	60
Sig.: Benzoin Milk	

All books on compounding include this formula and apparently there is nothing left to be said about it. Nevertheless, in our experience we have found very few compounders who can prepare this every time without an unsightly precipitation of some of the benzoin. Many float the tincture upon the glycerin and water mixture and give it one sharp shake; others add the tincture drop by drop with constant agitation; none seem to be sure of the perfection of the finished product. Consequently, with the assistance of our associate, Fred E. Marsh, we sought a

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