The spongy compound formed is what I presumed to be a definite salt of stearic and palmitic acid, which I called stearo-palmitate of soda. (Pat. 18,060/-1915.)

This stearo-palmitate compound is always formed, apparently, at the boiling point of the liquid in which it is dissolved, and not at a fixed temperature.

The amount of liquid retained does not vary with the nature of the different liquids, but seems to be the same for all liquids under the same conditions.

Many chemists, and even expert analysts, look upon these solidified preparations as being soaps or, more precisely, medicated soaps. The facts do not confirm this view. While medicated soaps contain the various ingredients, in the shape of a salt like sodium phenate or sodium stearo-cresolate, etc., these ingredients cannot be extracted, except by a breaking-down of their salts. In the solidified preparations the liquids can be obtained in their normal state by simple pressure, without any physical or chemical change. The whole of the liquid solution, chemically and physically unchanged, can be recovered by evaporation, leaving the spongy case behind. I tried to submit various slides of these preparations to microscopical examination, but the difficulty of staining without dissolving them could not be overcome. I then tried polarized light, with splendid results, clearly revealing the structure of the spongy compound, with its series of sparkling crystals, in symmetrical rows, and intervening liquid, looking like a diamond studded map. I hope on a future occasion to show the importance of polarized light in the analysis of soaps.

ACETYLSALICYLIC ACID IN SODIUM CITRATE SOLUTION.*

BY PAUL NICHOLAS LEECH, PH.D.

Acetylsalicylic acid ("aspirin") is dispensed in dry condition because it is easily decomposed in the presence of moisture; also it is insoluble in water. However, articles have appeared recently in both medical and pharmaceutic literature claiming that acetylsalicylic acid may be dispensed *in solution* by aid of sodium citrate; also that the acetylsalicylic acid would not be decomposed. For instance, the following, which was probably abstracted from some American pharmaceutic publication, appeared in the *Prescriber*:[1]

> Acetylsalicylic acid (aspirin) is practically insoluble in water, and though soluble in alcohol such a solution is not generally suitable for administration. It is therefore usually given in tablets or cachets. Solution may be effected by addition of sodium bicarbonate, but as the resulting solution is merely a mixture of sodium acetate and sodium salicylate, this method is not admissible. It is said that sodium citrate will dissolve acetylsalicylic acid without dissociation: for each grain of aspirin 4 grains of sodium citrate should be added. Such a solution, flavored with syrup of lemon, is suitable for administration to children.

The usual test for decomposition of acetylsalicylic acid is the detection of the freed salicylic acid by means of ferric chloride solution. It occurred to me, therefore, that possibly such a test was used as a basis of the contention of the non-decomposition of acetylsalicylic acid in sodium citrate solution. If so, the seem-

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* From the Chemical Laboratory of the American Medical Association, and reprinted from the *Journal A. M. A.*, January 28, page 275.

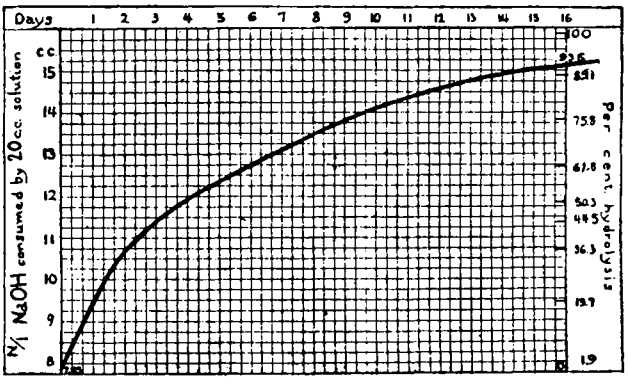
[1] "Solvent for Acetyl-Salicylic Acid," *The Prescriber*, June 1921, p. 247.

ingly negative reaction obtained may be misinterpreted, because citric acid, and citrates, interfere with the sensitiveness of the test, and hence it would not be reliable in the case at hand. To test this hypothesis, a solution was made up and the rate of hydrolysis determined by titrating with normal alkali during stated intervals. The solution was prepared by dissolving about 18 Gm. of pure acetylsalicylic acid and 72 Gm. of sodium citrate in 240 cc of water; after standing three hours it was filtered, and 20 cc used for the individual determinations. One teaspoonful of such a solution would represent about 5 grains of acetylsalicylic acid. The results of the titration will be found in the accompanying table. The solution was maintained at room temperature.

RESULTS OF TITRATION.

Interval of Time.	Cc of N/1 NaOH Consumed by 20 Cc of Solution
3 hours	8.0
1 day	9.4
2 days	10.7
3 days	11.35
$3^5/_6$ days	11.80
6 days	12.70
9 days	13.80
14 days	14.85
17 days	15.20
Complete hydrolysis	15.70

As will be noted in the accompanying chart, acetylsalicylic acid is hydrolyzed fairly rapidly in sodium citrate solution, over 50 percent decomposed in four days,



Hydrolysis of Acetylsalicylic Acid in Sodium Citrate Solution.

and 75 percent in nine days. Thus a patient taking such a mixture which was 9 or more days old would be getting essentially the same ingredients as if sodium acetate and sodium salicylate had been used in place of the acetylsalicylic acid.

Obviously, the assertion that acetylsalicylic acid is not broken down to form salicylic acid and acetic acid (or their salts) is not based on scientific work.

The hydrogen-ion concentration of the citrate solution alone was $p_H = 9.0$; after addition of acetylsalicylic acid, it was $p_H = 5.4$; after seventeen days it was $p_H = 4.6$. Thus it may be seen that the solution is appreciably acid, sufficient to decompose hexamethylenamine, with which it has been recommended to be dispensed.

Very recently 1 part of potassium citrate has been suggested in place of 4 parts of sodium citrate. Such a solution would hydrolyze, if anything, faster than one made with a higher concentration of the sodium salt.

CONCLUSION.

It has been claimed that acetylsalicylic acid may be dispensed in a solution of sodium citrate without decomposition of the acetylsalicylic acid. The experiments here reported show that this is incorrect; that after four days the acetylsalicylic acid is broken down to the extent of 50 percent; after nine days, to 75 percent, and that in seventeen days it is almost completely hydrolyzed.

SOLUBLE COMPOUND SPIRIT OF ORANGE AND A SIMPLIFIED PROCESS FOR AROMATIC ELIXIR.*

BY ERNEST R. JONES.

One of the simplest galenicals of the United States Pharmacopoeia to make is Aromatic Elixir and it is regrettable that so many pharmacists have given up the manufacture of this product. Yet, the fact is not to be wondered at for, simple as the formula appears, its clarification is very trying on one's patience, and the usual result is a cloudy preparation even after many repeated filtrations.

Some may disagree with me here and say, if I would try magnesium carbonate, I would have no trouble. I grant you that the clarification would then proceed beautifully, but we know that magnesium carbonate is slightly soluble, makes an alkaline elixir which may lead to dispensing difficulties, and must therefore be ruled out.

The reason for the difficulty in clarification is easily understood when the composition of the oils entering into the formula for Compound Spirit of Orange is studied. Only small fractions of oils of orange and lemon are of value as flavors, the balance of the oil being made up of various compounds, known as terpenes. These terpenes are soluble only in strong alcohol, have no flavor value and easily oxidize to products much resembling turpentine in odor. Oil of orange contains about 95 percent, oil of lemon about 90 percent, and oils of coriander and anise, none, or not more than traces of terpenes. In the case of the first two mentioned oils, this leaves a balance of only 5 and 10 percent, respectively, for the active flavor and associated compounds.

It is possible to separate and remove most of the terpenes from these two oils and thus obtain concentrated or so-called "terpeneless oils," which are much more soluble in low percentage alcohol. Terpeneless oil of lemon contains 60 percent citral, or is 15 times more concentrated than the U. S. P. oil of lemon which has a 4 percent citral content. Oil of orange is not standardized as to the content of any one compound, but the terpeneless oil of orange, I am reliably informed, is thirty times the U. S. P. strength. As experiments prove that the difficulty in clarifying the elixir is due to the terpenes in these two oils,[1] an elixir made from a Compound Spirit of Orange—which in turn is made from terpeneless oils—should be comparatively easy to clarify. We can go a step further and treat the Compound

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* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., New Orleans meeting, 1921.

[1] Oils of coriander and anise as used in Aromatic Elixir cause practically no cloudiness.