dissolve the cantharidin. This effect is apparently a depression of the ionization or neutralization of cantharidin, due possibly to the low dielectric constant of the solvent and its inability to ionize.

3. The effect of alcohol on other water-insoluble acid anhydrides has been investigated and it was shown that the two studied, benzoic and phthalic anhydrides, behaved similarly to cantharidin in attempts to titrate them quantitatively in the presence of alcohol. The effect of alcohol is thus apparently not restricted to cantharidin, but is general for all water-insoluble acid anhydrides.

4. A method has been developed for the quantitative titration of cantharidin, in which the organic solvent used to dissolve the compound is removed completely during the procedure, in the presence of water and excess alkali. This method yielded equally satisfactory results for cantharidin and the other anhydrides, benzoic and phthalic, and is generally applicable to all water-insoluble acid anhydrides.

5. The p_H's of solutions of potassium salts of cantharidic acid of various molar strengths have been determined. From these it was possible to estimate the ionization constant of the free acid, which was calculated as being 5×10^{-9}, stronger than boric acid but weaker than hydrosulfuric acid. It was also possible to calculate the degree of hydrolysis of the potassium salt as being approximately 2%.

REFERENCES

(1) Robiquet, M., *Ann. chim. phys.*, 76 (1810), 302.
(2) Picard, J., *Ber.*, 10 (1877), 150; 11 (1878), 2120.
(3) Homolka, B., *Ibid.*, 19 (1889), 1082.
(4) Anderlini, F., *Ibid.*, 23 (1890), 485.
(5) Spiegel, L., *Ibid.*, 25 (1892), 1468; 26 (1893), 148.
(6) Meyer, H., *Monatsh. Chem.*, 17 (1896), 429.
(7) Danckwortt, P. W., *Arch. Pharm.*, 252 (1914), 663.
(8) Gadamer, J., *Ibid.*, 252 (1914), 609; 255 (1917), 315.
(9) Rudolph, W., *Ibid.*, 254 (1916), 432.
(10) Scoville, W. L., JOUR. A. PH. A., 2 (1913), 18.
(11) Scoville, W. L., *Ibid.*, 8 (1919), 1031.
(12) Gadamer, J., *Arch. Pharm.*, 252 (1914), 622.
(13) Taylor, H. S., "A Treatise on Physical Chemistry," 2 (1931), 907.
(14) Mulliken, S. P., "Identification of Pure Organic Compounds," 1 (1904), 129.

The Sterol and Resin Alcohols from Celastrus Scandens

*By Ole Gisvold**

During the investigation of the pigments contained in the petroleum ether extract of the outer bark of the root of *Celastrus Scandens*, it was deemed advisable to investigate the phytosterols which might be present. In addition to the sterol that was apparently a sitosterol or a mixture of sitosterols, three resin alcohols were isolated.

EXPERIMENTAL

Phytosterol.—The pigment-free petroleum ether extract obtained from the outer bark of the root of *Celastrus Scandens* was saponified with alcoholic potassium hydroxide and the nonsaponifiable residue extracted by means of a continuous extraction apparatus with Skelly-solve B. The solvent was removed on a steam-bath and the residue taken up in alcohol. Fractional crystallization enabled the separation of some phytosterol. The residual sterol was isolated by means of its digitonide (1). The digitonide was decomposed by precipitating the digitonin with ether from a pyridine solution of the complex (2).

The purified sterol melted at 137.5° C. and its acetate at 121° C. It had a specific rotation of −32.5 in chloroform at 25° C. It gave the color reactions characteristic of sterols.

A number of sterols have been reported in the literature having physical constants closely approaching those given above. It is highly possible that it is a mixture. The amount isolated was too small to warrant further investigation.

Resin Alcohol No. 1.—The sterol-free nonsaponifiable material upon spontaneous concentration deposited needle-like crystals in an oily residue. The oily material was successfully removed by washing with cold Skelly-solve B. The crystals purified by several recrystallizations from Skelly-solve B became soft at 215° C. and clear at 221° C.

These crystals gave a deep purple color when subjected to the Lieberman-Burchard test. The material available was too small for further investigation.

Resin Alcohol No. 2.—The mother liquor upon spontaneous evaporation left a very viscous oil from which needle-like crystals slowly separated.

* Department of Pharmaceutical Chemistry, College of Pharmacy, University of Minnesota, Minneapolis, Minnesota.

These crystals were removed from the noncrystalline portion by stirring with Skelly-solve B in which the latter was readily soluble. The crystalline portion was removed by a suction filter. This material when purified by several recrystallizations from a mixture of alcohol and ether, gave rosettes of needles. The crystals melted at 175° C. and its acetate at 195° C. The free alcohol gave a rose to rose purple and finally a deep purple when subjected to the Lieberman-Burchard test for sterols.

Resin Alcohol No. 3.—Prolonged extraction of the nonsaponifiable portion with Skelly-solve B gave a very small amount of material which crystallized in rosettes of needles from the concentrated extract. Several crystallizations from alcohol and ether gave rosettes of platelets. These crystals although appearing to be very pure gave a very indefinite melting point. They appeared to soften at about 220° C. and liquefied at 235° C.

These crystals gave a pink to orange to a red-orange with the Lieberman-Burchard reagent. The amount of material was too small to warrant the preparation of a derivative or further investigation.

SUMMARY

A phytosterol, apparently one of the sitosterols or a mixture of sterols, and three resin alcohols were isolated from the nonsaponifiable portion of the petroleum ether extract of the outer bark of the root of *Celastrus Scandens*.

REFERENCES

(1) *Z. physiol Chem.*, 65 (1910), 110.
(2) *Biochem. Z.*, 282 (1935), 441.

Incompatibilities in Prescriptions

III. The Use of Inert Powders in Capsules to Prevent Liquefaction Due to Formation of a Eutectic Mixture*,†

By William J. Husa‡ and Charles H. Becker

In filling prescriptions for powder mixtures to be dispensed in capsules, pharmacists frequently encounter difficulties due to liquefaction or formation of a pasty mass (1), (2). The present paper is devoted to the correction of incompatibilities due to formation of a mixture having a melting point below room temperature (eutectic mixture).

One of the methods used in dealing with powders which liquefy or become pasty is to incorporate an inert powder such as starch, magnesium oxide, magnesium carbonate, talc, lactose, etc. In spite of the wide use of such inert powders, apparently no systematic studies have previously been made to determine the relative efficiency of the various powders, or to ascertain the best methods of combining the inert powders with the ingredients prescribed.

The present investigation was carried out to supply practicing pharmacists and teachers of pharmaceutical dispensing with more exact information regarding the best methods of selecting and using inert powders to overcome liquefaction in prescriptions for capsules.

EXPERIMENTAL PART

Prescription No. 1

℞ Camphor	gr. 1/4
Salol	gr. iii

Fac tales capsulæ no. xx. One capsule t. i. d. a. c.

When the ingredients of this prescription were triturated a pasty mass was formed. A study was made to determine the relative efficiencies of eight different inert powders in preventing or obviating the difficulty. In each case the camphor was triturated with the inert powder; the salol was then added and the mixture triturated lightly. The temperature at the time of compounding was from 70° to 74° F. The finished capsules were kept under observation for two weeks in open beakers as well as in closed capsule vials.

With reference to the period of observation, it may be said that many pharmacists lay too much stress on the appearance of capsules at the time they are dispensed, with little consideration of the changes which may occur before all the capsules are used.

Obviously the use of an inert powder increases the size of the capsule to a certain extent depending on the relative quantity of powder used and its bulkiness. This factor must always be kept in mind since many patients find it difficult to swallow the larger capsules. In exceptional cases it may be necessary to divide the material into twice the number of capsules designated and to double the dose

* Presented before the Section on Practical Pharmacy and Dispensing, A. PH. A., Atlanta meeting, 1939.

† This paper is based on part of a thesis presented to the Graduate Council of the University of Florida by Charles H. Becker, in partial fulfilment of the requirements for the degree of Master of Science in Pharmacy.

‡ Head Professor of Pharmacy, University of Florida.