After making this comparative study, we feel that the variation in percentage strengths of the constituents of these bases is neglible. We find that we can make just as satisfactory products using Simple Ointment in place of the basal constituents as listed in the different monographs. For the convenience of the pharmacist who can make these ointments using a standard base, we ask the question: why cannot we have Simple Ointment as the base for the ointments in the Pharmacopœia as was done in previous revisions?

IODINE IN LIQUID PETROLATUM.*

ITS PREPARATION AND A METHOD FOR ASSAY.

S. W. BOWER AND LEWIS G. FREEMAN.[1]

The therapeutic value of Iodine in Liquid Petrolatum has long been recognized, but no satisfactory method of procedure has been advanced to obtain a solution, the definite strength of which may be reasonably certain in the finished preparation. The lack of uniformity of the product is largely dependent upon the method of dissolving the Iodine, also, the volatility of this element at room temperature requires extra precautions in effecting solutions. Furthermore, the time required for solution is governed by the viscosity of Liquid Petrolatum used. On account of these differences several questions arise.

How much Iodine is lost by the prevalent trituration procedure?

Is the often recommended addition of Potassium Iodide advantageous in effecting solution more rapidly and is the limit of solubility increased by this addition?

Is this limit of solubility the same in Light Liquid Petrolatum and Heavy Liquid Petrolatum?

Are the advantages of solubility obtained by any alternative method superior to solutions made by trituration?

Limited information is available on the physical constants of solubility of Iodine in Liquid Petrolatums. Clark (1) in 1919 reported the findings of the Chemical Laboratory of the American Medical Association, in which a saturated solution was equivalent to 1.4% Iodine. No statement of specific gravity and viscosity of the Petrolatums used in this experiment is given. Two kinds of Liquid Petrolatum are described in the U. S. P.—the Heavy Liquid Petrolatum having a kinematic viscosity of not less than 0.381 at 37.8° C., and the Light Liquid Petrolatum having kinematic viscosity of not more than 0.370 at 37.8° C. No limit is given for the specific gravity of each, but a range of 0.828 to 0.905 at 25° C. is the U. S. P. XI standard.

One commercial source supplies six grades having definite physical constants for both viscosity and specific gravity. They are according to trade names:

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(x)	Liquid Petrolatum.	Specific Gravity.	Kinematic Viscosity.
1	Amsol	0.8900–0.9050	0.735–0.757
2	Soconol	0.8850–0.8950	0.702–0.724
3	Talcol	0.8750–0.8850	0.437–0.460
4	Amtol	0.8650–0.8750	0.301–0.324
5	Panacol	0.8600–0.8700	0.265–0.289
6	Comptol	0.8450–0.8550	0.156–0.182

(x) Furnished by Standard Oil Company of New York.

The label statements for the physical constants of the commercial available forms are either that of the U. S. P. limits or none at all. Greater detail of specifications are desirous for uniformity.

The only assay method given in the literature for Iodine in Liquid Petrolatum is that furnished by Clark (1), who uses chloroform to extract the Iodine from the Petrolatum and subsequently titrates with Sodium Thiosulfate solution using starch indicator. The end-point in this method is not sufficiently sharp due to length of reaction time of starch iodide—frequently requiring 0.3-cc. excess of Thiosulfate—therefore, back titration is necessary to avoid error.

The following method using alcohol for extraction was devised, so that the completion of the reaction is immediate and definite:

Transfer about 10 Gm. of Iodine in Liquid Petrolatum mixture, accurately weighed, into a separatory funnel. Add 25 cc. of ethyl alcohol and shake for one minute. After settling, draw off the lower layer into a second separator, shaking the Liquid Petrolatum mixture again with 25 cc. of alcohol. Proceed in this way until extraction is completed as indicated by a colorless Liquid Petrolatum. Usually four extractions are necessary. Rinse funnels with a little alcohol adding the washings to previous extractions. To the combined extracts, add 100 cc. of distilled water, 10 cc. of Potassium Iodide T.S. and with starch solution as indicator, titrate with $N/10$ Sodium Thiosulfate until colorless. Each cc. of tenth-normal Sodium Thiosulfate used is equivalent to 0.01269 Gm. of Iodine.

To serve as a check on this method, a concentration falling below the saturation point was prepared. In a tared volumetric flask a definite weight of Liquid Petrolatum was added to a previously accurately weighed quantity of pulverized recrystallized Iodine. After ten minutes of constant shaking, the container was placed in a water-bath at 80° C. for one-half hour, shaking intermittently. Complete solution resulted. Upon cooling to room temperature the preparation was assayed by the above method. From the weight of the Iodine and Liquid Petrolatum used, the per cent of Iodine recovered was calculated. The accuracy of this method is shown in Table I.

TABLE I.

Petrolatum Weighed, Gm.	Iodine Weighed, Gm.	Iodine Found, Gm.	Per Cent Iodine Recovered.
Sp. gr. 0.8506	...	...	...
89.73	1.0549	1.0526	99.78
97.40	1.1485	1.1460	99.79
93.27	1.0965	1.0914	99.53
103.50	1.2169	1.2205	100.30
Sp. gr. 0.8731	...	...	...
107.92	1.2360	1.2384	100.20

Saturation points of Iodine in seven different Liquid Petrolatums in which solution was effected by digesting the mixture for three hours at 100° C. resulted in variations from 1.32 to 1.42 per cent Iodine by weight as given in Table II.

TABLE II.

Oil.	Specific Gravity.	Per Cent Iodine.
A—P. D. & Co.—Light	0.8506	1.39
B—Comptol	0.8562	1.33
C—Amtol	0.8674	1.40
D—Commercial	0.8731	1.42
E—Talcol	0.8746	1.32
F—Soconol	0.8846	1.36
G—P. D. & Co.—Heavy	0.8886	1.37

Experiments were conducted to determine if the solubility of Iodine in Liquid Petrolatum is increased by the addition of Potassium Iodide. Using Light Liquid Petrolatum, Sample A, supersaturated Iodine solutions were prepared by heat to which 1% and 2%, respectively, of Potassium Iodide were added. The supernatant liquids on assay were equivalent to 1.389 and 1.40 per cent Iodine. Evidently the increase in solubility or as an aid to solution is not substantiated for Iodine in Liquid Petrolatum as is the case in alcoholic, hydroalcoholic and aqueous solutions.

Numerous difficulties are encountered in dissolving Iodine in Liquid Petrolatum by trituration, such as the volatility of the Iodine, differences in viscosity of the Liquid Petrolatum and time required to make solution. Appreciable variations in strength result, depending upon the method of procedure used in effecting solution. The prevalence of triturating Iodine in Liquid Petrolatum is no reason for its continuance, especially when the volatility of the element at room temperature means loss in the finished preparation depending upon the length of time required. This loss, using different viscosities of Liquid Petrolatum, may be greater than imagined. Even though great care may be employed in weighing the small quantity prescribed, the procedure can defeat the obtaining of a uniform, accurate product. Justification of this was found by having the Senior Dispensing Class prepare one-fourth to one per cent solutions of Iodine in Liquid Petrolatum of one- and two-ounce quantities. In no case was solution effected in less than ten minutes and upon assay the Iodine in the resulting product was equivalent to 40–75% of the quantity weighed.

Further recheck of this student contribution was made using 0.065 and 0.130 Gm. of Iodine in 30 cc. of Liquid Petrolatum, Samples A and D. From the figures given in Table III, it is evident that quantity, time and viscosity are variables

TABLE III.

Iodine Weighed, Gm.	Kind of Oil.	Quantity, Cc.	Trituration Time, Minutes.	Iodine Recovered.	Per Cent Iodine Recovered.
(x) 0.065	A	30	5	0.0532	81.85
(x) 0.130	A	30	11	0.0993	76.38
0.065	A	30	11	0.0475	73.08
0.065	A	30	12	0.0456	70.16
0.130	A	30	20	0.0798	61.40
0.065	D	30	20	0.0418	64.31
0.130	D	30	30	0.0608	46.78

(x) Chloroform dispersion.

which prevent an accurate product. It is interesting to note that several drops of chloroform used in pulverizing the Iodine previous to adding the Liquid Petrolatum decreased the trituration time and reduced the per cent loss in the finished product.

In order to overcome these difficulties the following method is recommended. Heat the Liquid Petrolatum contained in a glass-stoppered bottle to 70° C. in a water-bath, this requiring 6 to 7 minutes. To this heated oil on the water-bath add the prescribed amount of Iodine. Complete solution is effected requiring five minutes for one-quarter per cent to 23 minutes for one per cent. The apparent loss as given in Table IV may be explained by the smaller amount of Iodine weighed. It is evident that both compounding time and accuracy are gained.

TABLE IV.

Iodine in Preparation, Gm. per 30 Cc.	Time on Water-Bath 70° C., Minutes.	Iodine Recovered in Solution, Gm. per 30 Cc.	Per Cent Iodine Recovered.
0.065	6.5	0.0631	97.2
0.065	7.0	0.0648	99.8
0.130	11.0	0.1267	97.5
0.130	11.0	0.1281	98.6
0.195	17.0	0.1916	98.3
0.260	23.0	0.2579	99.2
0.260	23.0	0.2561	98.5

When such solutions are made on a water-bath using screw-capped bottles, the assay shows 15–20% Iodine loss in the solution which was found deposited on the cork or alkali liner at the top of bottle. This shows the necessity of using only a glass-stoppered container in preparing solutions of this nature.

SUMMARY.

1. A method for assaying Iodine in Liquid Petrolatum is presented.
2. The saturation point of Iodine in Liquid Petrolatum ranges from 1.32% to 1.42% controlled by the viscosity of the Liquid Petrolatum.
3. The errors in trituration procedure are demonstrated.
4. An accurate method for incorporating 1/4–1% of Iodine in Liquid Petrolatum is given.

REFERENCE.

(1) Clark, Albert H., JOUR. A. PH. A., 8, 611–615 (1919).

DEVELOPING THE PROFESSION OF PHARMACY THROUGH THE HOSPITAL.*

BY DON A. BROOKE.[1]

To every registered druggist who is a college man there should be two main objectives in his relation toward pharmacy: *First*, to establish himself as a professional man in his community; *second*, to raise the standards of Pharmacy to a level with that of the allied professions, *i. e.*, Medicine, Dentistry and Nursing.

This can be accomplished in the smaller cities or towns of 10,000 to 20,000 through the local hospital. In the smaller cities especially, the hospital is regarded

* Presented before the Sub-Section on Hospital Pharmacy, New York meeting, 1937.

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