

PURITY OF CHEMICALS AND DRUGS.

H. ENGELHARDT, BALTIMORE, MD.

During the year between June 1, 1911, and May 31, 1912, about seven thousand shipments of chemicals were examined. As I have pointed out on a previous occasion, the Pure Food and Drugs Act has exerted a very beneficial influence on the drug market, inasmuch as only a very few lots were found which were unfit for use. Not one lot was received which was greatly adulterated; those chemicals which were rejected being carelessly manufactured.

A lot of *Sodium Hydroxide* assayed far below 90 percent of absolute hydroxide, and contained an appreciable amount of carbonate.

A large shipment of *Powdered Opium* contained less than 12 percent of crystallized morphine.

A shipment of *Milk Sugar* contained an undue amount of cane sugar, when tested according to the U. S. P. even by keeping the temperature of the mixture of dilute alcohol and sugar below 15° C.

Potassium Carbonate. One lot assayed only 94.5 percent.

Beechwood Creosote. Several lots were received which possessed an odor recalling that of carbon disulphide.

Gold and Sodium Chloride. Two lots assayed only 22 percent of metallic gold.

Nitroglycerin Solution. One lot which assayed only 8 percent of nitroglycerin instead of 10 percent had to be rejected. In connection with this article and *Spirit of Nitroglycerin* it may be said that rather accurate results are obtained by allowing 5 cc. of the solution to evaporate spontaneously and drying the residue in a desiccator over sulphuric acid to a constant weight. The results thus obtained compare favorably with those obtained by the colorimetric methods with phenoldisulphonic acid or naphthylamine. The requirements for *Spirit of Nitroglycerin*, given in the U. S. P. should be changed. The specific gravity of a one percent solution is about 0.817 at 25° C., and 10 cc. of the solution, when cooled at 15° C. and mixed with 11 cc. of distilled water of the same temperature should show a faint opalescence, and on the addition of 1 cc. more of water should exhibit a turbidity.

Calcium Glycerophosphate. Considerable trouble was experienced with this salt. Although both by incineration and titration it could be shown that the salt was free from di- and tri-phosphoric acid ester, it possessed peculiar physical properties, which rendered it insoluble in 30 parts of water. When brought in contact with water insufficient for solution, the salt caked and did not retain its granular form. We are still engaged in an investigation of this salt, and we hope to report on this article at an early date.

Various other shipments of drugs had to be rejected for minor reasons, but in general, as mentioned before, the chemicals were entirely satisfactory.

Less satisfactory were the vegetable drugs submitted to us, as may be seen from the following:

Aconite Root. Of eleven samples examined, five assayed below 0.5 percent of ether-soluble alkaloids. The variation in alkaloidal strength was from 0.39 to 1.0 percent.

Asafetida. Twenty-four samples were examined. Eight of these contained less than 50 percent alcohol-soluble matter and in ten the ash exceeded 30 percent. The following results were obtained:

Alcohol Soluble Matter	Ash	Alcohol Soluble Matter	Ash
66.6	32.0	77.5	15.3
74.8	6.2	56.6	33.0
67.6	1.4	75.3	4.9
48.1	22.6	40.8	42.2
48.9	39.3	71.9	14.1
49.0	30.5	51.0	40.0
79.8	3.0	80.0	8.0
40.0	43.1	50.0	58.0
70.0	8.7	69.5	16.0
72.3	9.6	56.3	7.0
57.8	24.0	42.7	36.0
30.8	50.0	33.0	45.3

Belladonna Leaves. None of the samples examined were below U. S. P. strength. The percentage of alkaloids ranged between 0.36 and 0.60 percent.

Belladonna Root. Eleven out of twenty-six samples were deficient in alkaloids. The standard for this drug should be retained at 0.45 percent or even be reduced to 0.4 percent.

Benzoin. Ten out of sixteen samples of this item contained less than 80 percent alcohol-soluble matter, but all samples yielded on incineration less than 2 percent of ash.

Black Pepper. Four samples yielded on extraction 10.6, 12.5, 9.2 and 11 percent, respectively, of oleoresin.

Calabar Bean. Only two out of four samples came up to the required 0.15 percent of ether-soluble alkaloids, when assayed by the U. S. P. method. The latter should be modified by allowing the alkaline liquid to be shaken with ether (about ten times) until the alkaloids are completely extracted.

Capsicum. Six samples yielded 13.1, 14.8, 15.26, 15.8, 11.3 and 11.0 percent of oleoresin, respectively.

Cinchona Calisaya and Red Cinchona. All twenty-seven samples came up fully to the required strength.

Coca. The samples submitted (eight) were of good quality, some assaying 1 percent and more of ether-soluble alkaloids.

Colchicum Root. Of eighteen samples, six were below U. S. P. strength, and of

Colchicum Seed two samples out of six were deficient in colchicine, when examined by the unreliable official method.

Cubeb. The percentage of oleoresin varied from 18 to 25 percent.

Ergot. Fourteen samples out of forty-five had to be rejected partly on account of being deficient in cornutine and partly because they were in a moist and mouldy condition.

Golden Seal. One sample assayed only 1.5 percent of hydrastine, while eight other samples assayed higher than the U. S. P. requires. Some contained 3.5 percent and more of hydrastine.

Guaiac. Thirteen samples were examined. Two contained less than 85 percent of alcohol soluble matter, and in four the ash exceeded 4 percent.

Guarana. Four samples assayed 4.2, 4.28, 4.5 and 3.9 percent respectively of caffeine.

Gamboge. All six samples were of good quality.

Ginger. The percentage of oleoresin in Jamaica ginger varied from 2.81 to 5.24 percent. Eight samples were tested.

Henbane. We were compelled to reject seventeen out of thirty samples because they were deficient in mydriatic alkaloids. The standard for this drug should be reduced to 0.07 percent.

Ipecac. Both the Carthagena and Rio varieties were of fairly good quality. Five samples out of twenty-eight of the former and one sample out of eight of the latter were rejected.

Jalap. During the year previous to the last the samples of Jalap were of much better quality than those received during the latter period. Although we had no difficulty in obtaining a drug with 10 percent and more of resin, some samples even containing as much as 15 and 20 percent, many samples of poor quality were offered. We were compelled to reject seventeen out of thirty-seven samples or almost 50 percent. Some of these assayed below 5 percent of resin.

Kola. Seven samples out of twenty-one contained less than 1.5 percent of caffeine.

Kino. The solubilities of six samples of kino were the following:

Boiling Water	Alcohol
79.4	14.5
97.4	89.4
95.3	82.8
91.6	39.1
98.8	65.5
89.5	86.1

Lupulin. Twelve samples were examined. Eight contained below 60 percent of ether-soluble matter and eleven yielded on incineration more than 10 percent of ash. The latter in some of the samples amounted to 35 percent.

Myrrh. Of six samples of myrrh, the solubility in alcohol varied between 26.0 and 40.73 percent. On incineration, ash was obtained which varied between 4.56 and 11.9 percent.

Nux Vomica. All samples complied with the official requirements.

Opium. Thirty-two cases of opium were examined. The percentage of crystallized morphine averaged about 11.0 percent.

Parsley Seed. Three samples yielded 14.7, 11.4 and 13.04 percent, respectively, of oleoresin.

Strophanthus. All the samples examined were Kombé seed and contained more than six percent of strophanthin.

Stramonium. Eight samples were examined and were found to be of good quality. Some assaying nearly 0.5 percent of mydriatic alkaloids. There was no good reason for reducing the standard of this drug.