

Alcohol.**Distilled water.**

Other solutions may be found necessary, and may be either kept in stock or prepared as required. The elementary apparatus above described will enable the pharmacist to examine the greater proportion of his drugs which are liable to adulteration. Of course, if the pharmacist be a good analyst he will enlarge this in all probability, and will submit his drugs to a more exhaustive examination; but if not, the description of the more simple tests will afford the pharmacist who is not so skilled in analysis sufficient information to attain the end we have in view, namely, the protection of himself against prosecution under the Food and Drugs Act.

There is a mention several times in this article of the specific gravity of liquids. In the enumeration of the apparatus required we have also mentioned the specific gravity bottle. Although it is a simple operation, we may, nevertheless, explain briefly the taking of the specific gravity of a liquid. This is got by taking the net weight of the distilled water in the specific gravity bottle when full, and the net weight of the liquid to be tested filling the same bottle. Then divide the weight of the liquid by the weight of the water. We now pass on to our list of drugs.

OLIVE OIL.

For a complete analysis of olive oil, it would be necessary to apply a number of tests of great delicacy, as the adulteration in this article is very judiciously managed in some cases, especially when the oil is intended for medicinal use. However, there are several easily-applied tests which will at least give the chemist a very fair idea of its purity. The specific gravity is of the highest importance, and can easily be taken in the specific gravity bottle above mentioned.

It should never be less than .914, nor more than .918. Any higher gravity than this latter should at once condemn the oil as being adulterated, in all probability with cotton seed, sesame, or arachis oil. In addition to this, the following test, known as Conroy's, should be applied. About 6 fluid drams of the oil are mixed with $\frac{1}{2}$ dram of strong nitric acid in a large porcelain dish, and heated gradually until chemical action sets up, the source of heat taken away, and the mixture is then stirred until the action ceases. If the oil is pure, a pale, straw-colored mass results, which sets solid in two hours. The other seed oils commonly used for adulterating olive oil give a deep orange red mass, which does not set like olive oil. About 2 fluid drams of the oil may be heated on the water-bath with the same quantity of alcohol, in which 1 gram of nitrate of silver has been dissolved. If so little as 5 per cent. of cotton seed oil be present, the mixture, which should be shaken from time to time, will become black in a quarter of an hour.

VINEGAR AND ACETIC ACID.

To determine whether a given sample is vinegar or not is a task which involves great difficulties, and skilled analysts often disagree on a given sample; so that the pharmacist must, of necessity, in most cases, confine himself to determining the actual quantity of real acetic acid present. The specific gravity of the vinegar should be taken—it is usually about 1.018. Then a given quantity, say 4 fluid drams, should be diluted with water until the odor is very light, a few drops of solution of phenol-phthalein added, and the liquid titrated in the usual way with standard solution of soda. The 4 drams should require 220 minims of the soda solution. It is possible, however, that the free acid may partially consist of a mineral acid—for example, sulphuric acid. In order to satisfy oneself that this is not the case, a few fluid drams should be evaporated to dryness, when the resulting residue should not refuse to dry, nor begin to char. Further, when dry, the residue should be ignited and a little hot water (distilled, of course) be added, with a drop of phenol-phthalein solution, and if the ash is alkaline, as shown by the red color, no free sulphuric acid can have been present. In the case of ordinary acetic acid, the only difference to be observed is that no appreciable ash will be obtained. In the case of vinegar, barium chloride will often give a slight precipitate, but this may be due to the presence of sulphates, not necessarily sulphuric acid itself. A precipitate in acetic acid, however, is indicative of free sulphuric acid, since no bases to combine with the acid and form sulphates should be present.

ALMOND OIL.

Not only is almond oil often adulterated, but it is very frequently entirely substituted by peach or apricot kernel oil, sometimes sold under the name of oil amygdale (exot.). The specific gravity of almond oil should never be less than .914, nor more than .919, and is usually about .917. The two oils above named have gravities of .920 to .923, or even a little higher. With regard to a careful examination of this oil, the same remarks apply as in the case of olive oil. There are one or two simple tests, however, that are easily applied, and which yield useful results. A solution of zinc chloride is prepared by saturating strong hydrochloric acid with zinc oxide. Five drops of this and 10 of the oil are stirred together on a glass plate with a glass rod, and the color resulting is noted. Almond oil gives no color, peach kernel oil gives a purple brown, and apricot kernel oil gives a very similar, but a rather more muddy, brown color. This is a very useful and reliable reaction.

GINGER.

Now that a conviction has been obtained for the sale of partially exhausted whole ginger, pharmacists must be careful in their purchases of this drug. The best method for testing this article is a

little tedious, but presents no difficulty and requires but little apparatus. A weighed quantity is dried at the water bath temperature for six hours, and the loss in weight is taken. Nearly all this is due to moisture, and it should never exceed 15 per cent. In good ground ginger it is seldom so much. One hundred grains or any convenient quantity are then placed in the Soxhlet's exhausting tube and extracted with ether—which, of course, should be kept boiling with hot water, and not by a naked flame. This is allowed to exhaust for the whole day, and the ether is then allowed

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