

U. S. P. extraction method, the percentage of alkaloids was 6.31 percent, 6.28 percent, 6.41 percent, 6.24 percent. By the new extraction method, 6.37 percent, 6.39 percent, 6.34 percent, 6.40 percent. In another assay of cinchona, the writer took two samples, each five grammes, from the same batch of cinchona and got the same weight of alkaloid from each down to the fourth decimal place. This is the only perfect check that he has ever obtained in the hundreds of alkaloidal assays that he has run.

This method of extraction is applicable to all U. S. P. alkaloidal assays of crude drugs except colchicum seed, colchicum corm, opium and physostigma.

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SOME POSSIBLE PHARMACEUTICAL USES OF PARA-DICHLORBENZENE.

A PLEA FOR THE USE AND FURTHER INVESTIGATION OF A BY-PRODUCT RESULTING FROM THE WAR.

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In the chlorination of benzene at ordinary temperatures, about 85-90 percent of monochlorobenzene and 10-15 percent of dichlorobenzene, chiefly para, are produced. At the present time enormous quantities of benzene are being chlorinated, for it has been found that picric acid can be made more cheaply from monochlorobenzene than from phenol. At the same time, however, large quantities of dichlorobenzene are accumulating, for which there is very little demand. For the complete success of this most valuable process of manufacturing picric acid, it is necessary that uses be found for the dichlorobenzene. Owing to the firmness with which the chlorine atoms are attached to the benzene nucleus, *p*-dichlorobenzene does not enter readily into chemical reactions, and all attempts to convert it into other commercially valuable compounds have so far been unsuccessful. The physical properties of this substance are such, however, that the writer believes it may prove of considerable value in pharmacy. Some possible pharmaceutical uses which have occurred to the writer are here described, in the hope that pharmacists and manufacturers will try them out and so help to solve the problem of utilizing this by-product.

From the viewpoint of the pharmacist, the most valuable property of *p*-dichlorobenzene, and the one upon which most of its pharmaceutical uses will undoubtedly be based, is its powerful destructive action on certain lower forms of life. Galewsky, who studied the relative efficiency of many substances as moth exterminators,

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reported (*Z. Textil. Ind.*, 1915, 506) that *p*-dichlorbenzene is the most effective agent for this purpose, being superior to naphthalene, which is generally used. Many tons of *p*-dichlorbenzene could, undoubtedly, be disposed of annually in the form of moth-balls, moth-powders, moth-solutions, moth-paper, etc., if it were properly pushed. In physical properties *p*-dichlorbenzene resembles naphthalene very closely. It occurs as transparent, colorless flakes, somewhat unctuous to the touch, and of a faint, rather agreeable, camphor-like odor. It melts at 53° C. and boils at 172° C., the corresponding constants for naphthalene being 79° C. and 218° C.; it is, therefore, more volatile than the latter. Besides its greater efficiency as a moth exterminator, *p*-dichlorbenzene has the added advantage over naphthalene that the odor can be more readily removed from garments with which it has been packed. Strips of cloth saturated with a concentrated solution of *p*-dichlorbenzene in gasoline and dried, lost the odor completely after several hours of airing in the sun. The writer further finds that *p*-dichlorbenzene can be easily compressed into tablets with an ordinary tablet machine, and that it can also be readily formed into balls by melting and pouring it into molds. On the whole, *p*-dichlorbenzene seems excellently adapted for use as a moth-repellant, and, as it can probably be bought for less than naphthalene, it deserves to supplant the latter for this purpose. The writer earnestly recommends that pharmacists and manufacturers introduce and push it as a moth exterminator.

The effect of *p*-dichlorbenzene on moths suggests that it may also be of value in exterminating or repelling other pests. Dissolved in benzine or any other suitable solvent and applied as a spray to the joints of woodwork, to clothing which has been attacked, and to other articles, it may prove effective against various insects, bedbugs, roaches, ants, flies, etc., and their eggs or larvae. On account of the inflammability of benzine, it may well be replaced by carbon tetrachloride as a solvent, since the dichlorbenzene is very soluble in this liquid, and also in alcohol, ether, chloroform and benzene. Solutions of *p*-dichlorbenzene may also prove useful against vermin on animals and birds, and as a spray for plants.

It is also possible that the insecticidal and antiseptic properties of *p*-dichlorbenzene may render it applicable in the treatment of certain skin diseases. The writer finds that it is very soluble in petrolatum, lard and many fixed and volatile oils, and large quantities of it can be easily incorporated by simply stirring it into the melted base.

Many other uses for *p*-dichlorbenzene, than those which have here been briefly mentioned, may suggest themselves to those who will give the subject a little thought and carry out a few experiments. The attention of pharmacists and manufacturers has been called to this problem because it is nationally and commercially important that it be solved as soon as possible. It is hoped that those who work on the problem will publish their results, even though they may be negative, in order that the greatest possible good may come of their efforts. The writer will be glad to give such assistance as he can to any one who is interested.
