

and extended over such a long time interval that no error larger than  $0.01^{\circ}\text{V}$  could have been introduced by the interpolation. The variations between the two observers are of opposite sign on the blank determinations of the two sugars, and are, therefore, accidental. The data were plotted graphically. Owing to the length of the curve it was plotted in three sections all on the same scale. The ordinates, in degrees V, are the differences between the polarizations of two solutions, one of which contained basic lead acetate, the other none. The zero point represents the blank solution. When the polarization given by the basic lead acetate solution is the larger the difference is given the + sign and inversely for the - sign. The abscissas are the volumes of basic lead acetate added, expressed in cubic centimeters.

The curve shows beyond doubt that under the given circumstances basic lead acetate first causes a lowering of the polariscopic reading of sugar in the solution amounting to more than  $0.1^{\circ}\text{V}$  for normal concentration, and that further addition of the same reagent causes a continuous rise in the polarization up to the limit (63 cc) investigated. It will be observed that when about 6 cc of basic lead acetate are added the polarization is not affected, the curve crossing the axis at this point.

This effect of basic lead acetate on the polarization of sugar seems to be due to the formation of soluble lead saccharates having specific rotations different from that of sugar. Lead saccharates having properties which would account for the general nature of the curve have already been studied in connection with this investigation.

The values in the table show clearly the error that may be introduced in polarizations where relatively large amounts of the basic lead acetate are used. The depression in the curve, corresponding to small amounts of the reagent, is of special significance in the polarimetric estimation of sucrose in raw sugars and is of sufficient magnitude to place it along with the errors introduced by the volume of the precipitate, the temperature coefficient, and the presence of invert sugar and other impurities.

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## THE USE OF CARBON BISULPHIDE IN THE ESTIMATION OF SALICYLIC ACID IN WINE.

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In determining salicylic acid in wines a great deal of trouble is experienced with tannin, coloring matter and such bodies, which dissolve in

ether and interfere with the color reaction between salicylic acid and ferric salts. An obvious way of overcoming this difficulty is to exhaust the dried ether extract with a solvent which will dissolve the salicylic acid only. For this purpose petroleum ether has been quite largely used. The author has found, however, that this solvent cannot be depended upon to take up from wine extracts more than a small per cent. of the salicylic acid present. This is shown by the figures below which were obtained by extracting the wines containing a known amount of salicylic acid, four times with ether and rubbing up the dried extract with ten successive portions of 5 c.c. to 10 c.c. of petroleum ether.

Mgs. Salicylic Acid added	Mgs. Salicylic Acid found
5.0	0.5
20.0	2.0
7.5	0.7
17.5	1.5

In trying several other solvents 100 c.c. of wine were extracted with ether and salicylic acid added to the extract. The dried extract was then rubbed up with ten 5 c.c. portions of the solvent in question. The results appear in the table :

Solvent	Salicylic Acid present mgs.	Salicylic Acid recovered mgs.	Salicylic Acid recovered per cent.
Benzene.....	10	.4	40
Carbon bisulphide .....	10	9.5	95
Carbon tetrachloride .....	10	3.5	35
Petroleum ether 90% } .....	10	5.2	52
Ethyl ether 10% }			

Larger percentages of ethyl ether in the last solvent on the list seem to take up some coloring matter. Chloroform also dissolves too much coloring matter from the residues to be used in this connection.

From these results carbon bisulphide appeared to be a satisfactory solvent. Accordingly, wines containing known amounts of salicylic acid were extracted in the usual way with ether and the dried extract treated with carbon bisulphide as described above. The results follow :

Wine	Salicylic Acid added mgs.	Salicylic Acid recovered mgs.	Salicylic Acid recovered per cent.
White.....	10	6.07	60.7
" .....	10	7.89	78.9
" .....	20	15.00	75.0
" .....	20	15.00	75.0
Red.....	10	7.9	79.0
" .....	20	15.0	75.0
" .....	20	17.64	88.2

By employing carbon bisulphide in the way indicated the author has obtained better quantitative results in estimating salicylic acid in wine than by any other method.