A PHOTOMETRIC MODIFICATION OF THE WINKLER METHOD

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The Winkler method used for the determination of dissolved oxygen, is so well known to the chemical oceanographer that it requires no further description. The purpose of this paper, which is to be considered only as a preliminary report, is to see whether a photometric method can be substituted for the ordinary iodine titration with sodium thiosulphate and hence avoid the tedious routine of the ordinary standard method.

As is known, the photometric method is based on the fact that when monochromatic light passes through a coloured solution there is some relationship between the intensity of the transmitted light and the concentration. In the ideal case Beers law is obeyed. It is proposed to see if there is some relationship between the colour of the iodine solution and its concentration. The oxygen content of an unknown sample can then be estimated by finding, from the graph, the volume V of x normal sodium thiosulphate equivalent to the deflection for that particular solution and substituting in the formulae

$$\frac{Vx\ (B\text{-}4)\ 5600}{B} \quad \text{ml of } o_2/l \text{ of water at N.T.P.}$$

where B = vol. of sea water
(B-4) » » » » corrected for addition of reagent
1 ml normal sodium thiosulphate is equivalent to 5.6 ml oxygen.

Method.

The iodine solutions, obtained on the addition of $MnCl_2$ KI/KOH + HCl to a volume B of sea water, were used to find the above relationship.

A colorimeter, having a logarithmic scale, was brought to zero with distilled water. The absorption of the iodine solution was found and at the same time, under the same conditions, duplicate titrations of the same solution were carried out with. Ol N sodium thiosulphate.

This routine was repeated with other solutions of iodine obtained from different samples of sea water treated by the Winkler method.

Conclusion.

There seemed to be a linear relationship between the concentration and the absorption of the iodine solutions thus indicating the possibility that the titration can be substituted by a colorimetric method.

The standard deviation of 25 observations was found to be $\pm$ .02 .

A more comprehensive study will be conducted soon with specially made calibrated filters for the range of oxygen in sea water and we hope to publish a final paper as soon as possible.

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