

The content of organic matter in some waters in the Moscow region.

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Translation by A. Murphy.

There is at the moment no direct method of determining the organic matter content of natural waters. The only direct method by determining the loss of weight on combustion is not entirely satisfactory. Indirect methods are based on the determination of the quantity of some element present in the organic matter - e.g. the determination of organic carbon.

TABLE 1. Summary of compositions etc. of water samples - tested on day sampled.

No.	Where taken	Date	Transparency in cms.	Alkalinity mg eq.	Hardness %	Chlorides mg/l	NH ₄ salts	Nitrogen mg N/l		Phosphates mg P./l
								NO ₂	NO ₃	

For the calculation of total organic matter from the carbon content coefficients of 1.6 - 1.72 have been found. For natural waters a figure of 2.0 seems to be more accurate.

Average content of organic carbon was found to be from 64 - 58 - 50 %
 Although the figure for organic carbon, nitrogen and phosphorus in freshwaters are not very large they are of great interest. In the summer of 1940 and the winter of 1941 samples were collected in central Russia and determinations of organic carbon, and nitrogen by Krogh and Keys (ref.7.) method with Dataloo (1) and Skopintseva modifications. Other determination were but the standard methods

(2) Table two summarised the determinations of organic matter by various methods.

Although 8 different waters were tested they seem to represent two basic types of organic matter. The R. Volgusa 9 in table - very rich in plankton - the tuffy type 10 was mixed with it.

TABLE 2. Results of the determinations of organic matter done on same day as collected.

No.	Place.	Colouration	Oxygenation O ₂ mg/l.	Albuminous N. mg/l.	Organic matter			B.O.D. Mg.O ₂ /l.	
					C. mg/l	N. mg/l.	P. mg/l.	5 days	20 days

a - Natural Waters.

b - After filtering through sintered glass filter No. 4.
& layer of BaSO₄

Thus it is seen that in unfiltered tests there is wide fluctuations e.g. in colouration 22-160 - oxygen by the Kubel method 2.15 - 25.2 mg O₂/l. - albuminous Nitrogen 0.076-0.55 mg N/l. & B.O.D. 5. 0.45 - 2.5 mg O₂/l. At same time quantities of org. carbon varied from 1.8 - 20.1 mg C/l. - org. phosphorus 0.009 - 0.111 mg P/l. i.e. about ten times. Similar data is given in Refs. 3-6 (Birge & Juday) and these show even wider variations.

Assuming carbon content of organic matter in water to be 50% we find that the total quantity of organic matter varies from 4 - 40 mg/l. Size of ratio Oxygen/ Organic carbon varies from 0.6 - 1.6 - average is 1.1. The lowest for

figure for this ratio was obtained with water which contained much fresh undecomposed carbon - No. 9 in table. Highest from water rich in humus - no. 6 in table. From both our figures and those of Birge & Juday this ratio is very near to 1.0. Thus if we determine the oxygen as mg $O_2/l.$ by Rubels method the result is also an estimate of the organic carbon present. If we multiply this figure by 2 (2.0 ± 0.2) we will get an approximate figure for the total organic matter in the water.

Colouration/Carbon & Colouration / O_2 of oxidation wavered between 5.7 - 12 and 5.4 - 10 respectively. Due to absence in our experiments to water with very small colouration we did not get smallest figures.

Albuminous N. x 10 varied from 0.03 - 1.1
 O_2 oxydn.

B.O.D. 5 days varied from 0.04 - 0.42.
 O_2 oxydn.

smaller figures from water rich in humus and higher figs., from water with much unbroken organic matter in them.

C/P ratios from 90 - 500 were found - highest figures from waters rich in humus - similarly with C/N ratio.

There would seem to be no direct relationship for the various elements on the organic matter.

We can conclude that there is no easy method to give a true picture of organic matter in water - a number of methods must be used to avoid bias in favour of certain type of compound.

Notice

Please note that these translations were produced to assist the scientific staff of the FBA (Freshwater Biological Association) in their research. These translations were done by scientific staff with relevant language skills and not by professional translators.