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Short Communications

An Inverted Osmometer and Osmotic Pressure of Some Specimens of Potassium Hyaluronate

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For the determination of the molecular weight of expensive substances the microosmometer formerly described by us [1] proved to be too clumsy.

We have therefore constructed an osmometer based on a new but quite obvious principle: The testtube-shaped membrane is placed on the upper end of a capillary which contains an air column, confined at the upper end by the inner liquid and at the lower end by the outer liquid. This "inverted osmometer" is completely immersed in the outer liquid. The resulting hydrostatic pressure-difference thus counteracts the osmotic pressure and moreover the capillary forces are very nearly compensated for. To determine the equilibrium pressure-difference, the total pressure on the whole system can be varied from just above one atmosphere to about a tenth of that amount. This causes a change in height of the air column and at each height the velocity with which the upper meniscus of the column moves up or down is determined. From a plot of heights versus velocities the equilibrium pressure is found graphically, compare [2].

The hydrostatic pressure-difference is of course nearly proportional to the height times the density of the outer solution, but there are two corrections: One for the (small) difference in density between outer and inner liquid and another for the (small) difference in surface tension of the two liquids. In the experiments reported below neither of these corrections have been applied.

As an example of the applicability of the method we quote in Table 1 the results of measurements on various specimens of potassium hyaluronate, the same which were described in a recent paper by one of us [3]. In the table the preparations are mentioned in the same order as that in which they occur in Table 1, p. 606—607 of the paper mentioned.

Table 1. Molecular weights of specimens of potassium hyaluronate. Temperature 20°. Outer liquid 0.2 M *solution of KCl. Density: 1.0078. Inner liquids about 10 mg dissolved in 1 ml of the outer liquid. Weighings accurate to about 0.01 mg. No buffer added. Estimated accuracy: Better than 5 %.*

% N	Rel. viscosity conc. 1g/l	Molecular weight times 10^{-3}
3.36	11.80	517
3.35	11.91	530
3.31	12.19	516
3.34	12.12	527
2.90	5.46	367
2.88	68.46	1 750
2.82	5.29	—
1.16	5.75	316
5.78	(4.62)	—
2.99	76.39	554

A more detailed report will be published later.

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1. Christiansen, J. A., and Jensen, C. E. *Acta Chem. Scand.* **5** (1951) 849.
2. Sørensen, S. P. L., and coworkers *Compt. rend. trav. lab. Carlsberg* **12** (1915—17) 296.
3. Jensen, C. E. *Acta Chem. Scand.* **7** (1953) 603.

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