Short Communications

Microrefractometry with Abbe-Type Refractometer

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For evaluating the refractive and dispersive constants of a liquid several types of refractometers are available, of which the so-called Abbe-type refractometer is the most common.

This type is both rapid and simple by the measurements and has a precision (± 0.0001 units in \( n_D \)) that is sufficient for most purposes. Because it is provided with compensator 4, the dispersive constants \( v \) (\( n_D \cdot 1/n_P \cdot n_C \)) may be obtained with close approximation and also \( n_P \) and \( n_C \) separately 5, 6. By this the refractometer is also useful for investigations of structure and for quantitative analysis of complicated liquid mixtures.

To render a measurement possible it is necessary with a continuous liquid layer between the lower, illuminating prism (Fig. 1 a) and the upper polished prism (Fig. 1 b), where the light is reflected. The required quantities of liquid depend consequently on the dimensions of the free space that exists between the prisms in closed position. The surface of the base is 13 × 28 mm (Abbe-type refractometer model 1). The height i.e. the distance between the prisms, which varies slightly among the instruments, is about 0.15 mm. This makes a volume of about 50 mm³.

If the test volume is less than the above-mentioned the field of view will be irre-"
Making the measuring plate:
Material: 0.08 mm sheet of soft metal i.e. Sn or Al foil, and 0.03 mm paper (resinfree, bleached and hardpressed, of tissue-type).

In the metal foil, 10 × 10 mm, two parallel slits of 5 mm: length are cut 2 mm apart. A rectangle of 3 mm: length is cut between the slits and the two laps are unfolded. The paper, 3 × 4 mm, is fitted into the opening and is fixed by folding down the laps (Fig. 2). The plate is then pressed and controlled (micrometer screw) for absolute smoothness and evenness.

Measurement:
The plate is placed with the opening in the middle of the lower prism and the sample is fed from a capillary tube (Fig. 3). By closing the prisms it should be noted that the lower prism is held in as horizontal position as possible until they are locked together, in order to prevent sliding of the plate.

After the measurement the plate is carefully removed and washed in ether. Before measuring an unknown sample, the technique should be tested at a liquid with

Fig. 3. Photograph of the measuring technique. The sample is fed from a capillary tube to the measuring plate which is resting on the lower prism.
known refractive index in order to control the accuracy and the proper inserting of the paper. The procedure will not take much longer time than a measurement with normal quantities and may be used with all liquids which do not react with the paper. The minimum quantity for a measurement is $\frac{1}{4} - \frac{1}{2}$ mm.$^2$.

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Inability of two Hydantoins to act as Precursors of Pyrimidines in Ribonucleic Acid

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In earlier work we have found that the rat can utilize orotic acid as a precursor for the pyrimidines of polynucleotides.$^1$

During the course of work on further possible intermediates in the synthesis of polynucleotides in the rat we have investigated the utilization of two $\text{N}^{15}$ marked intermediates in the synthesis of orotic acid from aspartic acid according to Mitchell and Nye.$^2$ i.e. 5-acetylhydantoin and 5(carboxymethylidine)-hydantoin. The latter compound is transformed into orotic acid by alkali under mild conditions. A similar transformation might conceivably be caused by the hydantoin-splitting enzyme recently found in rat tissues by Bernheim and Bernheim.$^3$

Starting from $\text{N}^{15}$ aspartic acid the two hydantoins were synthesized according to the method of Nye and Mitchell.$^2$ They contained an over-all excess of 16.2 atom % $\text{N}^{15}$. Each hydantoin was injected subcutaneously into two different groups of two rats at a level of 125 mg/kilo of body weight per day. The injections were carried out twice daily with approximately 12 hourly intervals over a period of 3 days. The animals were killed 12 hours after the last injection. In each group the polynucleotides from the pooled livers were prepared and separated into deoxyribo- and ribonucleic acids according to Hammarsten.$^4$ The pyrimidine nucleosides were prepared from ribonucleic acids according to Reichard.$^5$ Both the mixed polynucleotides and the pyrimidine ribosides were analyzed for $\text{N}^{15}$.

In no case could a significant incorporation of the isotope be demonstrated thus indicating that none of the two hydantoins had been used for the synthesis of polynucleotide components.


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