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Gasometric determination of urea with urease.

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Urea is changed by urease into ammonium carbonate. The ammonia is commonly determined as a measure of the urea. However, as shown by Partos[1] and by Mirkin,[2] one can also estimate the urea from the CO_2 formed. The manometric blood gas apparatus of Van Slyke and Neill[3] is particularly adapted to this determination, because of the wide range over which it yields accurate results.

Blood. The entire estimation can be carried out in the apparatus, as the blood proteins protect the urease from inactivation by the mercury. For a micro-determination, 0.2 cc. of blood and 1 cc. of 0.02 N lactic acid are placed in the apparatus, which is evacuated and shaken 1 minute to remove preformed CO_2. Five-tenths cc. of 10 per cent urease solution[4] (Squibb) and 0.1 cc. (3 drops) of CO_2-free 0.3 M Na_2HPO_4 solution are then added. Mercury in the chamber is lowered and raised again, to bring the urease into contact with the blood solution wetting the walls. The mixture is allowed to stand 5 minutes or more for decomposition of the urea. Three drops of N/1 lactic acid are then added, plus enough water to bring the total solution to 2 cc. The CO_2 is then extracted by 1½ minute shaking, and determined, as described by Van Slyke and Neill for micro CO_2 determination in 0.2 cc. of blood. A concentration of 1 millimol of CO_2 per liter of blood is equivalent to 1 millimol or 60 mg. of urea, per liter.

For 1 cc. portions of blood, 1 cc. of 0.1 N lactic acid is used to remove preformed CO_2. The amount 0.3 *M* Na_2HPO_4 is increased five-fold to 0.5 cc.; the enzyme to 0.5 cc. of 20 per cent urease; and after digestion 0.5 cc. of 1 N lactic acid is added.

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[1] Partos, S., *Biochem. Ztschr.*, 1921, ciii, 292.

[2] Mirkin, A., *J. Lab. Clin. Med.*, 1922, viii, 50.

[3] Van Slyke, D. D., and Neill, J. M., *J. Biol. Chem.*, 1924, lxi, 523.

[4] Van Slyke, D. D., and Cullen, G. E., *J. Biol. Chem.*, 1914, xix, 211.

The CO_2 determination is performed as described by Van Slyke and Neill for 1 cc. blood samples.

Urine. In each of two 20 cc. cylinders, A and B, place 1 cc. of urine (or 2 cc. if the urine is dilute). To each cylinder add 5 cc. of a buffer solution containing per liter 4 grams of KH_2PO_4 and 2 grams of Na_2HPO_4. Dilute B to 20 cc. and A to 19 cc. and cover both with 3 or 4 cc. of paraffin oil. To A add 1 cc. of 10 per cent urease. Stir each solution gently by moving a footed rod in it up and down a few times. Let stand 30 minutes for enzyme to act. Determine CO_2 in 2 cc. samples from each solution, adding 1.5 cc. of 0.1 N lactic acid to decompose the carbonate, so that the total volume of solution in the blood gas apparatus is 3.5 cc. The CO_2 is determined as described by Van Slyke and Neill for 1 cc. of blood, except that absorption of CO_2 with alkali is unnecessary. The total gas pressure only is measured, the reading from A giving p_1 that from B giving p_2, for calculation as described by Van Slyke and Neill.

The determination can also be performed with the original volumetric apparatus of Van Slyke, although the results cannot be read with as great accuracy.

The entire blood determination requires about 15 minutes, the analysis of solutions A and B in the urine determinations 5 minutes each. The gasometric method has the advantages that aeration and distillation are avoided, and that standard solutions for titration or colorimetric comparison are unnecessary.

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A method for obtaining distribution of a therapeutic agent throughout the intestinal tract.

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Treatment of infections of the lower ilium and colon by the oral administration of drugs has been unsatisfactory, owing to the difficulty of getting the drug to these regions unchanged. Tablets coated with various substances have been used, but with poor results.