they approximated 100 grams but the animals fed Myrj or Sta-soft approximated 85 grams in weight. Therefore, these data are regarded as indicative, but not conclusive.

Summary. The ingestion of 5 or 15% of polyoxyethylene monostearate preparations (Myrj of Sta-soft) by weanling hamsters significantly reduced the rate of gain as compared to animals fed lard. This was evident after 2 weeks on experiment. There was also a decrease in food efficiency. The retarded gains were not attributable to reduced food intake or to the caloric inertness of the polyoxyethylene moiety of the test products. Marked changes in the intestinal tract and severe diarrhea were also observed when Myrj or Sta-soft was fed. Mortality data, data on organ weights and the gross pathology also indicated that the ingestion of these compounds was deleterious to the hamsters as compared to the data obtained on lard or lard plus celluflour.

Received January 31, 1950. P.S.E.B.M., 1950, v73.

A Convenient Method for the Determination of Urea in Blood and Urine. (17704)

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The need for a convenient method of determining urea in blood and urine by direct Nesslerization following the action of urease has been recognized since 1917(1). There is no satisfactory way as yet to avoid cloudy solutions completely. Folin and Wu suggested that urea may be determined in blood and urine by estimating the ammonia formed after heating in acid solution at 150°C(1). Clark and Collip showed that urea is quantitatively converted to ammonia by heating for 10 minutes at this temperature(2), and Leiboff and Kahn devised a special pressure bottle in which the reaction may be conducted in an oil bath at 150°(3). Nevertheless, the method has not been adopted to any appreciable extent, since there was the possibility that ammonia might be formed from other nitrogenous constituents of urine. For more than a year we have obtained satisfactory results for the determination of urea by heating in a modern pressure cooker. The method described below is apparently not affected by other constituents of blood or urine.

Experimental. Two household pressure cookers were used in this study. One had a capacity of 4 quarts and a maximum pressure of 15 lb to the square inch (121°C). The other had a capacity of 12 quarts and a maximum pressure of 20 lb (126°C). Using 0.5 ml of 1 M·phosphoric acid to 2 ml of urea solution (0.01 to 0.2 mg·N), 90 minutes are required to decompose urea completely to ammonia at 121°, and 60 minutes are required at 126°. After cooling, the addition of Nessler's solution frequently produces cloudy solutions in less than 10 minutes when protein-free filtrates of whole blood are used. On the other hand, filtrates obtained from oxalated blood plasma or serum with 10 per cent sodium tungstate and 2/3 N·sulfuric acid remain clear for at least 30 minutes after the addition of Nessler's solution. Urine diluted with water also remains perfectly clear. However, urine must first be shaken with permutit to remove ammonium salts before the decomposition of urea. In addition, the concentration of urea may be adjusted to that of blood by diluting the filtered urine, after permutit treatment, according to a table(4),

1. Folin, O., and Wu, H., *J. Biol. Chem.*, 1919, v38, 81.

2. Clark, E. P., and Collip, J. B., *J. Biol. Chem.*, 1926, v67, 621.

3. Leiboff, S. L., and Kahn, B. S., *J. Biol. Chem.*, 1929, v83, 347.

4. U. S. War Department, *Methods for Laboratory Technicians*, Tech. Manual No. 8-227, p. 107.

TABLE I.
Comparison Between the Values of Urea Nitrogen Determined by the Proposed Method and Those Obtained with Urease Followed by Aeration and Titration.

	Mg urea N per 100 ml			Mg urea N per 100 ml	
Plasma	Urease method	Proposed method	Urine	Urease method	Proposed method
1	13.5	14.3	1	405	405
2	15.4	15.3	2	485	451
3	15.9	16.0	3	495	519
4	16.4	16.7	4	501	536
5	18.6	18.7	5	606	602
6	19.2	19.0	6	636	632
7	22.6	22.0	7	774	789
8	24.1	24.5	8	858	867
9	25.0	25.5	9	930	932
10	39.5	40.5	10	1048	1010
11	40.6	41.5	11	1215	1240
12	42.5	42.4	12	1360	1360
13	52.5	53.3	13	1419	1419
14	62.5	62.1	14	1520	1490
15	163.	166.	15	1820	1788

that is based on the average normal values for urea clearance of Moller, McIntosh, and Van Slyke(5).

The method finally adopted is as follows: Place 2 ml of protein-free filtrate from plasma or serum, or 2 ml of diluted ammonia-free urine, in test tubes graduated at 10 ml. Add 0.5 ml of 1 M·phosphoric acid,* and cover the mouths of the tubes with tin foil. Heat for 60 minutes in a pressure cooker at 20 lb pressure or for 90 minutes at 15 lb pressure. After cooling, add 1 ml of 1 N·sodium hydroxide and dilute the solutions to 10 ml. Add 1 ml of Koch-McMeekin Nessler's solution, and let stand for 10 minutes. Measure the color in a Klett-Summerson colorimeter with filter 54. A blank tube containing water and acid is heated with each series, and a standard tube, containing 0.03 mg of nitrogen as ammonium sulfate, is prepared for comparison.

The method was tested in a series of samples of plasma and of urine in which urea nitrogen was also determined by incubation with urease, aeration into standard acid, and titration with 0.01 N sodium hydroxide. Table I shows the good agreement of values determined by the proposed method.

Summary. An accurate method is described for the convenient determination of urea nitrogen in blood plasma and urine by the estimation of ammonia after heating with acid for 60 minutes in a household pressure cooker at 20 lb pressure or for 90 minutes at 15 lb pressure.

5. Moller, E., McIntosh, J. F., and Van Slyke, D. D., *J. Clin. Invest.*, 1928, v6, 427.

* The reaction may also be accomplished with 0.5 ml of 1 N · hydrochloric or sulfuric acid, but a small yellow-precipitate of hydrated sodium tungstate may appear after heating. The determination is not affected, however, since the precipitate dissolves on the addition of alkali.

Received February 9, 1950 P.S.E.B.M., 1950, v73.