Letters to the Editor should be typed double-spaced (including references) with conventional margins. The overall length is limited to five manuscript pages, including not more than one figure or one table.

Determination of Citrate in Urine by Simple Direct Photometry

To the Editor:

We attempted to perform the urinary citrate test of A. Millán et al. (1) but found that this method has many disadvantages:

1. The urine blank prepared by the authors is not correct. The color of reaction product (citrate–Fe³⁺ complex) is yellow, and the normal color of urine also is yellow. Because 4 mL of sample is used in the reaction, 4 mL of urine also must be used for the urine blank, whereas the authors prepare a urine blank by adding 4.75 mL of HCl (pH 2) to 0.25 mL of urine. Thus, they do not subtract the urine’s color but include it with that of the complex, obviously not the proper way to calculate concentration of citrate in the reaction medium.

2. The color of the citrate–Fe³⁺ complex obtained with standard citrate solutions is yellow, but the color obtained in urine is brownish-yellow. We think that some urinary pigments interact with Fe³⁺ and interfere with the reaction. Thus the sensitivity of the method is low.

3. The authors suggest that the sensitivity of the method is excellent (linear from 52.9 to 696.6 μmol/L). We think this is impossible. If the authors prepared the sample blank correctly, they would find the actual sensitivity and linearity limits.

4. The authors give the values for “normal people” as 936 mmol/L (SD 170 mmol/L), while they suggest that the linearity range for the method is 52.9 to 696.6 μmol/L. How could they obtain these values?

5. The mean value for urinary citrate given by the authors for “normal people” is approximately 196.5 (SD 35.7) μg/L. It is impossible for humans to excrete these large quantities by the urinary route. The values reported for normal men are 174.7 mg/day (range 73.8 to 378.4 mg/d) (2), 4.05 ± 1.22 (range 2.12–6.26) mmol/d (3); 643 mg/d (4); 2.2–4.4 mmol/d (5); 1.6–4.5 mmol/L (6); 76–792 mg/d (7); and 2.29 mmol/d (range 0.91–3.81) (8).

References


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An author of the report cited notes the following errors in its final paragraph:

Instead of 936, SD 170 mmol/L, values for normal people should be 4.95, SD 0.95 mmol/L (936, SD 170 mg/L); and instead of 351, SD 156 mmol/L, values for stone-formers should be 1.86, SD 0.82 mmol/L (351, SD 156 mg/L).

Although space did not allow us to mention it, of course we used the same dilution for the sample and the blank (1/20): we added 4.5 mL of HCl (pH 2) to 0.25 mL of sample (phosphate previously separated) before adding 9.25 mL of Fe³⁺ solution. Therefore any further discussion should concern tests made on this basis.

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Approaching the Millennium in Automated Analysis

To the Editor:

As far-reaching advances are made in the technology supporting clinical chemistry, fresh thinking is needed in setting immediate goals or in redefining specific goals now attainable because of this recent progress in engineering and manufacturing. The goals are achievable because of the economic competition among an impressive number of manufacturers of “automated” clinical analyzers, who have convincingly demonstrated their willingness to devote considerable resources to the development of innovative systems of analysis. Advertising via mail and in trade and scientific journals, as well as the profusion of instructional exhibits and workshops at the annual AACC meetings, attest to this fact.

The time is propitious to move the technology into areas that promote “complete” automation. Assume that for the next 10 to 20 years analyses will continue to be performed on blood and other body fluids collected by invasive methods (punctures, mainly). Complete automation should begin with the instrument accepting the sample as it is brought to the laboratory (e.g., whole or clotted blood). No processing by the human should be essential other than appropriately identifying the sample and placing it in the instrument. The analyses must then perform those tasks that are now easily performed manually: centrifugation, if needed, and transfer of the supernatant fluid or, if necessary, cells (leukocytes, erythrocytes, platelets, precipitates), and removal of protein.

Secondly, the volume of sample needed for the total process of analysis (residual and analytical volume) should be the same for all patients. This means that to perform several tests, perhaps four or five on one sample, the requisite volume should be in the microliter range. Such volumes have become imperative, not merely because of the large number of laboratory tests performed on infants and older children but also because our aging population requires increased use of skin-puncture-derived blood samples. There will also be more mass-screening programs for “health assessment” measures of preventive medicine (e.g., total, HDL-, and LDL-choles-