capillary, the nine negative specimens were sampled and processed. This experiment was repeated with a plastic capillary.

With the glass capillary, the first specimen was positive as expected, but the next eight specimens were also positive. The last specimen was negative. For the plastic capillary, the first specimen was positive and the next three originally negative specimens were now positive. The last six negative specimens were still negative. These experiments clearly demonstrate that carryover of HBsAg is significant enough to give an erroneous result on a number of successive specimens, depending upon the type of capillary used.

We did another experiment to determine how feasible it would be to wash the capillary with several water rinses before sampling the next specimen. Even though our first experiment indicated that counts were reduced to background after six washes with glass capillaries and after three washes with plastic capillaries, as many as 10 rinses, in some cases, did not prevent a negative specimen following a positive specimen from also being positive. Twenty rinses did, however, eliminate the problem.

In HBsAg testing it is not practicable to wash 20 times between each specimen; the best solution is to use a new tip or capillary for each specimen.

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Thymol is a Suitable Preservative for Uric Acid Standards in the Uricase Technique

To the Editor:
Preservatives such as formaldehyde, sodium azide, and thymol in standards interfere with the quantitation of serum or urinary uric acid by various colorimetric procedures such as phosphotungstic acid reduction and direct acid ferric reduction procedures (1-4). However, it is generally accepted that the uricase method is more specific and free of these interferences except for the reductive compounds commonly affecting the colorimetric procedures. Because of its specificity, we implemented an uricase method for serum and urinary uric acid for use with a centrifugal analyzer (Union Carbide). Standards must contain a preservative. Formaldehyde is excluded as a possible preservative because it inhibits uricase (5), sodium azide because its use involves health and safety hazards (6, 7). I have shown that thymol is suitable for this purpose.

I first prepared two sets of aqueous standards, one of them in saturated thymol solution. I added 50 µL each of the standard to 3.0 mL of boric buffer (0.2 mol/L, pH 9.5). Ten minutes after adding 20 µL of uricase (1 g/L, Boehringer Mannheim Biochemicals, New York, NY 10017), I measured the decrease in absorbance at 292 nm caused by the uricase-catalyzed hydrolysis of uric acid. On plotting the relation between the decrease in absorbance at 292 nm and concentration of standards in the presence and absence of thymol, I found it to be linear and the same whether or not thymol was present (Figure 1). This same observation held true when the analyzer was substituted for the manual procedure. Moreover, with thymol-preserved standards for calibration, values for serum uric acid of 121 patients, determined by the uricase method, correlated excellently with those by a continuous-flow method that is based on phosphotungstic acid reduction (correlation coefficient = 0.99). Standards in saturated thymol solution were stable for at least 14 weeks.

Because thymol exerts no effect on uricase activity and is a suitable preservative, I recommend that it be used for standards if quantitation is performed by the uricase method.

Simplified Enzymic/Colorimetric Serum Urea Nitrogen Determination

To the Editor:
It is possible to simplify the enzymic colorimetric method (urease-Berthelot) for determination of serum urea nitrogen by combining urease (EC 3.5.1.5), nitroprusside, and salicylate into a single "enzymic reagent" and using sodium hydroxide and sodium hypochlorite as a second "color reagent." Thus only two reagents are needed instead of four (1), or three (2, 3).

The enzymic reagent contains, per liter, EDTA 1.34 mmol, urease 50,000 U, sodium salicylate 62.45 mmol, and sodium nitroprusside 3.36 mmol. The final pH (at 25 °C) is 5.8 ± 0.1. The reagent is stable for 15 days at 4 °C.

The color reagent contains sodium hypochlorite, 7 mmol/L, and sodium hydroxide, 190 mmol/L. It is stable for three months at 4 °C.

Procedure: Mix 20 µL of serum or plasma (collected without fluoride or ammonium salts of the usual anticoagulants) with 2.5 mL of the enzymic reagent; after 5 min at 25 °C (or 3 min at 37 °C) add 2.5 mL of the color reagent. After 10 min at 25 °C (or 5 min at 37 °C) read at 600 nm vs. a reagent blank. The final color is stable for at least 2 h.

The absorbances are converted into serum urea nitrogen concentrations by means of a calibration curve (which we find to be linear up to 100 mmol/L) or by means of a calculation from a single serum urea nitrogen standard; 0.001 A corresponds to 50 mmol of serum urea nitrogen per liter.

Within-run precision (CV) was 0.6 and 0.7% for serum urea nitrogen concentrations of 10 and 41 mmol/L, respectively. Between-run precision (CV) was 1.7 and 0.6% at serum urea nitrogen concentrations of 15 and 60 mmol/L, respectively. The average analytical recovery of serum urea nitrogen added to

![Graph](image)

Fig. 1. Relationship of decrease in absorbance at 292 nm vs. uric acid concentrations of aqueous or thymol-preserved standards.

- O-O: aqueous standards;
- ●-●: thymol-preserved standards.