wich-immunoassay methodology (1); the solid phase consists of glass fiber papers. We evaluated the performances of ferritin determination in serum on this system according to the general protocol proposed by the French Committee for Validation of Methods (2).

Reproducibility was tested in two laboratories with Tri-Rac controls (Baxter-Travenol) (n = 20); for concentrations of 66 and 163 µg/L, the within-run CVs were 1.9% and 3.2%, respectively. Between-day (n = 30) CVs were <6% for concentrations of 66, 152, and 260 µg/L.

Accuracy was checked by comparison of the Stratus calibrators with the international standard recommended by WHO (ref. 80/602). Bias between expected and experimental values range from −3.3% to 6.1%, depending on the dilutions. The between-sample carryover is constant (0.05%) and can be neglected for ferritin concentrations up to 5000 µg/L. The Stratus system exhibited no high-dose hook-effect up to 245 000 µg/L—for far higher than the upper limits given by other commercial kits. Immunological reaction is linear up to 750 µg/L.

The detection limit was assessed by geometric dilutions of a hypoferritinemic serum in zero calibrator; it was also calculated from zero calibrator values of each run. The calculated detection limit was 2.6 µg/L.

Stratus results (y) were compared with those of EIA-Ferrizyme (x) (Abbott Diagnostik, Chicago, IL) and of IRMA-Magic (z*) (Corning Medical, Medfield, MA). Results exceed those of the EIA-Ferrizyme but correlate well. The linear regression equations are: y = 1.43x + 1.3 µg/L for 55 subjects with iron deficiency, y = 1.17x + 1 µg/L for 40 healthy subjects, and y = 1.3x − 123 µg/L for subjects with hyperferritinemia (iron overload, inflammatory diseases, hematologic malignancies, and solid tumors).

In contrast, the Stratus results are lower than those of the IRMA method; the linear regression equation is y = 0.87x + 0.6 µg/L for 78 subjects. In all cases we never observed any discrepancy between sample results and the clinical groups to which the specimens belonged. Our observations emphasize the necessity of referring to appropriate reference values.

We conclude that precision, accuracy, quickness (8 min for a result if calibration curve is stored), and practicability are the main features of the Stratus System.

References

Glyoxal: An Artefact from Metronidazole and Glyoxylic Acid In Urinary Organic Acid Analysis, G. A. Mills, V. Walker, and D. L. Corina (1 Clinical Biochemistry, University of Southampton, Southampton General Hospital, Southampton, S09 4XY, U.K.; and 2 Dept. of Biochemistry, University of Southampton, Southampton, S09 5NH, U.K.)

During analysis for organic acids in urine samples from babies and children, with a procedure that incorporates an oximation step with hydroxyamine hydrochloride at alkaline pH to stabilize oxo-groups (1, 2), we sometimes observed two large peaks in capillary gas chromatograms, with methylene units 11.81 and 11.85 (on OV-101 stationary phase). Electron-impact mass spectrometry showed the unknown compounds to be isomeric (Figure 1). Their apparent relative molecular mass was 212, as confirmed by chemical ionization with isobutane as reactant gas, and the ion fragment at m/z = 147 suggested that the molecule contained two trimethylsilyl (TMS) groups. The peaks disappeared when the oximation step was omitted from the analysis, indicating the presence of either oxo or aldehyde functional groups. The even molecular mass suggested the compound contained two oxime derivatives. Of possible substances fulfilling these criteria, glyoxal (HCHOCHO) seemed likely. Chromatographic and spectroscopic analysis of the authentic compound corroborated this hypothesis. This compound has not been reported in urine before.

High concentrations of glyoxal were observed in samples from patients receiving the antimicrobial drug metronidazole (Flagyl); 1-(2-hydroxyethyl)-2-methyl-5-nitroimidazole). This drug, which is in part excreted unchanged in urine after administration (3), has a 2-hydroxyethyl sidechain, which could be converted to glyoxal after cleavage from the imidazole ring during analysis. Metronidazole subjected to our oximation procedure was found to produce glyoxal, indicating that it probably was the source of the compound in these patients.

In pursuing this investigation, we observed that glyoxal was also produced during oximation of the normal endogenous urinary constituent, glyoxylic acid (HCOOCOH). This probably accounted for the small peaks of glyoxal that we commonly saw in chromatographic profiles of normal urine samples.

Awareness of this previously unreported artefact is important to laboratories where a similar analytical procedure is used for urinary organic analysis.

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References