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## New Approaches with the Chem-1 Creatinine Determination

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**Summary:** Three modifications of the Chem-1 determination of serum creatinine were tested. Two different algorithms developed for compensating the interference of bilirubin were compared with the current one by analysing bilirubin-enriched albumin solutions and 82 icteric serum samples. A number of known other interfering substances were also tested.

The modification involving parallel bichromatic measurement plus bilirubin correction appeared to give the best performance.

However, despite the improvements, the determination is not yet completely satisfactory.

### Introduction

In a previous study we discussed the problems related to the determination of creatinine in icteric specimens (1). That study was undertaken because of doubt concerning some of our Chem-1 results. We also mentioned the involvement of the Bayer-Technicon company, which manufactures the Chem-1 analyser. In this article we present the results of performance studies of three modifications of the creatinine assay, two of them being experimental. All methods are kinetic *Jaffe* methods. The original, unmodified procedure is based on incubation of the sample with picric acid and initiation of the colour reaction with sodium hydroxide; there is no mathematical correction algorithm for bilirubin.

The modifications differ in two respects from this procedure. First, the addition of picric acid and sodium hydroxide is reversed. Second, two different bilirubin correction algorithms are applied, i. e. a selective bichromatic correction algorithm, and a parallel bichromatic measurement with a bilirubin correction for icteric samples.

We also studied the influence of other well-known interfering factors.

### Materials and Methods

#### Materials

Creatinine, unconjugated bilirubin, glucose,  $\beta$ -hydroxybutyric acid, ascorbic acid and acetone were obtained from Merck (Germany), conjugated bilirubin (ditaurate, di Na) from Porphyrin Products Inc. (Logan, Utah, U.S.A.) and human albumin from Behring Werke (Germany).

The following drugs were obtained from the Department of Pharmacy in our hospital:

1. cephalosporins – cephotoxin-Na (Claforan®)  
– cephalotine-Na (Keflin®)  
– cephuroxim-Na (Zinacef®)
2. dopamine-HCl
3. dobutamine-HCl (Dobutrex®)

Icteric serum samples were provided by various departments in our hospital. Only samples with a total bilirubin concentration higher than 100  $\mu\text{mol/l}$  were used. They were stored at  $-80^\circ\text{C}$  prior to analysis. Table 1 shows the frequency distribution of the bilirubin concentrations. Cyclosporin-containing serum samples were obtained from our transplantation unit. All cyclosporin concentrations, as determined by radioimmunoassay, were lower than 100 mg/l which is considered to be therapeutic.

#### Methods

An HPLC-based method already described by us (2) was used as the reference method.