

CAPSULES

preliminary notes and applications from Bioanalytical Systems, Inc.

Nitrofurantoin In Serum

Purpose

Determination of nitrofurantoin in serum.

Linear Range: 0-100 ng injected standards, 0-4 $\mu\text{g/mL}$ serum.

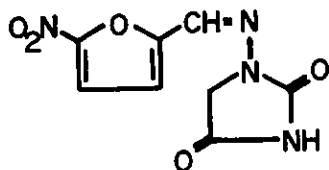


Figure 1. Structure of nitrofurantoin.

Nitrofurantoin (F1, 1-[[[(nitro-2-furanyl)methylene]-amino]-2,4-imidazolidinedione]) is an antimicrobial agent used in the treatment of urinary tract infections. It is related to the nitrofuran antibacterial agents (furazolidone, nifuroxime, nitrofurazone) and the nitroimidazole antibacterials (metronidazole, misonidazole). Nitrofurantoin may cause gastro-intestinal disturbances and fever, and is not used where kidney dysfunction is present. It also is not recommended for children under the age of 1 month, or for pregnant or lactating women. The normal therapeutic concentration is 2 $\mu\text{g/mL}$ blood.

Existing Methods

HPLC, GC, colorimetry, and microbiological assay. These may be time consuming or non-specific.

Conditions

Detector: BAS UV-108 variable-wavelength UV detector (365 nm)

Column: 3 μm , C_8 reverse-phase, 100 x 3.2 mm (PN MF-6214)

Mobile Phase: 92% (v:v) 5% acetic acid, 4% acetonitrile, 4% methanol. Flow rate was 0.8 mL/min.

Detection Limit: 70 pg injected standard (S/N = 3), 25 ng/mL serum (S/N = 3).

Sample Preparation

1. Combine the following in screw-capped test tubes: 200 μL serum, 50 μL 5% phosphoric acid, and standards as appropriate.

2. Add 5 mL ethyl acetate and mix vigorously.

3. Centrifuge 10 minutes at 10,000 x g.

4. Remove upper organic layer to clean tubes and dry in a vacuum evaporator or under a stream of nitrogen.

5. Redissolve the dried samples in 350 μL mobile phase. Filter through 0.45 μm membranes (PN MF-5645) in microfiltration tubes (PN MF-5500) by centrifuging at 1600 x g. Inject the filtered samples in 20 μL aliquots.

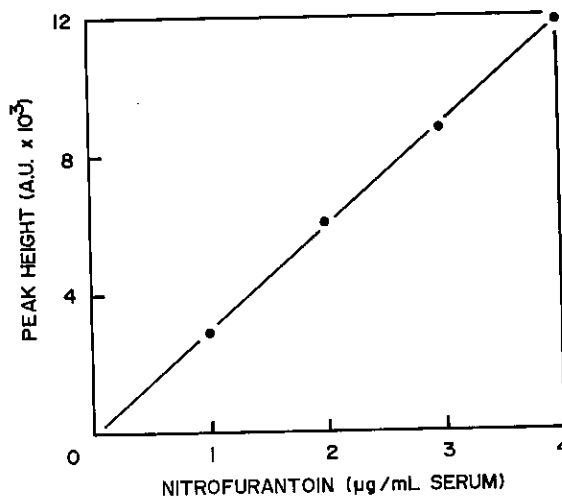


Figure 2. Calibration curve for serum samples spiked with nitrofurantoin.



Figure 3. Sample chromatograms for blank (left) and spiked (1 µg nitrofurantoin/mL) serum samples.

Notes

A calibration curve for spiked serum samples is presented in F2, and sample chromatograms are shown in F3.

Furazolidone has been used as an internal standard for the determination of nitrofurantoin [1].

The determination of nitrofurantoin presented above also can be performed on the BAS 200 Problem Solver.

Reference

Mason, W.D. and J.D. Conklin, *Analytical Let.* 20 (1987): 617- 626.

