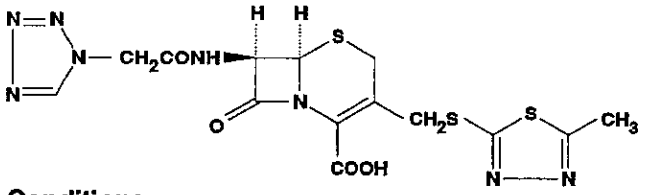
CAPSULES
notes and applications from Bioanalytical Systems, Inc.

Determination of Cefazolin in Ultrafiltrate and Microdialysate Samples

Purpose

Cefazolin (F1) is a first-generation cephalosporin antibiotic. It is used to treat both gram positive and gram negative infections and as a pre-surgical prophylactic. It has a half life appreciably longer than similar antibiotics and is often the drug of choice for moderately serious or serious infections. The pharmacokinetics of this drug can be investigated in a CMA/120 awake-animal system using either microdialysis (MD) or ultrafiltration (UF) probes implanted subcutaneously. Sampling from peripheral tissues permits the use of long membrane MD or UF probes, both of which give high recovery rates. With sufficiently large membrane surface area, MD recoveries can approach that of UF.



Conditions

System: BAS 480 Liquid Chromatograph

Detector: BAS UV-116 (271 nm)

Column: BAS 3µm Phase II ODS (100 x 3.2 mm) (PN MF-6213)

Temperature: 32°C (BAS LC-22A column temperature controller)

Mobile Phase: 92.5% (v:v) 0.05 M NaH_2PO_4 pH 5.3, 7.5% acetonitrile. Flow rate was 1 mL/min.

Detection Limit: 1.25 ng injected (S/N = 3) in ultrafiltrate.

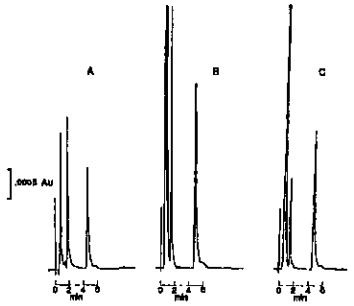
Linear Range: 10 ng to at least 500 ng injected in ultrafiltrate.

Sample Preparation

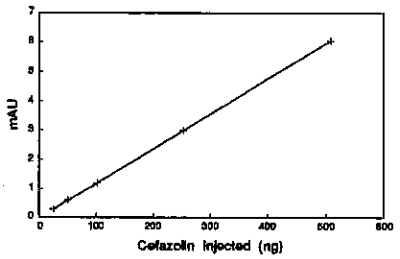
Cefazolin (25 mg/kg) was dissolved in normal saline, and injected intraperitoneally into a 300 g rat. Samples were obtained from a UF -3-12 probe (PN MF-7023) and a DL-12 microdialysis loop probe implanted in the subcutaneous tissue. No sample preparation is necessary. Ultrafiltrate or microdialysis samples can be injected directly.

Notes

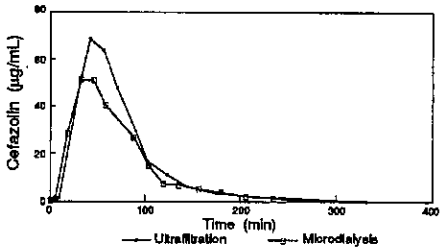
F2 illustrates a chromatogram obtained from the injection of 10 µL of cefazolin (20 µg/mL) in Ringer's solution (A), a chromatogram of cefazolin in an ultrafiltrate sample (B) and a chromatogram of cefazolin in a microdialysis sample (C).



A linear calibration curve was obtained consistently (F3).



F4 illustrates the change in cefazolin levels in MD and UF samples over time after a single intraperitoneal injection of cefazolin in an awake rat.



Reference

M.C. Nahata, J. Liq. Chromatogr. 13 (1990) 2285-2291.