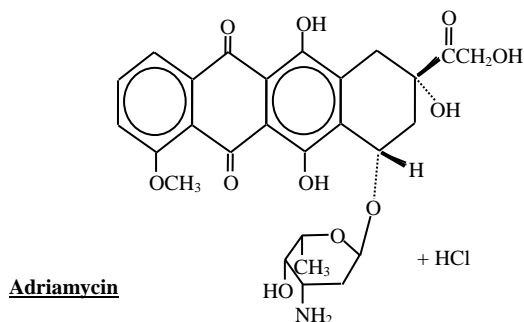


APPLICATION NOTE

ADRIAMYCIN: Detection in Urine Sample with STYROS™ 2R/XH.

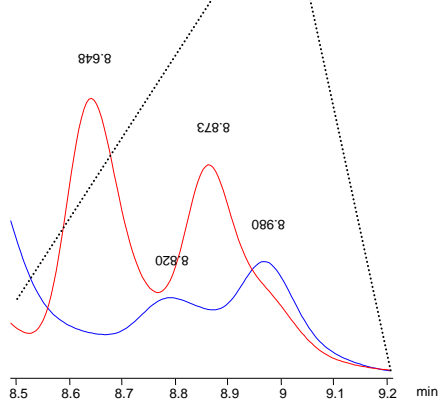
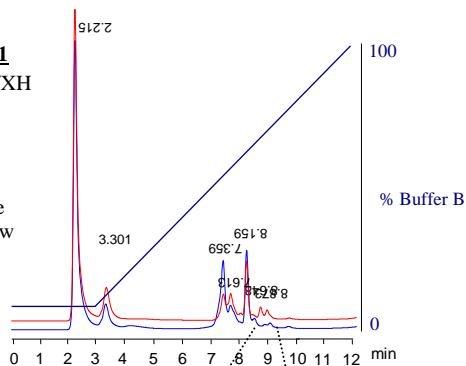
Adriamycin or Doxorubicin hydrochloride is an antineoplastic agent used to produce regression in metastatic conditions such as bone sarcomas, breast carcinoma, ovarian carcinoma and alike.



Chromatogram 1

STYROS™ 2R/XH

4.6 X 150 mm
Samples of urine
before and after
injection of
Adriamycin at the
beginning of a new
cycle.



The assignment of the peak was done in reacting Adriamycin with supplemental Calcium or Magnesium one would take in daily doses.

The relevant part of the chromatogram shows the retention of the Adriamycin peak at 8.825 min. being shifted to 8.874 min. shortly after mixing with the magnesium salt and generation of a deep violet-blue color. This is indicative of a higher resonance in the phenolic ring. The peak then shifts to 8.817 min. at equilibrium. Both these peaks are observed in the urine sample shortly after administration of the drug and a full week after it.

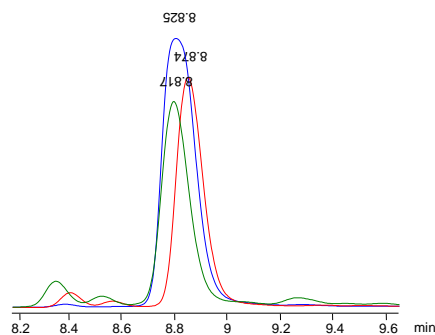


Table 1. Operating parameters for the chromatograms.

HPLC System.	Agilent 1100
Column	STYROS™ 2R/XH 4.6 X 150 mm
Mobile Phase	A: 0.075% TFA in H ₂ O B: 0.075% TFA in ACN:H ₂ O (95:5)
Flow rate	1 ml/min (360 cm/hr)
Gradient	3% B for 3 min., to 100% B in 12 min.
Temperature	37°C
Detection	252 nm
Injection volume	25 µl
Sample:	As indicated.

Adriamycin has an initial distributive half-life of ~ 5 minutes. The terminal half-life is 20 to 48hrs.

Plasma clearance is in the range of 8 to 20 ml/min/kg and is predominately by metabolism and biliary excretion. Approximately 40% of the dose appear in the bile in 5 days, while only 5 to 12% of the drug and its metabolites appear in the urine during the same period.

As an amphoteric substance, it can bind to Ca and Mg and deplete the body from these elements. The patient would develop severe debilitating muscle cramps in the short term, and compromised bone formation in the long term.

No recommendations are made at the present time, neither by the manufacturer nor by the physician on how to address the short and long term side effects of Calcium and/or Magnesium depletion as a result of treatment. This application note can be the basis for a more elaborate study in establishing these facts.