Analysis of Daunorubicin by Micellar Electrokinetic Capillary Chromatography with Scanning Detection

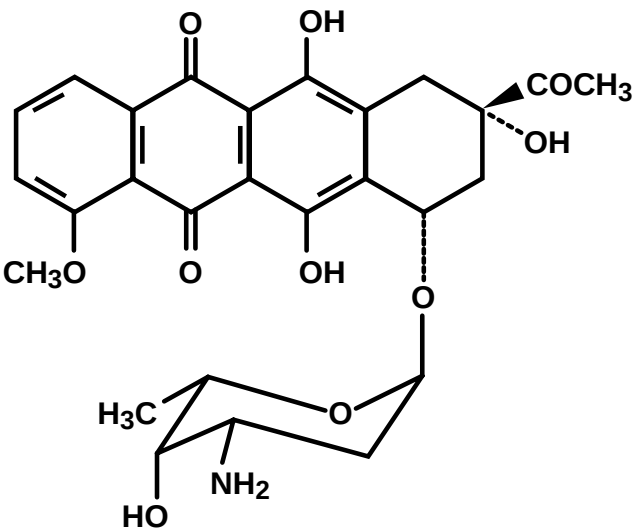

Fig. 1. Structure of daunorubicin.

Introduction

Daunorubicin is a cytotoxic anthracycline antibiotic produced by a strain of *Streptomyces coeruleorubidus*. Daunorubicin (Figure 1), in combination with other anticancer drugs, is administered in the treatment of various types of cancer and leukemia. In this note, a daunorubicin preparation was analyzed using micellar electrokinetic capillary chromatography, with UV scanning detection to confirm peak identity.

Results

Micellar electrokinetic capillary chromatography (MECC) is a versatile separation technique which can be used for resolution of neutral and charged species. An anionic surfactant such as sodium dodecylsulfate (SDS) is added to the run buffer to form a micellar pseudo-stationary phase, and electro-osmotic flow is used to pump the mobile phase towards the cathode. However, very hydrophobic analytes such as polyaromatic compounds have a high affinity for the micellar phase, resulting in long analysis times and poor resolution. In the case of daunorubicin, this problem was reduced by the addition of an organic modifier to the run buffer. The MECC separation shown in Figure 2 was achieved using 50 mM SDS in 10% Basic Protein Analysis Buffer supplemented with 10% acetonitrile. Figure 3 shows the spectrum acquired at 43.7 minutes as the sample zone migrated through the detection point. The characteristic maxima at 234, 252, and 290 clearly identify this peak as daunorubicin.

Analysis Conditions

Instrument	BioFocus® 3000 system
Polarity	+ to -, negative at the detector end
Capillary	50 µm x 50 cm, uncoated (catalog number 148-3040)
Run buffer	10% Basic Protein Analysis Buffer (catalog number 148-5023), 10% acetonitrile, 80% deionized water with 50 mM sodium dodecyl sulfate
Injection	20 psi * sec
Run voltage	10 kV
Detection	scanning, 195-300 nm
Cartridge temperature	20 °C
Autosampler temperature	20 °C

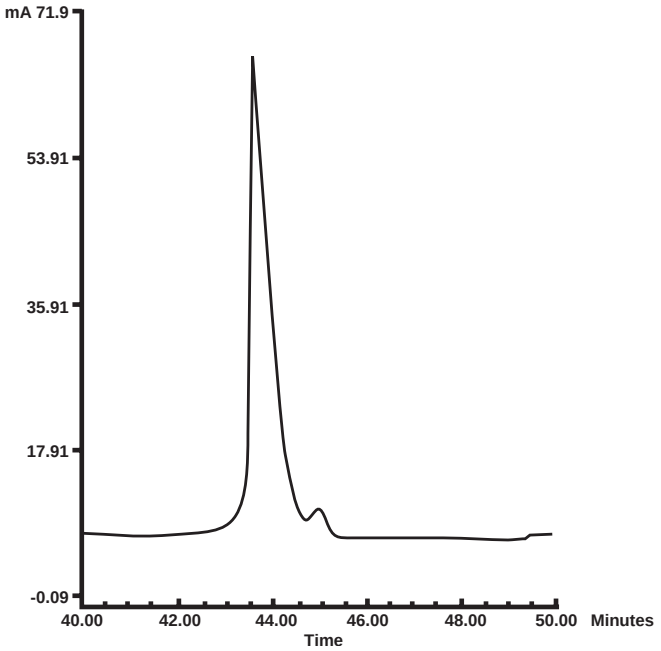

Fig. 2. MECC separation of daunorubicin with detection at 235 nm.

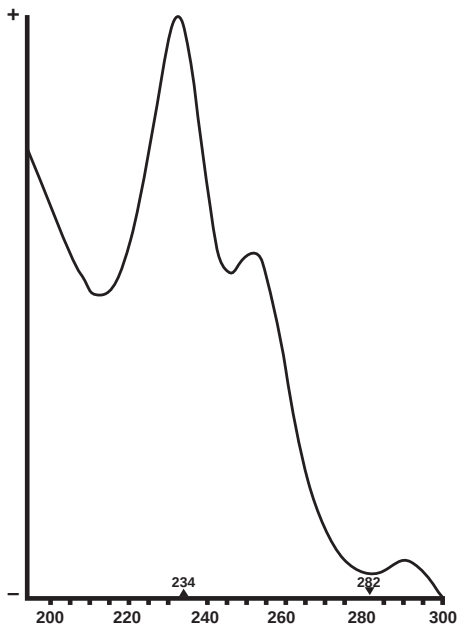

Fig. 3. UV spectrum (195-300 nm) of the peak migrating past the detection point at 43.7 min.

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