D. Chiral Separations Using the Macrocyclic Antibiotics

The macrocyclic antibiotics (ansamycins, glycopeptides, and polypeptides) have recently gained popularity as chiral selectors in capillary electrophoresis, high-performance liquid chromatography, and thin-layer chromatography (138). Vancomycin was used as a chiral mobile-phase additive for the TLC resolution of AQC-derivatized* amino acids, racemic drugs, and dansyl amino acids (139).

The enantiomeric resolution of 10 dansyl D,L-amino acids was achieved on TLC silica plates impregnated with erythromycin as the chiral selector (140). The mobile phases were mixtures of 0.5 M aqueous NaCl, acetonitrile, and methanol prepared in various proportions. Spots were detected with 254 nm UV light. Dansyl D,L-amino acids were also separated by normal-phase TLC on silica gel impregnated with vancomycin (141). The mobile phases were acetonitrile–0.5 M NaCl (10:4 or 14:3). Spots were detected by use of UV light at 254 nm.

E. Thermodynamic Study of the Retention Behavior of Antibiotics

The influence of temperature and mobile-phase composition on retention of cyclodextrins and two macrocyclic antibiotics, rifamicin B and rifampicin, was examined by RP-TLC, using wide-range (0–100%) binary mixtures of methanol–water (142). R_f values of the solute molecules were measured at temperatures ranging from 5°C to 60°C. From linear Van't Hoff plots, thermodynamic parameters, such as the change of enthalpy ($\Delta H°$) and the change of entropy ($\Delta S°$), were estimated.

F. Interactions of Antibiotics with Biological Matrices

The interaction of drugs with human serum albumin (HSA) modifies the biological efficacy and stability of the drugs. The interaction of 13 antibiotics with HSA was studied by charge-transfer RP-TLC in neutral, acidic, basic, and ionic environments, and the relative strength of interaction was calculated (143). The pH and the presence of mono- and divalent cations markedly influenced the strength of interactions.

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*AQC is the fluorescence-tagging agent 6-aminoquinolyl-*N*-hydroxysuccinimidyl carbamate.