INVESTIGATION OF INTERACTIONS ON CHIRAL ZWITTERIONIC STATIONARY PHASES IN ENANTIOMER SEPARATION USING HPLC AND SFC METHODS

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Abstract

Most biologically and pharmacologically important molecules (amino acids, carbohydrates, pharmaceuticals, etc.) are chiral compounds that may cause various biological effects; therefore increased attention is placed on their separation, qualitative and quantitative analysis. As a result of this knowledge, in this work the theoretical background of chiral chromatographic separation was investigated by high performance liquid chromatography (HPLC) and supercritical fluid chromatography (SFC). For our measurements, a new generation chiral zwitterionic stationary phase (Zwix (-) column) was used to separate the enantiomers one of the antimalarial drugs, mefloquine.

According to the stochastic model of chromatography [1,2], the peak formed during separation is a combination of the random walk of a molecule through the column and the slow adsorption-desorption processes. Using this theory, it is possible to determine the residence time of the molecules in the stationary phase and the average number of adsorption steps from which the retention factor can be calculated.

For chromatographic measurements, van 't Hoff plot [3] is used to explain the retention mechanism. In our case, the values of the retention factors were determined in two ways, on the one hand by classical calculations, on the other hand with stochastic model, which assumes multiple binding.

Finally, the thermodynamic parameters were compared for the two chromatographic methods, high performance liquid chromatography (HPLC) and supercritical fluid chromatography (SFC).

References

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