Chapter 8

Conclusions

Enantioanalysis of pharmaceutical compounds is necessary for chiral compounds that must be formulated as single enantiomers. For this purpose, highly reliable analytical techniques are required. If chromatographic techniques may be used for qualitative purposes, enantioselective, potentiometric membrane electrodes proved to provide high accuracy, precision, reliability of the analytical information, simplicity, and low cost for the quantitative enantioanalysis of pharmaceutical compounds.

The key of a high reliable enantioanalysis using enantioselective, potentiometric membrane electrodes is to find the best chiral selector for the enantiomers to be determined. The most used chiral selectors for the design of these electrodes are cyclodextrins and maltodextrins. C_{60} fullerenes proved to be good chiral selectors for the enantioanalysis of certain enantiomers.

Accordingly, for the enantioanalysis of S-ibuprofen the chiral selectors of choice were maltodextrins and antibiotics (vancomycin and teicolplanin), for S-deprenyl, fullerenes and cyclodextrins based electrodes were chosen while for the enantioanalysis of R-deprenyl, one maltodextrin proved to be the best for the enantioselective electrode design.

Five electrodes based on maltodextrins (DE 4.0-7.0, 13.0-17.0 and 16.5-19.5) and antibiotics (vancomycin and teicoplanin) were design for the enantioanalysis of S-ibuprofen. These electrodes did not show a Nernstian or near-Nernstian response for R-ibuprofen. The electrodes had good response characteristics, and they could have been reliable used for the enantioanalysis of S-ibuprofen in its pharmaceutical formulations, Myprodol and Nurofen.

Six enantioselective, potentiometric membrane electrodes based on fullerenes ((1,2-methanofullerene C_{60})- 61- carboxylic acid, diethyl (1,2-methanofullerene C_{60})-61-61-dicarboxylate and tert-butyl (1,2-methanofullerene C_{60})-61-carboxylic acid) and cyclodextrins (α-, β-, and γ-cyclodextrin) have been designed for the enantioanalysis of S-deprenyl and one enantioselective, potentiometric membrane electrode have been designed for the enantioanalysis of R-deprenyl. The utilization of fullerenes in the electrodes design improved the response characteristics, reliability and accuracy of the analytical information obtained using the proposed electrodes.

For the enantioanalysis of S-deprenyl the best slopes were obtained when the fullerenes based enantioselective, potentiometric membrane electrodes were used. The lowest limits of detections and the best slopes were obtained when maltodextrins were used for the enantioanalysis of S-ibuprofen.

The design of the electrodes is simple, fast and reproducible. One of the main advantages of the proposed method is that the sample did only need to be dissolved in distilled water

and buffered before the assay of any of the enantiomers and that makes the method simple, fast and highly reliable.

The proposed enantioselective, potentiometric membrane electrodes can be reliable used for the enantioanalysis of the proposed enantiomers as raw materials and in their pharmaceutical formulations. Their good selectivity over compounds such as creatine and creatinine proved that they can also be used for the enantioanalysis of the enantiomers in biological samples such as urine.