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Evaluation of affinity capillary electrophoresis for ligand binding assays

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Abstract

Process analytical technologies need precise and fast analytical tools especially in the early evaluation stage of drug discovery. Here, in the evaluation of ligand (drug) and receptor (plasma protein), affinity capillary electrophoresis (ACE) offers a lot of advantages including high separation efficiency, low sample volume, using of impure samples, ease and low cost of automation and ability to work under native physiological conditions. Furthermore, our recent published works suggested reduced experimental designs in which a single experiment could suffice. Then, the realistic duration of one binding-constant determination, including analysis and rinsing times, does not need to be more than a couple of hours, and this speed could be further multiplied by capillary arrays or miniaturized systems. Therefore, various analytical aspects of ACE including method development, and instrument qualification will be discussed. Precision certainly is a major parameter, to comply with acceptance criteria in quality control (QC), but also to investigate changes in biological systems. Further robustness, accuracy and selectivity are considered. In the case of high binding constants of the order of 105 per mol or higher, ACE is not applicable in its commonly used form. However, an advanced ACE version can also reliably detect high binding constants, which will be highlighted as an important feature.

Biography

Deia Abd El-Hady has completed his PhD at the age of 32 years from Assiut University joined with University of Bologna in Italy. He got postdoctoral grant by DAAD to study at Technical University of Braunschweig, Germany. Currently, he is an associate professor in King Abdulaziz University, Saudi Arabia. He has published more than 25 papers in reputed journals.