

Project PN2_Idei 55/28.09.2007 (Cod ID_957/2007):

STRUCTURE - RETENTION CORELATIONS IN HIGH-PERFORMANCE LIQUID
CHROMATOGRAPHY AND APPLICATIONS FOR ORGANIC COMPOUNDS OF
PHARMACEUTICAL INTEREST.

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Project presentation:

THE PROJECT IS FOCUSED ON A FUNDAMENTAL RESEARCH AREA IN LIQUID CROMATOGRAPHY: MODELLING AND THE CORRELATION BETWEEN EXPERIMENTAL RESULTS OF HPLC SEPARATIONS AND STRUCTURE OF COMPOUNDS OF PHARMACEUTICAL INTEREST (QSRR - QUANTITATIVE STRUCTURE-RETENTION RELATIONSHIP). THE MOST IMPORTANT SEPARATION MECHANISMS (REVERSED_PHASE, NORMAL-PHASE, AND CHIRAL) WILL BE STUDIED AND ORIGINAL MODELS AND VIEWPOINTS WILL BE EMPHASIZED IN ORDER TO DESCRIBE THE INTERACTION BETWEEN ANALYTE AND STATIONARY PHASE. THE HPLC BEHAVIOUR OF NEW TYPES OF PHARMACEUTICAL COMPOUNDS WILL BE ALSO STUDIED AND THEIR MOLECULAR DESCRIPTORS WILL BE CORRELATED WITH EXPERIMENTAL PARAMETERS. AMONG THE MOLECULAR DESCRIPTORS WIDELY USED IN QSRR STUDIES, THE HIDROPHOBICITY IS BY FAR THE MOST USED MOLECULAR DESCRIPTOR FOR STUDYING ANALYTES, AND AT THE SAME TIME AN ATTEMPT TO ASSIGN SUCH A DESCRIPTOR TO THE STATIONARY PHASE WILL BE PROPOSED AS WELL. THE RESULTS OF THIS PROJECT ARE INTENDED TO BE PUBLISHED IN AT LEAST 6 SCIENTIFIC PAPERS IN INTERNATIONAL ISI JOURNALS.

The project is not entirely a theoretical one. First of all, structure-properties correlation studies are based on a large amount of experimental information. In this particular case, the experimental part is decisive for the entire project; moreover, a chromatographic system has to be qualified, checked periodically, and the results are always processed by statistics, when sets of repetitive determinations are necessary. Therefore, the present project proposes both research activities: a large number of experiments under different conditions for a large number of organic compounds, as well as an interpretation by theoretical approaches, either from literature, or our own theoretical achievements, which are reported in literature and recognized as valid.

Basically, the chosen subject is focused on the following topics:

- a) the choice of organic compounds for pharmaceutical purposes that will be investigated in two Ph.D. contents, and in other activities;
- b) the development of a theoretical approach, based on the previous results and achievements;
 - c) Experimental retention studies for a large number of organic compounds, in different separation conditions, such as: mobile phase composition (pH of mobile phase; nature of organic modifier),

column temperature, the type of stationary phase, constructive parameters of chromatographic column,

d) experimental studies on injection volume and the parameters influencing this stage;

e) studies and methodologies of correlating the experimental results and structure of analytes.

Research tasks designated to this first year are following:

1. Checking and optimization of chromatographic systems for experimental studies;
2. Correlations between octanol/water distribution coefficients with values obtained from retention studies for acidic or basic compounds;
3. The dissemination of the results by preparing a scientific work sent to an ISI journal for publication.

For this year it was intended as a scientific paper, which is based on correlation studies between octanol/water distribution coefficients and values obtained from retention data, to be sent in the view of its publication in an international ISI journal. The work was focused on two pharmaceutical compounds (norfloxacin and its metabolite). The work was sent to reviewing process to the well-known ISI journal *Biomedical Chromatography* (with an impact factor of 1,611), from Wiley Interscience. (**BMC-07-0393**).

Title of the paper:

Characterization of a new norfloxacin metabolite monitored during a bioequivalence study by means of mass-spectrometry and quantum computation.

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