Embedded Molecular Geometry and Molecular Topology Approach for Structure - Activity Relationships

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Abstract

We report an integrated system that uses structure information and measured activity/property data (called MDF-SAR, from Molecular Descriptors Family on Structure-Activity Relationships) designed for structure-activity relationship (SAR) studies. The MDF-SAR system integrates structure descriptors generation (using MDF approach, [1]), descriptors pool inheritance, mutation, selection, and crossover (see [2]), in order to obtain multi-varied structure-activity/property relationships. More than thirty sets of biologically active compounds were investigated using MDF-SAR methodology (see [3]). The obtained relationships links the structure with the measured activity/property through the meaning of every descriptor included into the relationship (see [4]). The best performing MDF-SAR model with one descriptor was identified, analyzed and assessed as first step in modelling process. The multiple MDF-SAR regression models were identified, analyzed and assessed when the simple linear regression MDF-SAR model was not satisfactory and when the sample size allowed this analysis. The results showed that almost never the descriptor used by the best simple MDF-SAR model was not found again when pairs of descriptors were used for characterization of the link between compounds structure and property/activity on interest.

Keywords:

Structure - activity relationships; genetic algorithms; models analysis.

References:

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