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Under the REACH legislation, human and environmental protection requires carefully assessing each compound produced or imported in EU. To reduce the number of animal tests (in particular tests involving vertebrates) and the cost, REACH promotes the use of all existing information and alternative methods (e.g. in-vitro, QSAR or read-across). Goal of this work was to evaluate in which cases QSAR models can replace in-vivo tests. For this reason several QSAR models, developed within OSIRIS project (i.e. ChemPropTM and BCF regressions model for monovalent ionic compounds by Fu et al., 2009) or freely available (i.e. EPISuite, T.E.S.T., CAESAR, CORAL and logP-based equations) were tested. Performance and applicability of the models has been evaluated using a large dataset. The models were analysed both as regression models (in particular error distribution and correlation) and as classification models. It is interesting to notice that the results of the different models do not always overlap. This offers the opportunity to identify strategies for the careful integration of different methods. Besides the use of combination of the results on a purely statistical way, we will address the possibility to define a more reliable use of the model, referring to the applicability domain. Financial support by the OSIRIS project (GOCE-CT-2007-037017) is gratefully acknowledged.

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