

Abstract

My PhD study 'Educational application of models of complex biochemical processes' discusses the possibility of integrating simple bioorganic teaching experiments, modelling complex biochemical processes in living systems into a curriculum of secondary schools, and universities, and even elementary schools in some cases. The aim of these experiments is simplified, but illustrative and appropriate for approaching complex problems of biochemical processes in a transparent experiment, running in spite of conditions comparable to real natural clauses in a living system. The theoretical part is divided into three thematic circuits: biochemistry and bioorganic chemistry, bioorganic models and their characteristics and selected specific forms of applying bioorganic models into teaching chemistry. The next part dealing with bioorganic models and their characteristics is further divided on the base of some specific models. These are consisted of models of enzymes and their catalytic activity, models of biochemical reactions and antidotal and toxic substances affecting life-forms and their carcinogenic efficiency. The practical part contains methodic treatment of six selected models that demonstrate specific biochemical processes or structure of complex organic compounds. These models include modeling biuret reactions, methylene blue as a model of coenzyme, modeling the influence of reacting conditions in the case of fission reactions of starch amylase, models of human exposure to toxic substances and antidote products, models of mutated genes and models of antioxidants and their effects and actions. The practical part of the methodic educational research ought to verify the effectiveness of the use of an experiment, the efficiency of a teaching process. Based on the research results, it was discovered that selected secondary schools in the Czech Republic and Germany that taught experiments based on models of processes occurring in living organisms contributed to an improvement of teaching.