# USING MATHEMATICAL MODELS FOR QUANTITATIVE EVALUATION OF THE EFFECTIVENESS CHEMOTHERAPEUTIC IMPACT

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In biology and medicine one of the important and time-consuming problem is the process of selecting the optimal concentration of cytotoxic drugs. In this work some examples of using mathematical models to quantify the effect of inhibition of cell populations' growth in vitro by using the chemical agents are represented.

In this work are formulated and compared with the experiment two types of mathematical models: ecotoxicological model (Yuri A. Yershov, 1998) and a model based on the conception of cellular automata (KA). The object of the model is the growth of cell population (Saccharomyces cerevisiae) in vitro.

In ecotoxicological model is considered the open system, including two populations of growing and mature cells. The model uses such parameters as the density of growing and mature cells, the power of the external cell-source, transport coefficient, auto-inhibition coefficient, birth coefficient, coefficient of growth and reproduction of the cells population (these last two coefficients defined from the experimental data as the functions of the concentration of inhibitors).

In the cellular automata model we consider the Moore area field, with 2 types of cells: «living» and «non-living». Living Cell has the attributes (a set of parameters and transition rules).

The results of the modeling are consistent with experimental data: closure does not exceed 20 %, which make it possible to use the model to calculate the inhibitor concentration from the desired effect.