

The summary of PhD thesis by mgr inż. Maciej Konopacki “Analysis of rotating magnetic field influence on life parameters of selected microorganisms”.

The increase of productivity is one of the main aims in most biotechnological processes and may be achieved in several ways: using new or modified microorganism strains; developing new bioreactors and optimizing the operation strategies; improving the efficiency of separation processes; using efficient control systems and developing a more effective cell immobilization technique.

The quest for efficient processes involves non-conventional approaches for the stimulation of microorganisms. The application of physical factors to achieve for the most advantageous production performance has been studied for many years. Electromagnetic fields have been proven to induce in vivo and in vitro effects in many biological systems. Recently, increasing attention has been directed towards bio-magnetic stimulation of microorganisms using various types of magnetic fields. Magnetically assisted bio-processes are conducted using a non-conventional stimulation of classical bio-processes by various types of magnetic fields. It should be noticed that a time-varying magnetic field (e.g. rotating magnetic field) might be applied as a versatile option for enhancing bioprocess.

The main objective of this work was to analyze the effect of the rotating magnetic field on the selected microorganisms. It was obtained that the rotating magnetic field may be used to modulate growth dynamics, cellular metabolic activity. Moreover, the influence of this kind of magnetic field on ethanol fermentation and the process production of bacterial cellulose was discussed. On the basis of the experimental investigations, the practical usefulness of the rotating magnetic field was supported. In particular, the usage of the rotating magnetic field in the area of biochemical and processing engineering was analyzed.