

Rapid development of civilization in recent years involves growing food market. It is based not only on technologies engaged to improve food quality but on their packaging as well. Modern consumer demands mildly preserved, fresh and tasty food products with prolonged shelf-life, therefore new food packaging technologies are being developed. Limited shelf-life of food products is a consequence of oxidation reactions such as degradation, enzymatic browning, and oxidative rancidity. To prevent these harmful oxidative reactions many chemical compounds are currently employed. To avoid toxic effects of chemical preservatives, recently many additives were isolated from natural resources both of plant and microbial origin. These active substances of biological origin have not only a powerful wide-spectrum activity but remains at least neutral or even positive effect to human health. Incorporation of antioxidants to active packages are one of the most promising alternatives to traditional packaging, which in consequence should reduce oxidation of the food. Recent explosion in enzyme applications in different biotechnological areas resulted already in development of products in the healthcare, biomedical, and food industries. Enzymes with oxidoreductase activity are gaining special interest as the new generation of bioactive agents with the antimicrobials and the antioxidants properties. Cellobiose dehydrogenase is a typical example of such enzyme with promising future in biotechnology. This protein in nature is engaged in wood decomposition realized by many fungal species. In worldwide laboratories detailed studies proved that cellobiose dehydrogenase may be successfully used as antioxidant and bacteriostatic agent. Therefore it seems quite clear that this enzyme may be quite useful in developing active food packaging.

For many years our laboratory worked on wood degrading enzymes, which resulted in selection of several cellobiose dehydrogenases, which in future may be used as components in active packaging. Detailed results of these analysis comprising cellobiose dehydrogenase production, purification and characterisation were published in the international science journals. In the proposed project purified cellobiose dehydrogenase is planned to be immobilized on polymers which are or may be a future part of packages. Prepared in this way trapped enzymes will be analyzed by means of biochemical techniques in order to compare their characteristics with native enzyme. Above all, however, we hope that this immobilized cellobiose dehydrogenase will gain increased antioxidant and antibacterial properties. Considering that in future those compounds may become a part of active packaging we are also planning to examine their cytotoxicity on human cells.