PHYSICOCHEMICAL CHARACTERIZATION OF IMMOBILIZED LIPOLYTIC GDEST-LIP ENZYME AND ITS APPLICATION FOR TRANSESTERIFICATION REACTION

Agnė Savickaitė, Eglė Lastauskienė, Renata Gudiukaitė

Institute of Biosciences, Life Sciences Center, Vilnius University, Sauletekis ave. 7, LT-10257 Vilnius, Lithuania
agne.savickaite@gf.stud.vu.lt

Microbial lipases and esterases are highly used biocatalysts due to their particular characteristics such as the ability to utilize a wide range of substrates, high activity and stability in organic solvents, tolerance to broad pH and temperature ranges, regio- and/or enantioselectivity. These enzymes are currently being applied in a variety of biotechnological processes, including detergent preparation, cosmetics and paper production, food processing, biodiesel and biopolymer synthesis, and the biocatalytic resolution of pharmaceutical derivatives [1]. One of the reactions performed by these enzymes is transesterification, which is used in biodiesel production. Transesterification reactions involving lipolytic enzymes are suitable for biodiesel production due to the ability to more easily isolate glycerol, which is a by-product of the biofuel production process [1]. The major barrier to large-scale application of this system is the cost of producing lipolytic enzymes. The most important aspects of such biological tools are stability and reusability. Nowadays, immobilization of enzymes is commonly used to achieve these properties. One of the most effective enzyme immobilization techniques is enzyme entrapment in calcium alginate hydrogel.

In this study, immobilization conditions of GDEst-lip [2] enzyme were optimized. To achieve the most stable structure 3 % of sodium alginate and 150 mM of CaCl was used. The characteristics, including thermostability, substrate specificity and ability to catalyze reactions at different temperatures, were also evaluated. Transesterification reaction was performed using different oils and alcohols and obtained products were visualized using thin layer chromatography. Principal scheme of research is showed in Fig. 1.

This research is important for the future development of cost-effective immobilized enzyme systems that can be used in industry for transesterification or other by lipolytic biocatalysts performed reactions.

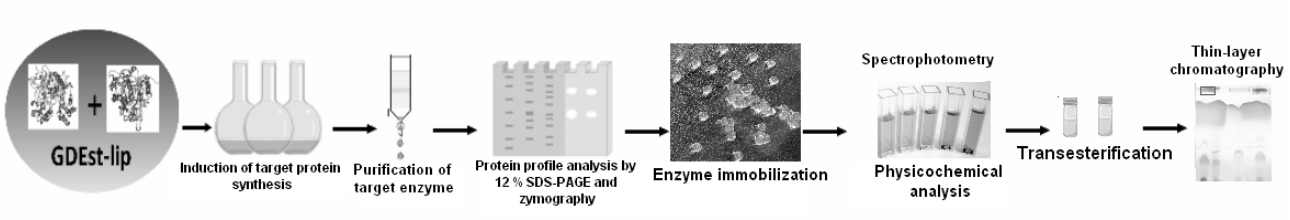

Fig. 1. Principal scheme of research.

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