UDC: **577.152.311**

METHOD FOR FUNGAL LIPASES PRODUCTION IN LAB-SCALE FERMENTER

Ciloci Alexandra*, Clapco Steliana, Dvornina Elena, Labliuc Svetlana, Bulimaga Valentina, Matroi Alexandra
Institute of Microbiology and Biotechnology, Technical University of Moldova, Chisinau, Republic of Moldova

E-mail: alexandra.ciloci@imb.utm.md

Fungal lipases are preferred for the application in different industries due to the fact that they are mainly extracellular enzymes, which could be easily extracted from culture filtrate, their activity and stability in a wide range of pH and temperature. Actually, reactions catalyzed by lipases represented approximately 20% of the performed biotransformations. One of the major concerns of the current researches consists in the development of new technologies to intensify the synthesis of enzymes and their transfer from the submerged fermentations in shake flask level to the production scale. It is known the role of coordination compounds of transition metals as stimulators of the synthesis of biological active substances in microorganisms.

The object of the present investigation was the fungal strain *Rhizopus arrhizus* CNMN FD 03 - producer of exocellular lipases. Based on the previously obtained results, the compound $[Ca(L)_3][Co(SCN)_4]$, where L_3 – represents the dimethyl ester of 2,6-acid pyridinedicarboxylic, was used as a potential stimulator of the lipolytic activity. Lipases production under submerged fermentation condition was carried out during 2 days in 500 mL Erlenmeyer flasks by taking 100 mL of optimized nutritive medium including the metalocomplex in a concentration of 5.0-20.0 mg/l. It was found that the optimal concentration ensuring the maximum increase (78.4% compared to the control without stimulator) of the lipolytic activity and the shortening of the technological cycle with 24 h is 10 mg/l.

Fermenter studies were carried out in BIOSTATR A plus Sartorius fermenter. The fermentation medium was the same with shake flask culture. Two series of experiments were set up, with the setting of the main technological parameters (aeration, agitation) as follow: volume of nutrient medium - 2 L, stirring - 100 and 180 rpm, volume of forced aeration - 2 L /L medium / min. In the first experimental variant, the enzyme activity was 15458 U/mL on the 1st day of cultivation and 35875 U/mL on the 2nd day, being by 30.3% higher than the maximum of control revealed in 2nd day. The enzymatic activity (65625.0 u/mL) at 1st day was by 117.2% higher compared to the upper level of the control when the stirring speed was increased to 180 rpm. So, the superiority of accumulation of lipases compared to classical cultivation (without stimulator) is preserved even under pilot station conditions.

Acknowledgments: this study was supported by the research project 20.80009.5007.28 with funding from ANCD. The coordinating compounds were synthesized and offered for investigations, according to the project's objectives, by the partner team from the Institute of Chemistry, MSU, coordinated by dr. hab. Bulhac Ion (project manager).

Keywords: *fungi, lipases, coordination compounds, production scale.*