

A comparative Study on Efficiency of two Different Methods for Cell Immobilization

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Background & Objectives: Considering the role of the microorganisms in different industrial and biotechnological processes and advantages of the use of immobilized microorganisms, importance of immobilization can be known. Cell entrapment in a support and cell cross-linking, are two cell immobilization methods; But the efficiency of different immobilization methods are not the same. The aim of this work is to compare the efficiency of two different immobilization **methods**, including cell entrapment in agar and cell cross-linking.

Methods: *E.coli* cells (ATTC=35218) were used in this study as model organism. In the first method, warm agar solution was added to bacterial suspension. After gelation, it was cut into pieces. In second method, the cells were covalently bound to each other via a chemical cross-linker. Metabolic activity of immobilized living cells was assessed using a colorimetric method. Before immobilization, the metabolic activity of free cells was also assayed by colorimetric method, in order to determine the immobilization yield. Two Gram stained slides were prepared from cell-contained agar and cross-linked mass.

Results: The Gram stained slides confirmed the existence of cocobacil and Gram negative *E.coli* cells. In addition, based on colorimetric assays, immobilization yield was determined to be 35.7% for entrapment in agar and 7.1% for cross-linking method.

Conclusion: Considering that during immobilization process some cells may die, for determining immobilization yield, measuring the amount of immobilized cells is not enough and the amount of living and active immobilized cells should be determined. Colorimetric measurements showed that the cell entrapment in agar is more appropriate method than cross-linking. Cells exposure to chemical cross-linker, due to its toxicity, can cause less immobilization yield for cross-linking method. Optimizing the immobilization process is also recommended in order to increasing the immobilization yield.

Keywords: Cell Immobilization; *E.coli*; Comparative