DOI : 10.35124/bca.2020.20.1.1791

Biochem. Cell. Arch. Vol. 20, No. 1, pp. 1791-1795, 2020 | www.connectjournals.com/bca | *ISSN 0972-5075*

PRODUCTION OF PROTEASE USING IMMOBILIZATION CELLS TECHNIQUE

Safaa Abed Latef Al Meani, Ebraheem W. Al-Duliamy*, Ali S. Al-Shojiary, Nawras M. Turky and Yasmen K. Ahmed

Department of Biology, College of Science, University of Anbar, Iraq.
*e-mail : abroham94ee@gmail.com

(Received 22 October 2019, Revised 30 December 2019, Accepted 15 January 2020)

ABSTRACT : This study aimed to investigation and evaluation of sodium alginate in different concentration for protease enzyme production from *Pseudomonas aeruginosa* using immobilization technique. Sodium alginate is suitable matrix for entrapped cells and repeated batch fermentation. Experiment immobilization of cells showed that the beads forming gave an enhanced production over the free cells. *Pseudomonas aeroginosa* produce proteases and in the same time this bacteria causes some problems such as contamination of the environment and diseases. To prevent the risk of bacteria we used immobilization method as well as to ensuring the fermenter work. Immobilized cells in sodium alginate to production of protease observed that the quantity of the cell mass that entrapped in this matrix increased progressively up to 48 hours of incubation and arrived maximum level of the production of protease.

Key words : Immobilization, protease, *Pseudomonas aeruginosa*, sodium alginate.

INTRODUCTION

Fermentation processes and bioremediation is usually improvement by the technology of cell immobilization, therefor it is often studied. Entrapment to whole cell immobilization is a simple mechanism and extensive used (Beshay *et al*, 2002; Abd-El-Haleem *et al*, 2003). One of the most interesting techniques offered during contracts the use of immobilized of cells in the metabolites production by microorganism cultures to improvement of the process of fermentation. Immobilization of cell offers variant advantages, such as increase of the reactor and prevention of washout in continuous operation among other things (Longo *et al*, 1992).

The production of extracellular enzymes by whole cells immobilization provides lots of advantages for instance the precipitation of bacterial cells from the supernatant for potential reuse, simplifying continuous culture in long term of time and enhanced the reactor production (Zhang *et al*, 1989). The previous studies were conducted by using organic synthetic polymers immobilization in the few binding site of enzymes due to of the simplicity of production of required structures and the exciting of functional groups reactivity.

Generally, immobilization term describe a broad assortment of bacteria or the molecules entrapment or attachment (Lopez *et al*, 1997). Immobilization can be used all kinds of enzymes-containing cellular organelles, plant and animal cells. Presently, many types of immobilization have extensive uses in several fields not only in the field of biotechnology, but also in environmental, pharmaceutical, biosensor and food industries (Peinado *et al*, 2005).

Immobilization techniques of cells was developed as an another technique for enzyme immobilization (Cheetham *et al*, 1979). Comparison of the immobilized cells with immobilized enzymes, immobilized cells availability modern possibilities because of they can be used as natural product or chemical polymers of desired enzymes activities (Vojtisek and Jirku, 1983).

The field of application of the microbial cell immobilization spreads from the industrial process to environmental process. Microorganisms immobilized on a transporter can be used in continuous and semi-continuous of the operations of production permit for reduce the cost, as the enzymes does not need to be replenished (Wada *et al*, 1979).

We can define cell immobilization as a ;localization of viable microbial cells to a some defined area of space in such a way as to limit their free transformation and exhibit hydrodynamic features or as the physical confinement, which are different from cells of the a rounding environment while retaining their enzymes