CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME III

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Ahmed Tariq Jameel
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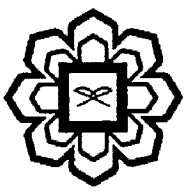

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CHAPTER 10

CELL DISRUPTION IMPROVEMENT OF *E. COLI* PRODUCING NP-AIV USING HIGH PRESSURE HOMOGENIZER

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INTRODUCTION

Homogenization of solution containing cells using high pressure homogenizer (HPH) is a widespread technique for extrication intracellular products from the cells. This mechanical cell disruption is currently being the general method of choice for the large-scale disruption of microorganism especially for recombinant *E. coli*. Homogenization technology is based on the use of pressure on liquids to subdivide particles or droplets present in fluids into the very smallest sizes and create a stable dispersion ideal for further processing. Homogenization features a high concentration of energy released on processed liquids by a combination of fluid mechanical effects such as shear and impact to achieve a homogeneous particle size distribution. In this case, the cell walls are broken by the hydrodynamic forces in the homogenizer. Operation at the maximum attainable hydrodynamic forces in the homogenizer will produce the maximum number of broken cells and consequently maximize the release of the desired product.

This research will focus on improvement of disrupting cells of recombinant *E. coli* producing Nucleocapsid Protein of Avian Influenza Virus (NP-AIV) using high pressure homogenizer (HPH). The experiment has been designed by Taguchi's Design using a Statistica Software v 6.1. From 4 runs that have been carried out using a pilot high pressure homogenizer, the best performance of cell rupture of recombinant *E. coli* producing NP-AIV has been achieved at pressure of 600 bars, feed pressure of 8 psi and two cycles with the highest percentage of cell rupture (>95%).