

IMMOBILIZATION OF RECOMBINANT *Escherichia Coli* ON HOLLOW FIBER MEMBRANE AS WHOLE CELL BIOCATALYST FOR CYCLODEXTRIN (CD) PRODUCTION

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RESEARCH BACKGROUND :

- Cyclodextrin Glucanotransferase (CGTase) + starch → CD
- Immobilization of *E.coli* on the hollow fiber membrane as a biocatalyst
- Cell biocatalyst offers more advantages in comparison to traditional fermentation : protect the cell from environmental changes, provides cell reusability and increase productivity

NOVELTY

- Reusability of immobilized cell will increase productivity and reduce the cost for separation process
- Economic impact - direct synthesis of CD without cell disruption may offer cheaper method instead of using commercialized CGTase (expensive)
- Optimization of the operating conditions: significantly enhance the cell immobilization
- Hollow fiber membrane as matrix

METHODOLOGY :



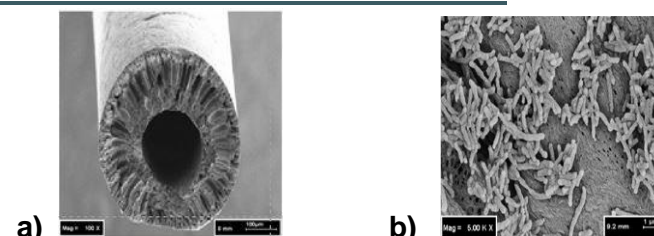
Cell Immobilization On Hollow Fiber Membrane

Measurement of cell concentration by dry cell weight

Determination of CD production by HPLC

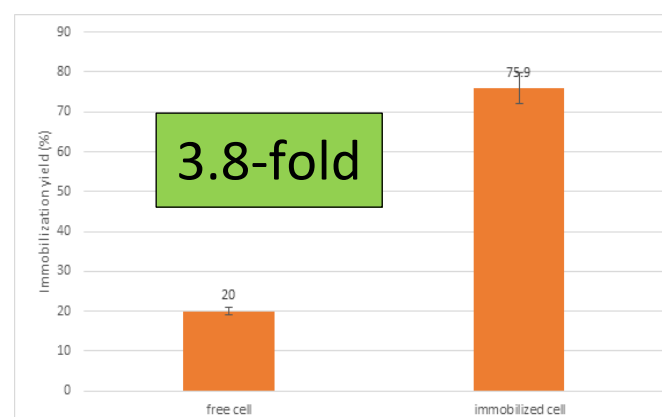
RESULTS

i. Cell Immobilization on Hollow Fibre Membrane



(a) cross-section structure of hollow fiber membrane
(b) *E. coli* immobilized on hollow fiber membrane

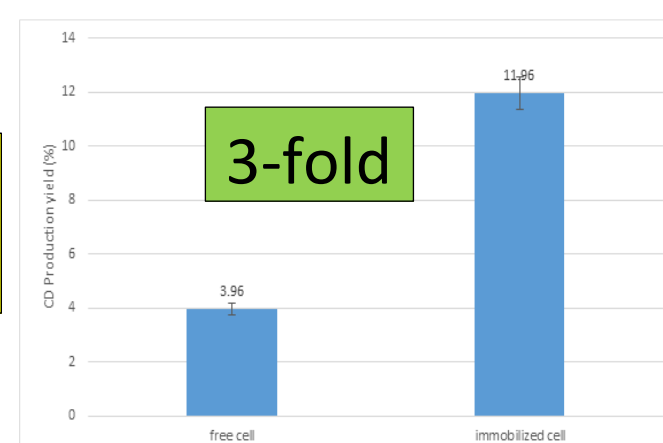
ii. Immobilization Yield on Hollow Fiber Membrane



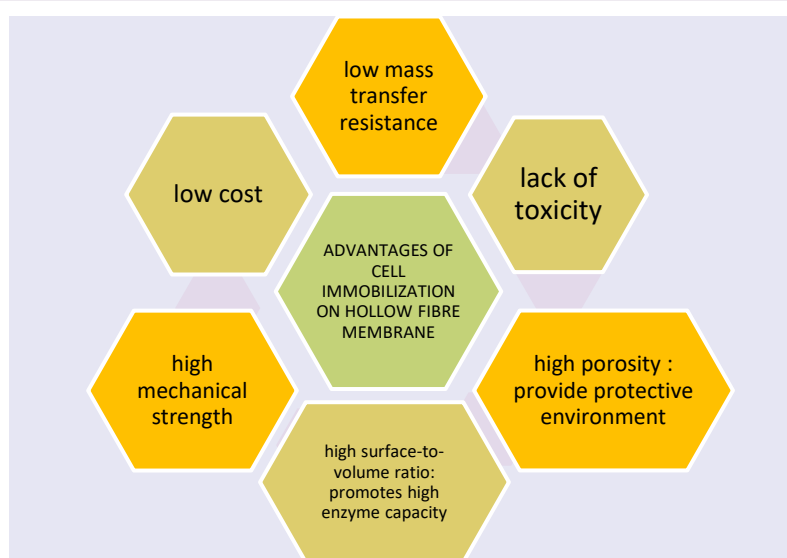
3.8-fold

Immobilized cell showed 3.8-fold as compare to free cell

Immobilized cell showed 3-fold as compare to free cell for CD production



3-fold



Marketability & Commercialisation :

The Potential Market Of Hollow Fiber Membrane :

- Water Treatment industry
- Food & Beverages industry
- Biotechnology industry
- Pharmaceuticals industry
- Chemicals industry



The market demand for hollow fibre membrane

ENVIRONMENTAL IMPACT

Hollow fiber membrane offers green technology as it does not caused any toxicity to the environment

ACHIEVEMENT

- Fundamental Research Grant Scheme (FRGS), RDU 1901113 from Ministry of Higher Education
- Internal Research Grant (RDU182305 and RDU190359) from Universiti Malaysia Pahang
- Matching Grant UTM-UMP (RDU 182305)

PUBLICATION

Immobilization Of Cell As A Whole Cell Biocatalyst: A Review
Manuscript Preparation To Biochemical Engineering Journal (Q2, IF:2.851)