Scopus

Document details

Back to results | 1 of 1

Export Download Print E-mail Save to PDF Add to List More...

Journal of Pure and Applied Microbiology
Volume 8, Issue SPEC. ISS. 1, May 2014, Pages 797-802

Optimization on cell disruption of E. coli BL21-AI expressing recombinant bromelain (Article)

Othman, M.E.F.[a], Amid, A.[ab], Jimat, D.[ab], Jamaluddin, M.J.A.[a]

[a]Department of Biotechnology Engineering, Faculty of Engineering, International Islamic University Malaysia, Jalan Gombak, 53100 Kuala Lumpur, Malaysia
[b]Bioprocess and Biomolecular Engineering Research Unit (BPMERU), Department of Biotechnology Engineering, International Islamic University Malaysia, Jalan Gombak, 53100 Kuala Lumpur, Malaysia

Abstract

View references (12)

Recent advancements in recombinant DNA technology proved to be a promising and effective approach for more sustainable large scale productions of many therapeutic proteins. Nevertheless, since this approach involves expression of proteins in a non-native host microorganism, the overall production processes are not straight-forward due to several common challenges, such as protein degradation, especially during cell disruption stage. As the process has been subjected to both protein and host-specific, a systematic process conditioning for maximal production of recombinant protein is therefore required. In this study, a simple approach to determine optimal conditions for cell disruption using ultrasonication to isolate recombinant bromelain from E. coli BL21-AI is reported. Suspension cells were lysed using ultrasonication which transmit sound wave in to break the cell wall. An optimized condition was obtained by response surface methodology (RSM). A three factor face-centered central composite design (FCCD) was applied to obtain the optimal process conditions consisting of amplitude, cycle and bursting period. The prediction model was further validated. Therefore, under the optimal conditions, having 20% amplitude, 0.5s cycle, and 1 minute bursting period in three times process, the specific enzyme activity of the recombinant bromelain was found to be functionally and reproducibly acceptable at 0.5270 U/mg.

Author keywords

Cell lysis Downstream Enzyme activity Intracellular Recombinant protein

ISSN: 09737510
Source Type: Journal
Original language: English
Document Type: Article
Publisher: Journal of Pure and Applied Microbiology

References (12)

View in search results format

All Export Print E-mail Save to PDF Create bibliography

1 Saptarshi, S.D.A.L., S, S.
Application of Evolutionary Optimization Technique in Maximizing the Recovery of L-Asparaginase from E.caratovora MTCC1428
(2010) *Global Journal of Biotechnology & Biochemistry*, pp. 97-105. Cited 6 times.

Metrics

0 Citations in Scopus

0 Field-Weighted Citation Impact

PlumX Metrics

Usage, Captures, Mentions, Social Media and Citations beyond Scopus.

Cited by 0 documents

Inform me when this document is cited in Scopus:

Set citation alert Set citation feed

Related documents

Yield optimization of a heterologously expressed novel mouse macrophage protein
Pahuja, P. , Srinivasan, A. , Puri, M.
(2013) Biosciences Biotechnology Research Asia

Screening of important autoinduction medium composition for high biomass production of E. coli expressing recombinant bromelain
Jamaluddin, M.J.A. , Amid, A. , Azmi, A.S.
(2014) Journal of Pure and Applied Microbiology

Comparison of different cell disruption methods and cell extractant buffers for recombinant bromelain expressed in E.COLI BL21-A1
Arshad, Z.I.M. , Amid, A. , Othman, M.E.F.
(2015) Jurnal Teknologi

2 Ho, C.W., Chew, T.K., Ling, T.C., Kamaruddin, S., Tan, W.S., Tey, B.T.
Efficient mechanical cell disruption of Escherichia coli by an ultrasonicator and recovery of intracellular hepatitis B core antigen

(2006) *Process Biochemistry*, 41 (8), pp. 1829-1834. Cited 49 times.
doi: 10.1016/j.procbio.2006.03.043

View at Publisher

3 Peternel, T., Komel, R.
Isolation of biologically active nanomaterial (inclusion bodies) from bacterial cells

(2010) *Microbial Cell Factories*, 9, art. no. 66. Cited 46 times.
http://www.microbialcellfactories.com/content/9/1/66
doi: 10.1186/1475-2859-9-66

View at Publisher

4 Amid, A., Ismail, N.A., Yusof, F., Salleh, H.M.
Expression, purification, and characterization of a recombinant stem bromelain from Ananas comosus

(2011) *Process Biochemistry*, 46 (12), pp. 2232-2239. Cited 27 times.
doi: 10.1016/j.procbio.2011.08.018

View at Publisher

5 Benov, L., Al-Ibraheem, J.
Disrupting Escherichia coli: A comparison of methods

(2002) *Journal of Biochemistry and Molecular Biology*, 35 (4), pp. 428-431. Cited 32 times.
http://www.jbmb.or.kr/jbmb/jbmb_files/[35-4]0207291633_403.pdf

View at Publisher

6 Feliu, J.X., Cubarsi, R., Villaverde, A.
Optimized release of recombinant proteins by ultrasonication of E. coli cells

(1998) *Biotechnology and Bioengineering*, 58 (5), pp. 536-540. Cited 82 times.
doi: 10.1002/(SICI)1097-0290(19980605)58:5<536::AID-BIT10>3.0.CO;2-9

View at Publisher

7 Rao Dasari, V.K., Are, D., Rao Joginapally, V., Mangamoori, L.N., Rao Adibhatla, K.S.B.
Optimization of the downstream process for high recovery of rhG-CSF from inclusion bodies expressed in Escherichia coli

(2008) *Process Biochemistry*, 43 (5), pp. 566-575. Cited 15 times.
doi: 10.1016/j.procbio.2008.01.024

View at Publisher

8 Valente, C.A., Monteiro, G.A., Cabral, J.M.S., Fevereiro, M., Prazeres, D.M.F.
Optimization of the primary recovery of human interferon α2b from Escherichia coli inclusion bodies

(2006) *Protein Expression and Purification*, 45 (1), pp. 226-234. Cited 18 times.
doi: 10.1016/j.pep.2005.06.014

View at Publisher

View all related documents based on references

Find more related documents in Scopus based on:

Authors > Keywords >

9 Muntari, B., Amid, A., Mel, M., Jami, M.S., Salleh, H.M.
Recombinant bromelain production in Escherichia coli: Process optimization in shake flask culture by response surface methodology

(2012) *AMB Express*, 2 (1), pp. 1-9. Cited 16 times.
doi: 10.1186/2191-0855-2-12

View at Publisher

10 Studier, F.W.
Protein production by auto-induction in high density shaking cultures.

(2005) *Protein expression and purification*, 41 (1), pp. 207-234. Cited 2491 times.

View at Publisher

11 Ketnawa, S., Chaiwut, P., Rawdkuen, S.
Extraction of bromelain from pineapple peels

(2011) *Food Science and Technology International*, 17 (4), pp. 395-402. Cited 14 times.
doi: 10.1177/1082013210387817

View at Publisher

12 Liu, D., Zeng, X.-A., Sun, D.-W., Han, Z.
Disruption and protein release by ultrasonication of yeast cells

(2013) *Innovative Food Science and Emerging Technologies*, 18, pp. 132-137. Cited 32 times.
doi: 10.1016/j.ifset.2013.02.006

View at Publisher

Amid, A.; Department of Biotechnology Engineering, Faculty of Engineering, International Islamic University Malaysia, Jalan Gombak, Malaysia; email:azuraamid@iium.edu.my

Back to results | 1 of 1 Top of page