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

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### Abstract

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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

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