Statistical Modeling for Permeabilization of a Novel Yeast Isolate for β-Galactosidase Activity Using Organic Solvents

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Abstract : The hydrolysis of lactose using β-galactosidase is one of the most promising biotechnological applications, which has wide range of potential applications in food processing industries. However, due to intracellular location of the yeast enzyme, and expensive extraction methods, the industrial applications of enzymatic hydrolysis processes are being hampered. The use of permeabilization technique can help to overcome the problems associated with enzyme extraction and purification of yeast cells and to develop the economically viable process for the utilization of whole cell biocatalysts in food industries. In the present investigation, standardization of permeabilization process of novel yeast isolate was carried out using a statistical model approach known as Response Surface Methodology (RSM) to achieve maximal b-galactosidase activity. The optimum operating conditions for permeabilization process for optimal β-galactosidase activity obtained by RSM were 1:1 ratio of toluene (25%, v/v) and ethanol (50%, v/v), 25.0 oC temperature and treatment time of 12 min, which displayed enzyme activity of 1.71 IU /mg DW.

Keywords : β-galactosidase, optimization, permeabilization, response surface methodology, yeast
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