

Critical physical parameters for optimum recombinant protein production in yeast systems

ABSTRACT

Yeasts become the most preferred expression system for the production of recombinant proteins which play an important role in the development of biopharmaceutical products, antibodies for disease treatment, and enzymes for the food industries. The ability to grow in simple media, and ease of genetic manipulation with the benefits of typical eukaryotic expression which include protein processing, folding, and posttranslational modifications, have pushed them as one of the emerging hosts for recombinant protein production. Furthermore, yeasts are additionally quicker, easy to use, and cost-effective with high yield production in comparison to higher expression hosts. The effective productivity of the recombinant proteins is also influenced by the external parameters. This paper reviews different optimization methods of the recombinant protein production for several factors such as pH, temperature, media, agitation rate, inducer, inoculum size and induction time using one factor at a time (OFAT), Response Surface Methodology (RSM) and Artificial Neural Network (ANN). This review highlights the current studies regarding the optimization of the recombinant proteins expressed in three different yeasts namely; *Saccharomyces cerevisiae*, *Komagataella phaffii*, and *Yarrowia lipolytica*. These are the critical parameters which can be used to optimize the recombinant protein in yeast systems. The purification methods used to purify the proteins are also discussed for each system.

Keyword: Yeast; Recombinant protein production; Optimization; Optimization methods; Physical factors