**ABSTRACT**

The recombinant protein production is an essential tool for many biotechnological applications including large-scale production of proteins, which are of therapeutic and industrial significance and also for the investigation of the structural and functional aspects of the proteins. The enteric bacterium, *Escherichia coli*, is the most popular prokaryotic expression system, known for its rapid and high yields of heterologous protein production. The major bottleneck in using this host system for recombinant protein production is the frequent formation of inclusion bodies, which are devoid of functionality. The chaperonins GroEL/ES assist in the folding of these recombinant proteins and hence improve their solubility and activity. The physiological expression of chaperonins in the host cells are quite low and hence the need arises to co-express the molecular chaperones concomitantly with the recombinant proteins.

The process variables such as temperature, inducer concentration, media components, presence of co-expressed chaperones and physiological stresses like osmotic and heat stress, are shown to affect the folding of recombinant proteins in the complex cellular environment. Hence, we have developed a bench-scale screening platform to enhance the yield of functional recombinant proteins.

The kinetic studies were carried out on the recombinant *E. coli* during the transient state continuous culture to understand the advantages the cells possess during GroEL/ES chaperone co-expression. It is found that the co-expression of GroEL/ES alleviates the stress produced in the recombinant cells during the overexpression of proteins. The cells expressing the chaperones GroEL/ES show enhancement in both the specific growth rate of the induced cells and the aconitase productivity.