The performance of a glass bead shaking technique for the disruption of Escherichia coli cells

ABSTRACT

The efficacy of a simple laboratory method for cell disruption based on the shaking of glass beads on a rotary shaker was assessed in this study, via measurements of the release of total protein and interferon-α2b from E.coli. The optimum conditions for cell disruption were detected after 30 min of shaking in Tris-HCl buffer (pH 8) at 300 rpm with 1.5g of glass beads (diameter: 0.5 mm) per mL of cell suspension volume. Three test runs were conducted under the above conditions and the maximum average protein release values were determined as 3.048, 3.564, and 3.015 mg/mL, respectively. The amount of protein release was comparable to the amount of protein release in ultrasonication and glass bead vortexing procedures. The amount of interferon-α2b release in the ultrasonication, glass bead vortexing, and glass bead shaking trials were 240, 172, and 201 ng/mL, respectively. This method was shown to process between 1 and 10 mL of sample volume in a 50 mL Falcon tube without a great deal of deviation, and was able to handle in excess of 60 samples simultaneously.

Keyword: Cell disruption; Downstream processing; E.coli; Glass beads; Shaker; Interferon-a2b.