

**Improved Folding of Recombinant Proteins via Co-expression of Archaeal Chaperones**

**The Challenge:** Protein production in bacteria, typically in *E. coli*, offers a number of advantages such as, ease of transformation, simple culture growth conditions and a wide range of inducible expression vectors that produce large amounts of proteins. While other expression systems are better suited for proteins requiring extensive post-translational modification, the bacterial synthesis of recombinant proteins remains a preferred mode of production for genetically engineered proteins. Despite many advantages of bacterial expression, protein insolubility remains a major bottleneck for recombinant protein production. Insolubility of recombinant proteins is likely a consequence of limited folding capacity in the bacterial host. The failure to fold properly leads to protein aggregation and formation of insoluble inclusion bodies. Therefore, it would be advantageous to develop a method that can improve the yield and recovery of correctly folded active recombinant proteins in bacteria.

**UMBI Solution:** Protein folding *in vivo* is promoted by the activity of chaperones. One way to increase the folding capacity of the bacterial hosts is to over-express *E. coli* chaperone proteins. UMBI scientists have utilized an alternative and more potent approach to expand the folding capacity of recombinant proteins produced in bacterial hosts, including *E.coli*. They have developed *E.coli* strains that over-express heterologous chaperone machinery from a variety of extremophiles species that have evolved under extreme conditions of temperature, pH, salinity and pressure. This method is extremely useful for stabilizing proteins that are predominantly insoluble under typical recombinant protein expression conditions.

**Commercial Application:** A novel protein expression system to produce large quantities of properly folded and stable recombinant proteins.

**Advantages:** Overcome stability limitations of typical prokaryotic system (*E. coli*)

**Stage of Development:** Reduced to practice

**Patent Status:** Pending provisional patent application

**Licensing Potential:** UMBI is seeking non-exclusive and exclusive licensees to all or part of this technology. The inventors would welcome the opportunity to work with any licensee to further refine or extend the capabilities of this invention.

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